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## **Editorial**

The journal “Man in Society” brought out by the PG Department of Anthropology, Utkal University aims to provide a platform for young scholars pursuing research in new areas in the human science. The present volume, continuing with the importance of anthropological tradition of empirical fieldwork, includes papers highlighting the importance and relevance of ethnographic data in social science research. All the papers included in this volume were selected from a workshop on Scientific Research Paper Writing conducted by our Department and have pass through an intensive, interactive hands-on-training by resource persons specialized for this purpose as well as a peer review process.

The first paper by Sahoo and Upali is a discussion of how to design culture-specific consumer products based on analyzing a set of consumer culture theoretical paradigms related to product design in the relevant literatures and also sketches a historical review of consumption, culture and society. The next paper by Panda, et. al. highlights the intrusion of culture and its crucial role in the designing of Human Resource Information System (HRIS) in organizations. Since both organizational and societal culture influences managerial processes either directly or indirectly, culture becomes an important factor in HRIS's contribution to the efficiency and effectiveness of organizations.

The next paper by Mohapatra, et. al. deals with blood groups which is a causative factor in human evolution, and calculates ABO and Rh frequency distribution and gene frequency among a sample of 187 Bhumijas of Gopinathpur village of Nilagiri block of Balasore district. The following paper by Baral, et. al explores the factors associated with maternal and child health-care services of a sample of 50 females, both tribals and non-tribals of Turunji village of Nandahandi block of Nabarangpur district. The paper also discusses various factors such as age at menarche, age at first conception, food preferences and taboo during and after delivery, type and place of delivery, immunization and vaccinations of mother and child which are associated with the utilization of maternal and child health care services.

Mohanty, et. al paper highlights the association of alcohol consumption with perceived stress among Munda and Pano communities of Sukinda block of Jajpur district of Odisha showing that in their sample of 170 individuals, the respondents dependant on alcohol scored high on stress. Puja, et. al paper evaluates the age, menopausal symptoms and its problems among a sample of 45 post menopausal participants of 4 ethnic groups and reveals that psychosomatic symptoms are more prevalent than Vasomotor complaints as well as no significant difference of menopausal age in both caste and tribal participants.

Bindhani's paper throws light on the knowledge, attitude and awareness of Sickle-cell disease (SCD) among a sample of a selected population from 9 villages in Koraput district and measures how stigmatization affects the health related quality of life (HRQL). The following paper by Krishna Kumar and Upali discusses the urban spacio-temporal transformation of the city of Bhubaneswar in the light of the global transformation of urban areas. As the capital of Odisha, this city has evolved from a small temple town, as an administrative city, to its selection as a smart city in 2016.

The next paper by Badamali, et. al. discusses the growth pattern of Height and Body Weight of children childhood and adolescence of the children of three rural population – Amanatya, Saora and Bhotra of Turunji village of Nandahandi block of Nabarangpur district of Odisha. The paper highlights the fact that though children upto 9 years of age exhibit consistency in terms of height and weight as compared with national averages, they lag behind during their adolescence stage. Another paper by Sahoo, et.al among the same groups and same area studies the prevalence of under nutrition in a sample of 200 adult individuals using an internationally accepted BMI guidelines to calculate the Chronic Energy Deficiency (CED) among two groups as well as gender differences among all three groups.

Sarangi's paper discusses the role of forest and its proximity in coping with livelihoods and food security of forest dependant tribal communities by using HFIAS, a scaling technique assessing household food security based on 3 level of proximity- High, Moderate and Low. The last paper by Sahoo and Upali discusses anthropology of disaster in the context of a worldwide increasing of vulnerability to environmental hazards. The main emphasis of the paper is on how the decision-making of societies at risk is embedded in culture and hence intervention measures should acknowledge cultural settings to reduce disaster risk and vulnerability.

I hope, the contributions in this volume will be helpful for researchers as well as practitioners of anthropology and other social sciences today.

**Upali Aparajita**  
Editor in Chief

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## Consumer Culture Affects Product Design: A Discussion

Manas Ranjan Sahoo<sup>1</sup>

Upali Aparajita<sup>2</sup>

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### **Abstract**

*Although history has witnessed that consumers are always a part of the production process, in recent years, they are more focussed particularly when consumer researchers study them globally. This paper traces how the consumer behaviour has become a very important factor in the production process of various products and how the designing of these consumer products are culture-specific. The analytical discussion is made based on a set of consumer-culture theoretical paradigms related to product design in the relevant literatures for finding out the scope for further research in this area. The analysis of consumer culture and product design papers shows that most of these were found applying survey research methods to collect both primary and secondary data and rarely ethnographic methods was employed for data collection. It is also found that the studies were based on the product as a whole while linking it with consumer culture but research to analyze the cultural linkages with different features of the single product is yet to begin. In addition to this the studies are mainly focused for the successful marketable product designs but were not sustainable designs.*

**Key Words:** Culture, Consumer Behaviour, Product Design.

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### **1. Introduction**

Given the accelerated pace and increased scope of world trade, it is now more normal for goods to cross borders than ever before. As a result, the various products are now not necessarily consumed by the people from the same culture where the products are being produced; rather people from the outside cultures are consuming more. Further due to technological innovations and market split, the difference between the producer culture and consumer culture has more manifested leading researchers to study the consumers' and their behaviour. In this context, consumer behaviour can be defined as the study of individuals, groups, or organizations and the processes they use to select, secure, and dispose of products, services, experiences, or ideas to satisfy needs; and the impacts that these processes have on the consumer and society.

A review of consumer researches entailing studies on consumer behaviour are subsumed under

“Consumer Culture Theory”. Consumer culture is defined “as a social arrangement in which the relations between the lived cultural experience of everyday life and social resources, between meaningful valued ways of life and the symbolic and material resources on which they depend, is mediated through markets”. This includes a system of consumption or a set of behaviours found in all times and places, being dominated by the consumption of commercial products. It is also a system in which the transmission of existing cultural values, norms and customary ways of doing things from generation to generation “is largely understood to be carried out through the exercise of free personal choice in the private sphere of everyday life” (Arnould, 2010). Furthermore, consumer culture is also bound up with the idea of modernity, that is, a world “no longer governed by tradition but rather by flux,” and in which “social actors who are deemed to be individually free and rational” holds sway (Slater 2000,). And finally, “consumer culture denote an economy in which value has been

divorced from the material satisfaction of wants and the sign value of goods takes precedence” (Baudrillard, 1968). The present paper focuses on three important research questions which serve as guidelines while reviewing the relevant research papers on consumer culture and product design :

- How consumption has boomed and shaped towards consumer culture in recent years and what changes are happening in society due to this mass consumerism?
- What are the main findings and methodologies followed in the literatures?
- What more can be included for further research?

With the above introductory background, the following sections discuss the paper in detail. The second section discusses the interplay between consumption and society and gives a brief historical account of modern consumption. The societal changes because of modern consumption patterns from the 16<sup>th</sup> century to the 21<sup>st</sup> century are also highlighted in this section. The third section notes the different theoretical paradigms relating to consumer culture and product designs. The influence of culture on different product is categorically highlighted with reference to the reviewed literatures. The paper concludes with an analysis of the major theoretical paradigms and their shortcomings which are discussed to find out the scope for further research in the area of product design with reference to consumer culture.

## 2. Consumption, Culture and society

Culture is the ideas and activities with which man construe and construct his world and consumption includes the process by which consumer goods and services are created, brought and used. Culture and consumption have an unprecedented relationship in the modern world (McCracken, 1988), a relationship that is so mutually intense. In recent years, the changing research trend shows that consumption is basically a cultural phenomenon. It is shaped, driven, and constructed at every point by cultural considerations. The system of design and production that creates consumer goods is an entirely cultural enterprise. The consumer goods on which the consumers devote time, attention and income are charged with cultural meaning. They use

the meaning of consumer goods to express cultural categories and principles, cultivate ideas, create and sustain life style, construct notions of the self and create (and survive) social change. Without consumer goods, modern developed societies would lose key instruments for the reproduction, representation and manipulation of their culture. The world of design, product development, advertising, and fashion that create these goods are themselves important props of the cultural universe. The meaning of consumer goods and the meaning creation accomplished by consumer processes are important parts of the scaffolding of present realities.

Modern consumption was the cause and consequence of so many social changes that its emergence marked the great transformation of the Western world and is rivalled only by the Neolithic revolution for the thoroughness with which it changed society. Following the lead of Braudel and McKendrick, it has now been historically recognized that the 'great transformation' of the West included not just an 'industrial revolution' but also a 'consumer revolution'. Consumer revolution represented not just a change in tastes, preferences and buying habits, but a fundamental shift in the culture of the early world. Infact, modern consumption is a historical artefact. Thus, the consumer revolution is a piece of a larger social transformation to which a large amount of social, scientific and historical inquiry has been devoted by all social scientist who addressed themselves to 'the great transformation' of Polanyi (1957).

In the last quarter of the sixteenth century, a spectacular consumer boom occurred. The noblemen of Elizabethan England began to spend with a new enthusiasm on a new scale. In the process they dramatically transformed their world of goods and the nature of western consumption. They rebuilt their country seats according to a new and greater standard, and they began to assume the additional expense of a London residence. They changed their patterns of hospitality as well, vastly inflating its ceremonial character and costs. The second factor responsible for the consumer boom of the sixteenth century was the social competition that took place among the Elizabethan nobility. Developments in consumption have a way of creating circumstances which give rise to still further developments in



consumption (Mc Cracken, 1988). The Elizabethan family as a unit of consumption was devoted to establishing and maintaining 'the cult of family status' which had preoccupied English families from the medieval period onwards (Thrupp, 1974). Family status rose and fell as a result of the efforts of each generation to increase the standing and honour of the lineage (Stone, 1965, James, 1974). This was a reciprocal process insofar as the success of one generation was seen reciprocate the efforts of past generation and to indebt future ones (Marston, 1973, McCracken, 1983). Family consumption was a collective matter undertaken by a corporation that spanned the generations. One generation brought goods that would represent and augment the honour of previous generations even as these goods established the foundation for the honour-seeking efforts of the next. Purchases were made by the living, but the consumption unit included the dead and the unborn.

The eighteenth century saw a consumer explosion as the world of goods expanded dramatically to include new opportunities in the frequency with which goods were bought, its influences on the consumer, the numbers of people engaged as active consumers and the tastes, preferences, social projects and cultural co-ordinates according to which consumption took place. McKendrik (1982) claims that the eighteenth century sees the "birth" of a consumer society and the beginning of the modern consumer culture. Following Simmel (1904) trickle-down concept and Veblen (1912) conspicuous consumption, McKendrik (1982) suggested that social competition was the motive force of this revolution. Furthermore, the explosive growth of markets in time and space is an innovation which included consumer choices and the participation rate. Earlier, the subordinate classes who could only watch in fascination nobility cultivating new tastes in their consumption, could now become participants in this consumption. In general terms, the implications this profusion was that consumption was taking place more often, in more places, under new influences, by new groups, in pursuit of new goods, for new social and cultural needs. Infact, consumption now became a major activity.

McKendrik's study of the eighteenth century gives sufficient evidence of the new use and sophistication

of other marketing devices such as fashion magazines and plates etc.. Further, it was also clear that the eighteenth century consumer had access to a new volume of influence and information. The consumer was the object of a more sophisticated attempt to awaken his wants and to direct his preferences. Living in an artificially stimulated climate the consumer removed his/her tastes and preferences from the hold of convention and local tradition, and put them increasingly in the hands of the emerging forces of marketplace. With the growth of fashion, an entirely new habit of mind and pattern of behaviour was cultivated by the consumers wherein aesthetic and stylistic considerations took precedence over utilitarian ones.

It appears, then, that in the eighteenth century goods began to carry a new kind of status meaning. This gave a very different implication for the status system and the organization of society and the kind of role information carried by goods in the present days probably began to emerge in this period (Solomon, 1983). Belk (1984) has suggested that growing role differentiation and anonymity in western society has encouraged the use of goods as an expression of and guide to social identity. Thus, the cultural meaning of goods was increasingly a way an anonymous society could maintain its centre. The consumers were surrounded by meaning-laden objects that could only be read by those who possessed a knowledge of the object-code. In other words, more social behaviour was becoming consumption, and more of the individual was subsumed in the role of the consumer. Besides as Mauss (1985) and subsequent anthropologists (Carrithers, Collins and Lukes, 1985) have pointed out the consumer varies from culture to culture. The consumer in the Western cultures as argued by Campbell (1983) led to a new pattern of consumption which were both cause and consequences of Romantic definition of the self. Both the Romantic instance on the uniqueness and autonomy of the self, and its insistence on the realization of the self through experience and creativity, drew from and drove the consumer revolution. Increasingly individuals were prepared to suppose that 'the self is built through consumption and that the consumption express the self'. This connection between consumption and individualism is one of the great cultural fusion of the modern world. Another cultural development is the

development of new attitudes and outlook among the consumers. Consumer revolution required the inculcation of a willingness to consumers (O' Neill, 1978; Leach, 1984).

Fundamental changes were also taking place in the cultural definition of space and time. Space and time were being reconfigured to accommodate consumption and to make it a centrepiece of social and personal activities. Thompson (1967) has examined the reconfiguration of time for the purpose of a new industrial order. The reconfiguration of space was better studied by Braudel (1973) who argues that privacy was an eighteenth century innovation and the way this idea played out in the new building form and home furnishing. The consumer good also continued in its transformation from an object with 'patina' to an object that was fashionable. Fashion became the uppermost design consideration for most of the consumer goods of the eighteenth century.

With this shift in the symbolic properties of consumer goods, these goods came to assume a different gate-keeping significance by concealing the status origins of consumers and encouraged social mobility. Along with the explosive growth of consumption in space and time, there was also an explosion of choices by participating subordinate groups, new kinds of advertising, a new intensity to the control of fashion over consumer goods, an increase in obsolescence and an overall increase of sophisticated marketing techniques. The consequences of these development led to producers exploiting a social dynamics and harnessing the power of social competition and market manipulation. Increasingly amounts of time and attention devoted to the process of consumption, more information was required for its successful execution, and more of the individual's world being occupied by message carrying objects. New concepts of the person were driving, and driven by, new consumer pattern. Consumption was beginning to take place more often, in more places, under new influences, by new groups, in pursuit of new goods for new social and cultural purpose. The 'world of goods' was steadily making itself co-extensive with the world of social life.

By the nineteenth century, consumption and society were inextricably linked in a continual process of change. Some of the changes of this period are

essential for understanding the modern character of consumption and include the emergence of the department store, which contributed fundamentally to the nature and context of purchase activity as well as the nature of information and influence to which the consumer was subjected. It also saw the emergence of new 'consumer lifestyles' and their unique patterns of interaction between persons and things. New marketing techniques such as the employment of new aesthetic, cultural and sexual motifs were devised to add value to products and social meanings being loaded into goods through new and more sophisticated devices for meaning transfer. Social changes created new and more pressing communicational needs than the language of goods could claim to answer. The important change in this period was that the production of certain goods moved out of the private realm of nobel households into the public marketplace. In the 1790s, Chefs moved from aristocratic hotels to public restaurants while dressmakers and tailors who had once served nobel patrons now opened public shops. Increasingly it was public consumption rather than private consumption that directed the work of the producers of luxury goods (Williams, 1984). The style of democratic consumption attempted to draw the mass consumer away from one's preoccupation with goods by creating a manner of consumption that encouraged a simplicity of lifestyle and the dignity of the common man.

Williams (1982) suggests that the symbolic purpose of this new aesthetic was a crude one. It was simply to bring together anything that expresses distance from the ordinary. But it is also possible to say that in this period the use of goods to communicate much more coherent and purposeful messages. The language of goods was being used here very deliberately and skilfully to undertake a piece of social invention: the creation of a new order of social life. Another important development during this period was the emergence of the department store wherein the marketplace has changed. It was now devoted to the "arousal of free-floating desire instead of immediate purchase. Besides, prices were fixed and the consumer either purchased or did not the goods. Infact, this new pattern of interaction encouraged a passivity on the part of the consumer. Borrowing was made possible by the system of instalment purchase which gave consumption a

dream-like quality when the unobtainable was within the grasp of the consumer". Miller (1981) similarly examines the contribution of the department store to changing tastes and preferences, purchase behaviour, marketplace and a changing relationship between buyer and seller.

Thus, the nineteenth century saw the creation of a permanent interaction between consumption and social change. Consumption now bred constant social change. This social change bred constant reforms in consumption. This dialectical relationship created a 'great transformation' which led to the manipulation of the cultural and symbolic properties of goods. With the growth of social disorganization and indeterminacy, due in some part of the consumer revolution itself, it was now necessary for everyone to resort to use of the expressive and culturally constitutive powers. The use of the cultural inventory and instrument was no longer a discretionary opportunity but an increasingly urgent necessity.

By the beginning of twenty-first century, consumption and the consumer behaviour became the part of full time academic research. Consumer research also successfully produced a flurry of research addressing the socio-cultural, experiential, symbolic, and ideological aspects of consumption. Finally, the concept 'Consumer Culture Theory' developed which refers to a family of theoretical perspectives that address the dynamic relationships between consumer actions, the marketplace, and cultural meanings (Arnould and Thompson, 2005). While representing a plurality of distinct theoretical approaches and research goals, CCT researchers nonetheless share a common theoretical orientation toward the study of cultural complexity that programmatically links their respective research efforts. Rather than viewing culture as a fairly homogenous system of collectively shared meanings, ways of life, and unifying values shared by a member of society (e.g., Americans share this kind of culture; Japanese share that kind of culture), CCT explores the heterogeneous distribution of meanings and the multiplicity of overlapping cultural groupings that exist within the broader socio-historic frame of globalization and market capitalism. The consumption of market-made commodities and desire-inducing marketing symbols is central to consumer culture, and yet the

perpetuation and reproduction of this system is largely dependent upon the exercise of free personal choice in the private sphere of everyday life (Holt 2002). The term "consumer culture" also conceptualizes an interconnected system of commercially produced images, texts, and objects that groups use—through the construction of overlapping and even conflicting practices, identities, and meanings—to make collective sense of their environments and to orient their members' experiences and lives (Kozinets 2001).

### **3. Culture-specific Designs of Consumer Products**

Culture permits man to transcend sensitive experiences by manifesting its interpretation in science and symbols for converting the world appropriated used and sementized. Cultural identity is the symbolic concretion of culture and a set of science and symbols created, adopted and redesigned by each human group that permit its identification and projection towards inner and outer species. Objects are cultural products. The way a cultural identity appropriates a give object depends on collective imagery. Products influence culture through the creation of new imageries, and at the same time, respond to the identity, being an expression of culture. Culture embraces complex ways of living, value systems, traditions, beliefs and habits, including knowledge, morals, law and customs acquired by those within that society. These provide for a set of cultural objects which symbolize a shared schematic experience, and which we recognize as having cultural value. In this sense, culture is distinctive and distinguishable and is celebrated by the quality and of its sophistication, belief and level of enlightenment. It is nutrient rich and diverse in its concentration of medium. Thus culture is a creator of objects and objects are cultural identity shapers. The central theme of cultural interactionism coined by Blumer (1969) states that human life is lived in the symbolic domain. Symbols are culturally derived social objects having shared meanings that are created and maintained in social interactions. Through language and communication symbols provides the means by which reality is constructed. Reality is primarily a social product and all that is humanly consequential-self, mind, society, culture- emerges from and is depended on symbolic interaction for its existence. Even the physical

environment is relevant to human conduct as it is mainly interpreted through symbolic system. Thus Blumer proposes symbolic interaction is a communicative process involving five elements: the self, the act, social interaction, objects and joint action. These are interrelated to constitute a system that explains the idea of culture as constructed, learned, interpreted and transmitted among the group of people where meanings are given or shared in supporting social interactions.

A cultural insight has become essential for improving designs and product sales in both regional and global markets. Early links between culture and design became apparent in the domain of social anthropology where civilization was evaluated through the evolution of objects and it was traced through cultural characteristics left on those objects. Culture generates diversity revealed in all human actions including the products which people design. Design is seen both as a mirror and an agent of change. It also changes culture and at the same time is shaped it (Rose, 2004). As an example it is argued that cultural belief and social practices create and reinforce frames of meaning which determine ways of relating to a product. These cultural framings affect ways in which people use or do not use a particular product. It is culture that gives the product its meaning and provides the rituals within which artefacts are used and the values that are often reflected in their form and function (Press and Copper, 2003).

Design is embedded in the users' culture who are not just physical and biological beings but socio-cultural beings. Baxter (1999) argues that designers are not yet been able to consciously encode cultural phenomena to the same extent as physical and cognitive human factors due to inadequate research in this area. However, each culture has evolved its own answer to its problems (Hofstede et al., 2001). The use of society's cultural factors in design not only makes technologies more appropriate for their social context, but also makes better use of culture itself as a resource for innovation. Since design is an important medium of communication, it expresses the values of the system within which it functions. The users are not only competent members within their own cultures but are also interpreters of other cultures. The designers interpret and transform the users' needs and wants into products features that

will give them narratives as well as benefits. Popovic (2002) observes the following criteria which assists the designers to effect this transformation: (a) the interface and human interaction should support the user culture, (b) the artefact form or shape should correspond to the culture and life cycle which conforms to the appropriate aesthetics; (c) the artefact form and shape should convey humour or joy of that particular cultural set up; (d) appropriate colours should be used to evoke desirable feelings within the same cultural context; and (e) flexibility and adaptability of interaction should be related to culture. Cultural oriented products can be used for marking boundaries between groups, for creating and demarcating differences and communality between people (Fetherstone, 1995).

Globalization has ignited a new awareness within design which promotes local identity and highlights cultural values and traditions. Hence the challenge before the designer is to foster cultural diversity through localization of the products. In fact, individual users are no longer willing to settle for one-size-fits-all products with standardized design (Delaney, et al., 2002). Rather factors like a wide range of sizes, shapes, colours, materials and features have become necessary for designing successful products. Thus designers have to balance core shared values with local empowerment to best satisfy individual wants and needs.

The importance of product design has been addressed in research, arguing that product form has a major role in product approach and avoidance behaviour in consumers (Bloch, 1995). Product design has also been understood to be part of marketing communication in which consumers can be persuaded to buy products through emotion eliciting product design (Seva, et al., 2007). Furthermore, symbolic- aesthetic interaction in a product plays greater role towards difference in consumers responses. The role played by a product's physical elements such as geometry, dimensions, textures and other aspects of a product, influence what symbolic meaning a consumer infers from its design (Crilly, et al., 2004).

The visual appearance of products is a critical determinant of consumer response and product success (Bloch, 1995). Judgements are often made on the elegance (Coates, 2003), functionality (Mono, 1997) and social significance (Dittmar,



1992) of products based largely on visual information. These judgements relate to the perceived attributes of products rather than their needs (Lewalski, 1988)). Users requirements of designed products have frequently been compared to Maslow's (1987) hierarchy of needs. This suggests that once issues of utility, safety and comfort have been satisfied, emphasis may shift towards the decorative, emotional and symbolic attributes of design. Thus depending on motivation and context, a product's perceived attributed may be of greater importance than its tangible properties. This is because appearances are important, and consumers do not just buy a product, they buy value in the form of entertainment, experience and identity.

Although visual information frequently dominated both culture and environment, it is accepted that the full range of human senses influence response to design. It is important that a product's appearance is congruent with other sensory aspects of design, as the product form that the eye sees creates in the observer expectation of what the other senses will perceive. Cognitive response refers to the judgements that the user or consumer makes about the product based on the information perceived by the senses. These judgements include evaluation of the products' perceived qualities. However, the three factors, aesthetic impression, semantic interpretation and symbolic association are important to describe cognitive response to product appearance (Lewalski, 1988; Crozier, 1994; Baxter, 1995; Cupchik, 1999). Aesthetic impression may be defined as the sensation that results from the perception of attractiveness in products. Semantic interpretation may be defined as what a product is seen to say about its function, mode-of-use and qualities. Symbolic association may be defined as the perception of what a product says about its owner or user: the personal and social significance attached to the design (Lewalski, 1988; Crozier, 1994; Baxter, 1995; Cupchik, 1999; Norman, 2004).

In addition to their apparent decorative and practical qualities almost all products are seen to hold some socially determined symbolic meaning (Levy, 1959; Mayall, 1979; Doyle, 1999). As such, products may evoke thoughts, feelings and associations which links to the commodity, or assumes that others must be associated with it (Haug, 1986). This culturally agreed meaning of objects allow persons to

communicate their identity through products, it allows them to project a desirable image to others, to express social status and to make visible their personal characteristics. Thus products contribute to the expressive equipment with which people present themselves (Goffman, 1990). The semantic interpretation relates to what the product is seen to indicate about itself, whereas symbolic association is determined by what the product is seen to symbolise about its user, or the socio-cultural context of use. As such, the social value assigned to products determines the symbolic associations that are made.

Products are used by people to communicate their identity not only to others but also to themselves (Dittmar, 1992). The objects consumed both reflect and contribute who are the consumers. The possessions may impose their identities and as such consumers regard possessions as parts of themselves. In addition to this distinction between an inward and outward expression of identity, Dittmar divides the symbolic qualities associated with products into self expressive and categorical meaning. The self expressive symbolism associated with products allows the expression of unique aspects of one's personality. This includes individual qualities, values and attributes (Dittmar, 1992). These self expressive meanings serve to differentiate the consumer from those that surround them. As such products are used to reflect the owner's distinction from others. They represent a means of defining one's self as unique and may symbolise the person's unique identity (Snyder, 1980). The categorical symbolism associated with products allows the expression of group membership, including social position and status (Dittmar, 1992). These categorical meanings serve to integrate the consumer with those that surround them (Csikszentmihalyi and Rochberg-Halton, 1981).

Indeed, one of the principal approaches to expressing membership of a social group is through shared consumption symbols (Belk, 1988). The symbolic meanings attached to products are culturally defined (Dittmar, 1992). Therefore, the extent to which a product is seen to reflect or support identity will be determined by the cultural context within which the product is consumed. The meaning attached to products are often determined by factors

external to the product's appearance (Haug, 1986). Historical precedents, social conventions and marketing programmes all influence the perceived symbolism of products (Forty, 1986). However, it is the designer's job to decode the common values and opinions that exist in the culture, and reproduce them into forms that embody the appropriate symbolic meaning (Opperud, 2002). Thus, the meaning of designs should be considered from the beginning of the design process. Here, image boards may be of use in capturing and communicating the lifestyle, moods, and themes that are of interest (Baxter, 1995; Julier, 2000). The materials used in products are one aspect of visual form that may be associated with specific qualities (Ashby and Johnson, 2002).

Lazarus (1991) described that people evaluate a situation on goal relevance, goal congruence and on ego involvement. When evaluating a product, the situation is an object. This means that people evaluate the product, the object, on being significant for achieving goals they find important. Norman (2004) defines this as the reflective level of design which means that the product is evaluated in terms of goals and values. When being confronted with the appearance of a product only the evaluation must be performed with use of the design, including colour, form, material, etc. In this evaluation, an important information source is also the symbolic meaning. Besides, communicating brand identities, a product can also communicate characteristics of the product itself. Janlert and Stolterman (1997) argue that people have the tendency to think and talk about objects as having a character. People do not only use personality characteristics to describe and discriminate between people, but also use these characteristics for describing and discriminating product. Govers (2004) introduces the concept of product personality characteristics that people use to describe a specific product variant and to discriminate it from others. He shows that products that differentiate in product appearance (colour, form, proportion, material, etc.) differentiate in containing personality characteristics and assimilate this in the design.

Janlert and Stolterman (1997) address that within the field of product semantics, different approaches built on the assumption that certain shapes, patterns and symbols create certain emotions and

associations in the beholder. This product experience is influenced by conventions that people hold which are learned by interacting with others and the environment within a specific culture. Certain signs can create different associations in different cultures. Van Rompay, et, al. (2005) argue that product expressions are involved with image reactions with the environment. An example is the containment schema, which refers to the ways containers that are designs with high degrees of closure will evoke feelings of security and constriction. However, the degree of congruence between the symbolic meaning of product design and commitments possesses by consumer can be seen as an indicator for predicting product emotions.

#### 4. Conclusion and scope for Further Research

It is now clear that the consumerism was started mainly from the sixteenth century western centuries, particularly among the Royalty and nobel families who spent more and more conspicuously for their own immediate purposes. Gradually it became a source of competition and a showcase of power and prestige. During the eighteenth century it became more wide-spread covering all over the world and became a part of social life. The participation rate was high as consumption became a mass activity. The number of consumer goods steadily rose and the transforming power of fashion now touched more product categories. Fashion also destroyed the 'Patina system' which served as a status gatekeeper. By nineteenth century, consumer revolution has installed itself as a permanent social fact and became a structural reality. It found an institutional locus, the department store which changed the nature of aesthetics by which goods were marketed. It created meanings that goods carried and became agents of diffusion of the new roles of the consumers. Thus, by the twentieth century, consumerism became a mirror and agent of social identity and consequently, in twenty first century it became a full-fledged academic discipline as well as an emerging area of research.

Over the years, the thematic review of consumer research has dealt with the socio-cultural, experiential, symbolic and ideological aspects of consumption. The focus of these conceptual orientations and theoretical agendas are categorized in the Table-1, which are derived out of the different paradigms defined in previous section.

Table I: Theoretical paradigms relating to Consumer culture and product design

<i>Theoretical Paradigms</i>	<i>Evaluated Product as a whole</i>	<i>Evaluated Product with its different features</i>	<i>Historical account of the product</i>	<i>Tested with different product categories</i>	<i>Culture is observed on local level</i>	<i>Included producer culture</i>
Cultural identity	Yes	No	No	No	No	No
Product	Yes	No	No	Yes	Yes	No
Symbolism						
Design as a mirror and agent of change	Yes	No	No	No	No	No
Physical and cognitive human factors	Yes	No	No	Yes	No	No
Technology appropriates with social context	Yes	No	No	No	No	Yes
Users' needs and wants	Yes	No	No	Yes	No	No
Product semantics: Form, shape and colour	Yes	Yes	No	Yes	No	No
Cultural values and traditions	Yes	No	No	No	No	No
Localization of the product	Yes	No	No	No	Yes	No
Product personality	Yes	No	No	No	No	No
Product use and environment	Yes	Yes	No	No	No	No
Reflective level of design	Yes	No	No	Yes	No	No

Table 1 reflects that there is no such historical account of any particular product with its societal utilization and the changes made through time and space. The consumer culture is studied for every product in same manner and there is no difference in perspective to study consumer behaviour according to various product categories e.g. societal product, luxury product, festive product, etc. Infact, the various product categories are important because different products have different cultural implications. Furthermore, most of the consumer culture studies are based on the marketing perspective whereas there are very less studies from the product designing perspective particularly for

sustainable product designing. In addition, cultures are usually studied at the national level and hence products have been designed devoid of local influences. Hofstede's (2001) cultural dimensions were used dominantly which is generally organizational research used in.

The current research about culture-oriented product design is still underdeveloped. While studying the consumer culture from the design perspective, producer or the producer culture is also a major stakeholder for design process. This producer part is totally lacking in consumer studies. Literature does not suggest or present holistic solutions for a culture-oriented product design process. Similarly the

research methods used for consumer studies are mainly consumers on large scales and their group behaviours on a macro-level. Research methods are not developed for a through understanding of users from different cultures. Recently the consumption time and space are also changing due to modern market pattern and online consumption. So consumer ethnography may be a solution to study consumer culture and the product design. This can also provide new opportunities for companies, small and medium enterprises and local producers of developed as well as developing countries and consequently there will be value addition and motivation for academic network for further research as well. The future studies on consumer culture can focus on design process and models both for successful and sustainable product design as the final results rather than only general marketing suggestions. These results may need more examples and empirical research both in local and global industries.

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## Anthropology of Disaster Mitigation and Management

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### Abstract

*At a time of increasing global warming and climate change, increasing worldwide vulnerability to hazards, like floods, cyclones, droughts, earthquakes and so on, the study of disasters has become an important focus for anthropological research to address the multi-dimensionality of the effects to a community's social structures and its relation to the environment. This has resulted in a new field of growing importance known as anthropology of disaster, within ecological or environmental anthropology. Anthropology of disaster examines contemporary contributions and investigations, following the life-cycle of a disaster event, from pre-disaster vulnerability, and the conceptions of risks, to individual and social responses, coping strategies, and relief management. Its main emphasis is to study how the decision-making of societies at risk is embedded in culture, and how intervention measures acknowledge or neglect cultural settings. Understanding these cultural systems would help us to understand both the contributing causes to disasters as well as the collective responses to them. It concludes by providing recommendations and actions to be taken - for reducing the disaster risk and vulnerability - as well as for future research.*

**Key words:** Anthropology, Culture, Disaster, Climate Change, Hazards, Risks, Vulnerability, Management.

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### 1. Introduction

With its holistic and comparative approach along with the unique method of ethnography, anthropology has widely called the attention in the world of academics as to how risks and disasters both influence and are products of human systems, rather than representing simply isolated, spontaneous, or unpredictable events. There is an especial concern with how cultural systems (the beliefs, behaviors, and institutions characteristic of a particular society or group) figure at the center of society's disaster vulnerability, preparedness, mobilization, and prevention. As a result of the better acquaintance with these local communities the causes of the disasters will be acknowledged. In other words, anthropology of disaster studies how the decision-making of societies at risk is embedded in culture, and how intervention measures acknowledge, or neglect, cultural settings. The

social construction of risk is being given increasing priority to understand how people experience and prioritize managing hazards in their own lives and how vulnerability can be reduced, and resilience increased, at a local level.

### 2. Evolution of The Anthropology of Disaster

Anthropologists have studied disasters since their post-war emergence as research field, but only quite recently have disasters actually become a focus for anthropological research. After World War II, research on human behavior during bombardment evolved into the social scientific study of natural and technological disasters and anthropologists were the earlier contributors. Only one anthropologist Anthony F. C. Wallace actually carried out research in which the primary focus was the human structuring of the disaster experience (Oliver-Smith and Hoffman, 2002). With a reemergence of interest in socio-cultural change,

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multi-lineal evolution and cultural ecology in the 1960's, and the interest in the political ecology and discourse analysis in the 1980's, the issue of disaster has become increasingly salient to the concerns of anthropologists. They are learning that they have an important contribution to make to the study of disasters and that disasters, in turn, have great expository relevance to the inquiries of their field. The alarming increase in disasters and their aftermaths have clearly demonstrated how much light catastrophes can shed on the content of an anthropological purview (Oliver-Smith and Hoffman, 2002).

Oliver-Smith (1996) in his paper "*Anthropological Research on Hazards and Disasters*" holds that there has been a general failure to consider the interaction of the social, technological and natural processes that produce hazards and disasters in accounts of human environmental adaptations. The paper ends with a discussion of potentials in hazard and disaster research for theory building in anthropology, particularly in issues of human-environment relations and socio-cultural change.

In their edited text "*The Angry Earth: Disasters in Anthropological Perspective*" (1999), Oliver-Smith and Hoffman highlight the problem of disaster research in anthropology including the very definition of what constitutes a disaster. From an anthropological perspective, they categorically hold that "disasters occur in societies and not in nature", stating clearly the intimate linkage between the causal factors of disasters and the societal-environmental relations. Taking a political ecological approach, Oliver-Smith and Hoffman view that the conjunction of a human population and a potentially destructive agent does not inevitably produce a disaster; rather the society's vulnerability – its adaptive failure – is an essential element of a disaster. Consequently, a disaster is made inevitable by a historically produced pattern of vulnerability, evidenced in the location, infrastructure, socio-political structure, production patterns, and ideology that characterizes a society.

Another edited volume by the same authors named "*Catastrophe and Culture: The Anthropology of Disaster*" (2002) is the most pioneering work till date in the field of disaster anthropology. In the very first line of the introduction, they state that 'disasters are not bolts from the blue' 'but take place through

the conjunction of two factors: a human population and a potentially destructive agent that is a part of the total ecological system, including all natural, modified and constructed features'. Thus the crux of their argument is that it's through the "conditioned" conjunction of a community and hazard that a disaster takes place.

The paper "*Impact of Culture towards Disaster Risk Reduction*" (Kalatunga, 2006) highlights that in some situations culture is a factor for the survival of the communities from disasters, whereas in other situations, culture act as a barrier for effective Disaster Risk Reduction (DRR) activities. Kalatunga suggests that community-based disaster risk reduction activities as a mechanism to integrate disaster with culture for effectively managing disaster risks and holds that anthropologists can greatly contribute in such an endeavour. Scott's (2007), concept paper "*Importance of Cultural Competency in Disaster Management*" holds that 'disaster professionals do not have to be students of sociology or anthropology in order to understand and appreciate cultural differences and better relate to the varied neighborhoods within which they work'. He is of the opinion that since culture itself is the 'common sense or the shared understanding', the natives react to any particular natural hazards on the basis of this and that outside experts or professionals should become familiar with common sense disaster coping indigenous knowledge system of the communities.

"*Introduction to Disaster Risk Reduction*" by USAID (2011) is a comprehensive document on the DRR perspective because it defines all the relevant conceptual clarifications like disaster, risk, coping ability, resilience, vulnerability, disaster risk reduction and disaster risk management and so on. It throws light on the close interaction between hazard, vulnerability, and risk. Moreover the paper has a module on the development aspect of disaster. The most significant aspect of this document is that of disaster governance which is based on the Hyogo Framework (2005-2015) which states that each country has the sovereign responsibility to protect its people, infrastructure as well as economic and social assets from disasters. Therefore it is essential to build the "Resilience of Nations and Communities to disasters".

Jha and Jha (2011) studied how the traditional

knowledge of the Lepcha community of Sikkim helped them to resist the ill effects of disasters. Md. Anwar Hossain (2013) brings about the importance of the concept of *community based disaster management* (CBDM) in disaster risk reduction in Bangladesh. He also points out the role of social work and the contribution of anthropologists to help mitigate the disaster risks which can be a great learning point for the National Disaster Management Authority.

Jogia et al (2014) discuss the psychological impacts of disasters and disaster mental health as natural disasters have caused extensive loss and damage to the human psychological wellbeing, economy, and society. However, the issue of culture in disaster mental health seems to have received limited attention in policy and practice. In particular, this paper suggests the importance of cultural competence in the planning and delivery of effective disaster mental health services which requires significant changes in policy making, administration, and direct service provision.

Ekstrom and Kverndokk (2015) warns about increasing climate-related hazards, and the unevenly distribution of suffering caused by such disasters between different regions and groups of people. They emphasize that contemporary disasters fundamentally challenge the understanding of global and cross-temporal relations as well as long-established distinctions between natural and technological disasters, human and non-human agency, culture and nature. This is why social norms and cultural metaphors make a crucial difference to the capacity of societies to cope with and come to terms with disruptive events.

The edited book *“Disaster Risk Research and Assessment to Promote Risk Reduction and Management”* (Ismail-Zadeh and Cutter, 2015) holds that natural hazards are becoming direct threats to national security (because their impacts are amplified by rapid growth) and unsustainable development practices, both of which increase vulnerabilities of communities. Hence, reducing disaster risk becomes a foundation for sustainable development. According to them, science-driven approaches to disaster risk reduction and disaster risk management (DRM) can help communities and governments to become more resilient thereby

reducing the human and economic impacts of disasters.

Another edited text, *“Culture and Disasters: Understanding Cultural Framings in Disaster Risk Reduction”* (Kruger et al, 2015) adopts an interdisciplinary approach to explore the cultural dimension of disaster and throws light on how the decision-making of societies at risk is embedded in culture. Faas (2016) in his paper *“Disaster Vulnerability in Anthropological Perspective”* rightly highlights the concept of vulnerability as an indicator of the unequal distributions of certain populations in proximity to environmental and technological hazards as well as individual or group ability to anticipate, cope with, resist and recover from disaster. This concept has influenced disaster research as a means to answer as to why a particular population is at more risk than others.

Anthropology of disaster is unique in that it incorporates both the qualitative and quantitative methods of collecting, analyzing and presentation of the data. In addition to the basic anthropological methods, three specific methods are discussed here which can be effectively employed in disaster research. For the firsthand collection of data regarding indigenous knowledge on disasters, perception of people and their response including community based management etc, the ethno-climatology method is employed. Similarly to compare the hazards and their occurring at a cross-cultural level, hazard ranking method is used to highlight the severity of any particular hazard as per its frequency and how the natives perceive about the disaster as per their impacts. On the same line, various disaster risk indices have been formulated by several international agencies and institutions to quantify the level of vulnerability of particular regions.

#### 1) Ethno-climatology:

It is people's specialized knowledge about weather and climate like folklore which have developed over thousands of years of inhabiting and observing one's natural environment. Thus the particular field of research on people's local, indigenous or traditional knowledge about the natural world is called as “ethno-climatology” (Lazrus, 2010). This knowledge is local, situational and embedded in a cultural context (Berkes, 1999). An interesting

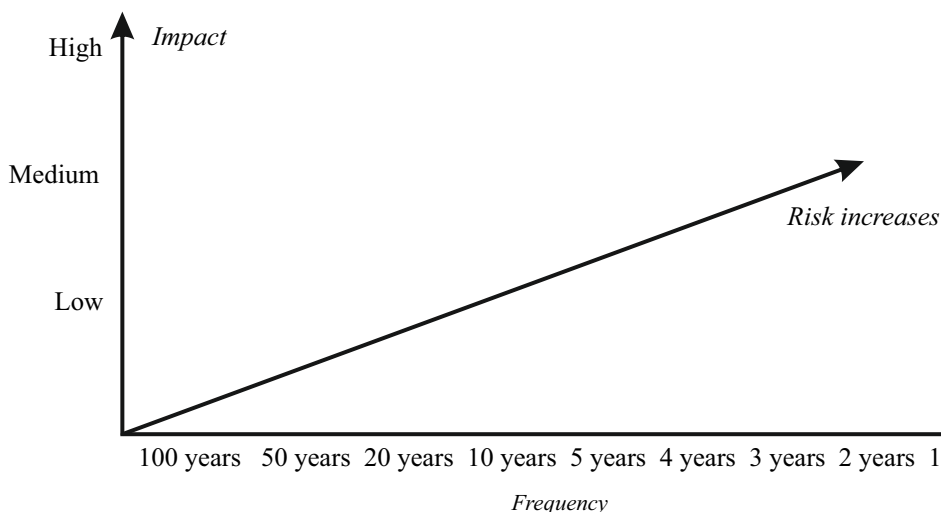


example of ethno-meteorology comes from an interdisciplinary team of anthropologists and meteorologists who learned that the traditional technique used by Peruvian potato farmers in the Andes to forecast rainfall and crop yield relied on the influence of El-Nino on the visibility on the Pleiades during the festival of San Juan in late June (Orlove et al, 2002). So ethno-climatology would bring forth the point of how to apply the local knowledge of environmental phenomena, especially the aspects of weather forecasting and planning of agricultural activities etc.

## 2) Hazard Ranking:

It is possible to rank hazards on a simple graph that plots magnitude of impact on an individual or

community against the probability and frequency of a specific hazard occurring. Risk is high where an event has a high magnitude of impact and a high probability of occurring in a short time span. The following graph can be used not only to judge the risk associated with impacts derived from a specific hazard, but can also be used to make judgments on the degree of attention that should be given to developing strategies to cope with different hazards. For example, if a second hazard of earthquakes had been identified for this region in addition to a major hazard, say flooding, then by comparing the different frequencies and magnitude of impact with flooding with those for the earthquake, we could identify what the priorities of the program should be relative to these hazards.



## 1) Disaster Risk Index:

Several disaster risk indices have been formulated by several international agencies and institutions to quantify the level of vulnerability of particular regions and thus the status of adaptability and resilience in case any disaster strikes. For instance, India has been ranked 77th on the World Risk Index, topped by Island state of Vanuatu. The Index, calculated by University of Stuttgart, ranks 171 countries according to their risk of becoming a victim of a disaster. It takes into account three factors for calculating the index:

- **Risk:** Inadequate infrastructure and weak logistic chains substantially increase the risk that

an extreme natural event will become a disaster.

- **Response:** Challenges mostly lie in the 'last mile' of the logistics chain: organizing transportation despite destroyed streets or bridges and ensuring fair distribution when there is a shortage of (for example) water, food, and shelter.
- **Relief:** Crumbling transport routes, unreliable electricity grids, and dilapidated buildings not only hinder humanitarian aid from overseas, but also delay crucial aid.

## 1. Anthropological Perspectives in Disaster Research

The Anthropological perspectives in Disaster

Research are circumscribed under the *holistic approach* which examines the complex interrelationships between humans, their cultures, and environment, ranging from the human actions that may influence the severity of disaster to the range of socio-cultural adaptations and responses. The *comparative* and *relativistic* thrust of the discipline has often given disaster research a critical stance, privileging local knowledge and local ways of management. Similarly, the *ethno-scientific* approach emphasizes the cognitive aspects of the natives when dealing disaster management. The *humanistic tradition* in anthropology help the anthropologists to experience the disaster themselves understanding their problems and provide a helping hand to the disaster affected communities. *Applied* anthropologists also advise and suggest to the concerned authorities to take endogenous policies to better cope the aftermath of disasters as well as to initiate preventive measures for mitigating future impacts. The following are some of the definitions of conceptual terms associated with disaster research:

#### *Hazard vs. Disaster*

Hazards “are the forces, conditions, or technologies that carry a potential for social, infrastructural, or environmental damage” (Oliver-Smith and Hoffman, 2002). On the other hand, a **disaster** is “a process/event combining a potentially destructive agent/force from the natural, modified, or built environment in a socially and economically produced condition of vulnerability, resulting in a perceived disruptions of the customary relative satisfaction of individual and social needs for physical survival, social order, and meaning” (Oliver-Smith and Hoffman, 2002). In other words, when a natural catastrophe or hazard is mixed-up or has some bearings with humans, it becomes a disaster. Therefore, the very definition of disaster and its various dimensions become important area of anthropological research because whenever and wherever the human interface are involved; anthropological perspectives are necessitated and incorporated.

#### *Perceiving Vulnerability*

Anthropology has sought ways to call attention to and alleviate structural conditions like gender inequality, global inequities, endemic poverty,

racism, a history of colonial exploitation, imbalances of trade, and underdevelopment of pre-disaster vulnerability that predispose some communities to experience disaster or that increase the severity of disaster impact. While talking about the perception of people, anthropologists stress on ethno-science that is the people's local knowledge and world view of what they perceive about certain natural events causing hardships to them.

#### *Risk*

*Risk is a function of hazard and vulnerability. This means that while the phenomenon of hazard is experienced by all, the impact may be different for different communities based upon their adaptation to the natural and social environment. It is in accordance with this fact that the extent of vulnerability is estimated both qualitatively and quantitatively. As a consequence, societies which are more vulnerable are at greater risk and societies with less adaptive mechanism are more exposed to the vagaries of nature. Therefore managing risk is a matter of reducing the frequency of an event happening or reducing vulnerability to its impact.*

#### *Coping capacity vs. Resilience*

Coping capacity refers to “the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions such as hazards, emergencies or disasters” (UNISDR, 2009). Therefore the focus here should not only be the individual or community but also the capacity of the supporting mechanisms at large. For example, an impoverished community might not be the focus of development, but inherent in their internal social and economic structures these communities might possess significant coping capacity and resilience. Coping capacity is therefore just as much about what a community internally possesses, as the external structures on which they depend.

On the other hand, resilience is “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (UNISDR, 2009). This definition however considers the presence of a hazard and not a disaster. Thus once a disaster actually strikes, it would be

incorrect to refer to the concept of resilience; rather the concept of coping capacity is more apt. Resilience therefore means the ability to “spring back from” a shock. Returning to an original state corresponds to returning back again to those vulnerable places without improving the conditions or rebuilding residential colonies without strong disaster-resilient coeds. Resilience, therefore, implicitly requires improvement ground. It is for this reason that people should be resilient enough to withstand the vagaries of nature with all possible means including the own cultural set up and the outside support.

#### *Disaster risk reduction vs. disaster risk management*

Disaster risk reduction (simply disaster reduction) is defined as the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects (UNISDR, 2009). The assessment of the vulnerability of critical facilities, social and economic infrastructure, the use of effective early warning systems, and the application of many different types of scientific, technical, and other skilled abilities are essential features of disaster risk reduction. Disaster risk management, on other hand, is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and their possibility of disaster. Disaster risk reduction activities are more focused on a strategic level of management, whereas disaster risk management is the tactical and operational implementation of disaster risk reduction.

#### **4. Culture and Disaster: A symbiotic relationship**

Cultural influences hold that some people within the social system are more vulnerable to disasters than others. Ethnic minorities, disempowered castes or classes, religious groups, or occupations may live or work in physical areas that are relatively disaster-prone. Some conceptual statements in this regard are highlighted in the following points:

- Culture plays a vital role in our perception, understanding, and activities undertaken to mitigate, manage and face the disaster. In the very idea of culture is embedded the notion of a social group. In other words, culture is a product of the society and the members share its culture. Because *culture* is *shared* that people realize that they are not the only ones but there are many others who have experienced the impact of disaster. Confrontation with disaster is, thus, a shared experience and accordingly people have always organized themselves to provide immediate rescue, relief, and support.
- One of the greatest consequences of disasters is that it acts as a *cohesive force*. Perhaps suddenness and acuteness of disasters breaks the social fabric of race, religion, caste, and class and forces people to live and survive as a cohesive unit. Strangely people revert back to their selfish mode once the imminent danger is gone.
- The role of hazards and disasters in mobilizing *forces of cultural change* is vastly understudied. Much of the sociological research considered that disasters rarely played a significant role in the evolution of society. But anthropologist with archaeological and historical perspectives has increasingly made evident that how causal disasters have been bringing about cultural transformation. There is much to be learned about cultural and societal modifications from the calamities that a people endure. Not only do societies undertake immediate adaptations after impact, but these can also set in motion forces with long-term implications for the evolution of each society.
- Disasters permit considerable trial and error in societal adaptation to the environment. While many hazards display their presence quite constantly, others despite their systematic environmental quality may not occur with great frequency, allowing the possibility of maladaptive responses over time. If these maladaptive responses become institutionalized they may lead to an increase in societal vulnerabilities that in due course may bring calamity and social collapse.
- These cultural adaptations include innovation



and persistence in memory, culture history, worldview, symbolism, social structural flexibility, religion, and the cautionary nature of folklore and folk tales.

Anthropologists dealing in disaster research are unique in their wide-scale application in areas of understanding climate change, global warming, culture-specific perceptual studies of disaster, applying ethno-climatological knowledge, understanding community-based disaster management, psychological health of post disaster period of affected communities and so on.

Anthropologists working in disaster research point out that there is an unequal distribution of risk and vulnerability. While discussing “why” and “how” of the vulnerabilities people face, anthropologists first look upon the local socio-cultural and natural environment and the psychology of the people. This is because of the fact that the same climatological/meteorological phenomena may not constitute a disaster for a particular group while that may be very harmful for another group. Taking this into account, anthropologists draw vulnerability map of the world on cultural basis and can rightly reason out the causes behind this. Further, as reckoning diversities in every form is a hall mark of the discipline, culture-specific, region-specific and population-specific, micro-studies help the world of knowledge as well as the authorities concerned to recognize the myriad forms of disasters. This knowledge helps to apply the techniques of disaster management not at a universal or generalized level but rather a specific and local level. Therefore cultural differences have a significant bearing on disaster risk management.

As ethnography is mostly employed as a method of data collection, the ethno-climatological perceptions of people would go a long way in policy advocacy and rooting out the top-down approach. This it would lead the way for a community based disaster management approach where people will have the major role instead of the outsiders. It is especially significant in the context of the National Disaster Management Authority Act, 2005 which works in bureaucratic set-up instead of emphasizing upon people-led works. Intervention during pre-disaster/post-disaster period, ignoring to recognize the shared views of people would result in the failure of mitigation programs.

The study of social structure, livelihood etc in pre and post-disaster period is an important area of research by anthropologists. This paves the way for looking into the societal relations and the solidarity among people. Scholars have found that during disasters peoples forget their disputes and work as a family while post-disaster people normally play their expected societal roles including quarrelling, competing with each other and the like. Therefore, the curiosity of anthropologists is as to why and how the society maintains the solidarity and social control of its people.

Anthropologists also play the role of torch-bearers in highlighting the negative impact from culture towards disaster risk reduction activities and focus on the process of integration of adaptive mechanisms toward effective disaster risk reduction. This particularly helps the authorities to take note of the adaptive mechanisms and to frame policies according to the needs of the people. For example, proper funding can be made and unnecessary expenditure could be diverted towards other constructive activities. Besides, this will make DRR strategies and measures compatible with cultural aspects of community. To estimate the loss of life and property both qualitatively and quantitatively, some indices or mathematical formula are needed so that the risks can be assessed comprehensively and effectively for a better disaster resilient community.

## 5. Conclusion

Every discipline has its own limitations and issues which it always strives to offset by deriving new tools and methodology and even new perspectives. Some of these issues includes as follows: First of all, disasters have pasts, presents and futures, whether they arise from events that people consider being sudden (earthquake) or those that occur unperceived over long periods (droughts) only to be recognized well after their initial manifestations. Therefore the very definition of what constitutes a disaster is the first problem.

Second, disasters are experienced first at the local level. However not all communities experience a disaster in the same way. Each undergoes a catastrophe in the context of its own profile of vulnerability. Such variations challenge more global macro approaches. By the same token, it is necessary

to understand the total phenomenon, both physically and socially. Disasters therefore compel us to pair *multi-site ethnography* with quantitative methods capable of accessing greater levels of aggregation.

Third, just as the spatial dimension of disasters present challenges to anthropological research, temporal dimensions can prove equally problematical. Most anthropological research is planned out considerably ahead of actual entry into the field. Proposal preparation and review is a lengthy process. Research funding organizations have programs that are designed to support rapid response or perishable data research, but they generally fund very short term and even-focused kinds of research as opposed to the more important processual aspects of disasters that enquire longer term commitments of ethnographic research.

Fourth, while much important data about disasters can be gathered by synchronic slices based on surveys, questionnaires and crash emergency overviews, the actual process by which people and communities respond to risk, threat, vulnerability, impact and recovery are best understood through on-site ethnographic research. However it's very difficult to collect empirical data at that particular time as the people are affected and unstable and will be hesitant to speak; rather they need instant support and co-operation from all quarters including the researcher.

Lastly, disaster research has not yet assessed the effectiveness of disaster risk reduction. Here "effectiveness" means how far has the discipline, established itself to study disasters and its reduction as well as management in quantitative terms and how anthropologists dealing in disaster research are successful far are we satisfied in mobilizing community resources and people to reducing the impact of disasters. In this direction, the Sendai Framework (2015-2030), adopted recently by the international community, is the right step which aims to reduce the ill-effects of disasters in quantitative terms through its seven goals.

To conclude, anthropology of disaster incorporates the totality of human perception, response, adaptation and mitigation to disasters. As a sub-discipline of anthropology, it has strong bearing upon anthropological orientations and perspectives like holism, relativism. Similarly, as people's view

point is majorly emphasized, ethno-scientific approaches like ethno-climatology, ethno-meteorology is employed. Accordingly anthropologists always prioritize on community based management of disasters. Not only their adaptive mechanisms are highlighted but also the maladaptive features in that cultural context are pointed out so that appropriate actions could be initiated to reduce those cultural practices. In matters of application towards DRR, anthropology of disaster proves at ground the compatibility or incompatibility of various disasters-related policies and laws with the local cultures for better resilience strategies.

However certain areas are to be urgently looked upon in disaster research. At present there is a lack of comprehensive assessment of disaster risk. Besides formulating some indices for estimating vulnerability across geographical regions; making a culturally-based vulnerability map of the world; new perspectives on the political economy of disaster research and climate change; establishing a strong link between climate change, disaster management and sustainable development. To sum up, what is required is perspectives on integrated disaster research – the engagement of multiple disciplines and researchers, scales (local to global), methodological approaches, and stakeholders in the co-production of problem-focused, policy relevant research related to disaster risk (Ismail-Zadeh and Cutter, 2015).

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## Cultural Framework for Human Resource Information System Design

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### **Abstract**

*The integration of information systems with human resource management functions has led to the evolution and adoption of human resource information systems in business organizations. The cultural dimension of business as well as of information technology is an important consideration that highlights the crucial role of culture in its two sub-systems, viz., human resource management and information system. We discuss here a cultural framework of human resource information system for higher organizational effectiveness.*

**Key words:** Culture, cultural mapping, ethnographic research, human resource management, human resource information system, reflective design.

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### **1. Introduction**

Human resources management (HRM) plays a strategic role in the achievement of organizational growth and excellence. With globalization and the advent of the information age, organizations need to adapt to the changes in technology and the changing issues in managing people. A set of individuals making up the workforce of the organization is its human resource (HR), who is responsible for performing the work assigned to them, so that organizational goals can be achieved effectively in time and space. This requires that HR should be properly managed and maintained, resulting in the emergence of HRM in the organizational setup. HRM has the responsibility of handling vital issues such as attracting people of different cultural background, dealing and managing workforce diversity and coping with technological and informational changes. However, some critical aspects of such a kind of management need to be addressed for planning, acquisition and development of HR, for responding to the demands of the work place so as to evolve a strategy to deal with organizational conflict. In this domain, the concept of competitive advantage acts as the main catalyst for taking correct decisions for the effective

functioning of the organization. This is because organizational success rests on the speed of decision-making and the response to both internal and external environmental changes. Numerous rational decisions are possible only with the availability of information at the right time, which is possible only by a well-designed information system. Thus, information is an important and critical resource in every organization.

Information system (IS) is a set of interrelated components that collects, stores, processes and distributes information for various organizational activities. Organizations use these systems for managing information, thereby increasing their efficiencies and effectiveness. In this context, the management of HR with the help of such a system has resulted in the development of human resource information system (HRIS). HRIS helps organizations in supporting and improving the communicational process by significantly reducing the cost and time of HRM activities. The complicated operations necessary for hiring and retaining top performers and improving productivity with enhanced job satisfaction of the employees becomes much simpler by adopting HRIS.

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The present paper discusses the importance of cultural dimension in HRIS effectiveness which derives its values from the effect it has on the performance of the organization. These effects include usage, user satisfaction, productivity, performance and above all its usefulness. Apart from organizational culture, an anthropological perspective of societal culture also plays a dominant role in HRIS development and implementation. Since HRIS is closely intertwined with culture, be it organizational or societal, it has a powerful influence on the performance of people, organization and information flows. As culture influences managerial processes either directly or indirectly, it becomes an important factor in HRIS's contribution to the efficiency as well as the effectiveness level of the HRM unit of any organization.

## 2. From HRM to HRIS: A Paradigm Shift

Prior to 1945, the personnel staff of the organization kept its record of the core business interactions, limiting only to the employee's name, address and job history. The formal process for selection and development of HR by organizations began after 1945 when it was recognized that the employee's morale had an impact on the improvement of organizational performance. The next two decades saw the integration of HR into the core business mission of organizations as well as an increase in government and regulatory reporting requirements. Eventually, HRIS was introduced to meet the complexity of HR system of the organization and utilize them for effective organizational development. For the most part, HRIS remained as simple record-keeping systems in the initial period of their introduction, but gradually they grew extensively in size and scope and had to be computerized (Kavanaugh et al., 1990). Presently HRIS is considered as a systematic procedure for collecting, storing, maintaining, and recovering data required by an organization about their HR, personnel activities and organizational characteristics (Kovach et al., 2002). It assists HR in numerous ways by streamlining workflow processes and participated at all levels of organizational functions, viz., administrative, operational and strategic. In this context, Beckers and Bsat (2002) pointed out five reasons as to why organizations should use HRIS:

1. increasing competitiveness by improving HR practices
2. producing a greater number and variety of HR operations;
3. shifting the focus of HR from the processing of transactions to strategic HRM;
4. making employees part of HRIS; and
5. re-engineering the entire HR function

A sixth function was added by Ruel et al. (2004) which consisted in integrating the HR functions by setting the HRIS goals as the basic reasons for adopting it in any organization. Human resource planning (HRP) provides an example of its relevance by being concerned with forecasting the needs of additional employees and their availability in the future for the organization. When an organization considers a strategic decision to expand its production facility in a new location, HRP supports it by providing timely and requisite information, estimates of the available external labor market in the new location and other tactical and operational decisions for avoiding litigations for the organization. As a result, HRIS helped to improve the skills of professionals working in the HR department of the organization, leading to better delivery of its services. Infact, this technology was seen as HR's 'partner in progress', by acting as a building block and an effective aid in the process (Lawler and Mohrman, 2003).

HRIS also affected changes on the organizational HRM by redesigning jobs, modifications in the recruitment and training of personnel and educating managers to deal with the complexity of a global economy. Very often, these systems are replacing several related systems, such as a personnel database, payroll system and benefits system, with one HRIS that does it all. In this regard the study of Hussain et al. (2006) on '*the use and impact of HRIS on HRM professionals*' is quite relevant. They sought to determine whether HRIS usage was a strategic value-addition for the organization, and its impact on professional standing for HR professionals. By providing a comprehensive information picture as a single integrated database, it helps structural connectivity across units and activities and increases the speed of information



transactions in organizations (Lengnick-Hall and Lengnick-Hall, 2006). Hence, HRIS can have a wide range of usage starting from simple spread sheets to complex calculations performed easily for all sorts of human resource functions in an organization(Perry, 2010).

Business functions of many organizations were transformed with the emergence of internet for finding improved way of managing their HR at a global level.Web-based operations of HRIS led to the performance of HR activities irrespective of time and space and by the creation of self-service technology which could be operated by line managers and employees. Hence, the time spent on basic administrative tasks couldbe spent on strategic issues and implementing progressive plans of the organization.

### 3. HRM in the framework of culture

Although the concept of culture is central to Anthropology, yet it is a fuzzy concept because once its definition is stated, it becomes difficult to identify it in specific human situation. As stated by Jordan (1994), “the culture of the Trobrianders and the culture of General Motors are different. Organizational culture is the result of secondary enculturation, which begins with employment of a member through training programmes, asides from seasoned employees, observations regarding rewards and punishment, and a host of other elements. The employee is also the member of a traditional culture resulting from enculturation from birth”. Thus, a business organization can be defined as an economic and social entity, composed of a group of people who interact with each other for the purpose of achieving a common goal. Traditionally, organization studies views organization as having three levels of structure:

- a) The individual or micro level, which focuses on individual behaviour with extensive understanding of individual motivations and personality,
- b) The group level focusing on managing relationships among individuals and involves group formation, structures, norms and conflicts and
- c) The macro or organizational level in which purpose, technology, structure and change including decision-making and communication all function efficiently in the external environment(Jordan, 2012).

From this perspective, culture is an important characteristic at the organizational level, the “unwritten feeling” (Cherrington, 1948) representing values, beliefs and shared understanding. It is considered intangible and difficult to define and measure. The cultural approach as suggested by Trice and Beyer (1993) is useful in organizational studies, which it helps to explain neglected or overlooked aspects of organizations, and when concepts of other approaches are integrated with it.This accounts for the endurance of the concept of culture in organizational studies.

Anthropologists have defined the concept of culture of a society as an integrated system of shared ideas, behaviors and artifacts characteristic of a group. In this sense, an organization is a web of interacting cultural groupings. This inter-related nature of the organization is important for studying organizational culture. Like societal culture, organizational culture also rests on a set of universal components

Table I: Universal components of societal culture and organizational culture

Sl. No	Societal culture	Organizational Culture
1	Patterns of subsistence	Type of technology, division of labor
2	Magic and religion	Values, goals, ceremonies and myths
3	Economic system	Reward system
4	Political system	Organizational structure, leadership behavior, power and politics, conflict -management
5	Language and communication	Communication
6	Social structure	Group formation other than formal organizational structure
7	Art	Organizational artifacts, dress, building types, logos

Source: Jordan Ann. T. (1989). Organizational culture: It's here, but is it Anthropology? *Anthropology of Work Review*, 10 (3): 2-5

Since the 1930s, anthropologists have also conducted research in industrial and corporate settings. For example, the human relations school of organizational research of the 1930s and 1940s produced a number of ethnographies showing how informal culture patterns could influence managerial goals (Mayo, 1933; Roethlisberger and Dickson, 1939; Gardner, 1945; Warner and Low 1947; Richardson and Walker, 1948). Management interest in anthropology focused on methodology as reflected in several articles published in management journals by anthropologists (Morey and Luthans, 1984, 1987; Sanday, 1979; Schwartzman, 1993). There has been a surge of research interest by anthropologists in 1980's and 1990s which takes several forms: some of it is found in the study of work (Applebaum, 1984; Sach's, 1989); development of anthropology in formal organization (Britan and Cohen, 1980; Jordan, 1990); industrial ethnography (Britan, 1981; Dubinskas 1988); anthropological fit in international business consulting (Hamada, 1988; Reeve-Ellington, 1988; Sherry, 1988); cross cultural research on organizational culture (Hamada and Jordan, 1990; Serrie, 1986; Ouchi, 1981; Pascale and Athos, 1981); in-house research by corporations (Briody and Baba, 1991; Briody and Chrisman, 1991) etc.

Understanding cultural differences relevant for examining organizational behaviour is a study by Hall (1976), which discusses differences between low context and high-context societies, context being defined by Hall "as the information that surrounds an event." The cultures in former societies value clear explicit and written forms of communication whereas in latter societies, the external environment and non-verbal cues are more crucial. Moreover, culture is conceptualized and measured through a number of value dimensions (Hofstede, 1980; Schwartz, 1994; Trompenaars & Hampden-Turner, 1997). Although this concept of culture has its own limitations, it provides cross-cultural comparability and allows for its measurement. Hofstede (1980) examined the predominant values and attitudes across nations, basing on their national cultures and observed four important dimensions viz., power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity. Power distance is the extent to which the less powerful members of the

organization expect and accept the unequally distributed power. Application of high power distance in an organization is reflected in the form of sending reports only to top management, closed-door meetings with selected people, centralized working of the organization as well as large gaps in remuneration and delegation of authority. On the other hand, a low power distance reflects a team-work culture and a flat hierarchy among top management, supervisors and employees and their involvement in the decision-making process in the organization. Secondly, uncertainty avoidance is the extent to which members of a culture is threatened by unknown situations, risky and unpredictable environment. High uncertainty in the organization is observed in the form of many rules, regulations and policies, which leads to increased anxiety and nervousness, whereas low uncertainty avoidance accepts change and risks and never biased by emotion as it is more concerned with long-term strategy. Thirdly, individualistic societies emphasize on personal achievements, giving importance to self-respect, privacy, honesty etc. In contrast, collective societies value the group over the individual, giving importance to collective decision, harmony, skills, training and group-achievement. Basing on social-gender roles, societies are masculine as men are assertive, tough and focus on success whereas in feminine societies, women are modest, tender and concerned with quality of work. Thus, the goals of male members in an organization include high earning, facing more challenges, professional advancement and recognition, in contrast to female members, who are inclined to have good relations with superiors, subordinates and peers in a working environment with a sense of security. A fifth dimension namely long-term versus short-term orientation considers the time-orientation of people towards the past, present and future. Long-term orientation indicates cultural values that are future-looking including thrift, perseverance, humility, shame and observe hierarchical relationships, whereas short-term orientation looks at the past such as respecting tradition (Hofstede & Bond, 1988). Additionally, a sixth dimension includes indulgence versus restraint. (Hofstede, Hofstede, & Minkov 1991). Indulgence stands for a society that stands for the fulfillment of basic human desires related to fulfillment of their desires, enjoyment of leisure time, freedom of speech, leading to a high

percentage of happy people. In contrast, restraint stands for a society that controls and regulates the fulfillment of needs by strict social norms, leading to helplessness and a low percentage of happy people. These reinforce particular values and help to understand and analyze managerial actions and choices in organizational setups.

A similar cultural orientation framework was earlier given by Kluckhohn and Strodtbeck (1961), who stated five main value orientations namely human nature, man-nature relationship, social relation with people, human activity and time-sense. This framework has been used by later studies (e.g., Aycan et al., 2007; Nyambegera et al., 2000; Sparrow & Wu, 1998). Schein (1984) pinpoints three specific levels in organizational culture including artifacts and behaviour, espoused values and shared basic assumptions. Schwartz and his colleagues (Schwartz and Sagiv, 1995; Schwartz & Bilsky, 1990; Schwartz, 1994) found seven value types in national culture across countries, which they labelled as egalitarianism or recognizing individuals as moral equals, harmony or adjusting well with the environment, embeddedness of people, hierarchy where unequal distribution of power becomes legitimate, mastery over natural and social environment, affective autonomy in the quest of positive experiences, intellectual autonomy or independent hunt of individual ideas. Trompenaars and Hampden-Turner (1997) discuss a link between organizational and national cultures and classify four ideal types of organizational cultures by focusing on task-relationship and extent of hierarchy: family model places high priority to the notion "to doing the right things rather than doing things right" and hence HR practice of pay for performance are viewed as threatening to family bonds; Eiffel tower model where relationships are based on recommended roles within a rigid system and typical HR strategy include workforce planning and performance appraisal systems; guided missile model is egalitarian, task-oriented with focus on performance and contribution of employees to the overcome outcome with HR strategy focusing on objective and pay for performance; incubator model is more personal and individualistic where the goal is innovative products or services and HR focus is on rewards for innovation. The Globe project (House et.al, 2004) provides a more pervasive nine-dimension framework for investigating cultural

variations, both similarities and differences in organizational culture. The model of 'culture fit' (Kanungo and Jaeger, 1990; Mendonca and Kanungo, 1994) highlights that both socio-cultural environment and enterprise environment affect the internal work-culture and HRM practices. The model was also tested, using 1954 employees from business organizations in 10 countries (Zeynep et. al., 2000).

A more often quoted definition of organizational culture is that of Schein (1984) who argues that culture identifies and differentiates a social group, and suggests that culture can be managed and changed. De Lisi (1990) suggests that organizational culture and learning play a control role in strategic change in organizations. Similarly Applegate (1994) views that, the culture of a firm is embodied in the behaviours and values of its members. Zimmerman et al. (1994) talk of a shift from a control culture to a learning culture and discuss culture as if it was synonymous with learned behaviours which identify and distinguish one group from another. Straub (1994) assumes that culture is a clearly defined entity, that it, is something which identifies and differentiates one social group from other. There is a substantial debate within management literature which argues that HRM practices do not directly impact organizational performance (Boxall and Purcell, 2000). There is a missing link between the two. It has been claimed that organizational culture is manifested in the behavior of its employees (Ngo and Loi, 2008) and affect job attitudes, efficiency and productivity (Mahal, 2009) of its members. The plans and strategic goals of the organization also get influenced by it (Chan, Shaffer and Snape, 2004).

Societal cultures have an important impact on approaches to managing people as all HRM practices seem to be most vulnerable to cultural differences which certainly have important implications for their design and implementation. The cultural diversity in organizations have also become the challenging context for designing and implementing the unique and thus integrated HRM policies and practices that address cross-cultural concerns. In this context, a lot of studies have already been done highlighting the interdependencies between the cultural dimensions of Hofstede (1980, 1981, 1991 (a), 1991 (b)) and HRM practices and purposes. At the same time, as an organization gets influenced by internal and external



environments, HRM requires understanding of internal work culture as well as enterprise or institutional culture (e.g. market characteristics, nature of industry, ownership status, resource availability etc.), and socio-cultural environment (viz. paternalism, power distance etc.).

Unlike management researchers who defined organizational culture as its characteristics values and beliefs, is only one of the variables of the organization, for an anthropologist organizational culture is holistic, integrated and super-organic which results in a web of interwoven and hierarchical cultural group. It is a part-culture in one or more larger cultures that might include regional cultures within one nation, more than one national culture and even a world culture of international business. Jordan(1994) defines it as an integrated system of shared ideas, behaviours and artifacts shared by members of the group in the organization. The nuances of behaviour can be understood if diversity is recognized. Baba (2006) classified organizational anthropology into three broad areas, viz., organizational culture in technology firms, boundary-crossing roles in global context, and regional views of corporation and work. Thus, the anthropological approach of developing organizational culture is more participative as well as human-centric which is instrumental in effective governance (Mangaraj&Upali, 2013).

Morey and Morey (1994) highlight the point that anthropologists have the ability to bridge the gap between macro-level and micro-level structures in the organization. Besides, organizational culture is something that all employees create and transmit. In this regard, anthropologists have the strength in knowing how to conceptualize, explain, predict and modify the impact of structure (both formal and informal) on individual behaviour beyond the micro-level. Patterns in individual behaviour have to be discovered through participant observation and informed questioning (Morey and Luthans, 1984). These patterns create macro-level structures that impact on individuals to create additional patterns. Thus, anthropologists can unravel the intended and unintended patterns (Morey and Morey, 1994). Another area where anthropologists also contribute is in the field of cross-cultural expertise. Hofstede (1980, 1981) has chastised management for the implicit assumptions that

American management theories have universal application. There have been numerous examples of business miscues when U.S. corporations attempted to operate in an international context. These cross-cultural blunders have resulted in the loss of revenue, reputation and even product credibility.

#### 4. Information systems in the framework of culture

At the organizational level, Information Systems (ISs) are considered to benefit organizations by increasing operational efficiency, strategic benefits, organizational intelligence and management control (Melville et al. 2004). These systems assemble, store, process and deliver information relevant to an organization in such a way that necessary information is accessible and useful to those who wish to use it, including managers, staff, clients and citizens. It is a human-cum-organizational activity system that may or may not involve the computer systems (Buckingham et al., 1987). This definition encompasses a wide range of areas, as for example, information theory (information), semiology (delivers information), organization theory and sociology (organization and society) and computer science and engineering (computer systems). Hence, one finds that the discipline of information systems is pluralistic by nature and is founded on knowledge from many other well-established source disciplines. This definition aptly reflects the multi-faceted nature of IS which entails a wide variety of approaches that have been blended and refined. Although each approach has a different flavor requiring different expertise, this can be blended in a multi-view (Avison and Wood-Harper, 1990). Multi-view is a holistic or system approach in which the differences of the various approaches are considered as different means to a common goal. Besides, a cultural approach to information system not only adds to its holistic perspective, but also serve as a framework for optimizing the effectiveness of IS. This is because social theory has a substantial part to play in the development of the discipline of IS in helping to understand and interact with social, organizational and personal contexts without which the technology is meaningless (Rose and Scheepers, 2001). Many of the IS research into the effect of national culture has relied on Hofstede's (1980, 1991) dimensions of culture to test and validate propositions relating to varieties of IS issues. Leidner and Kayworth (2006) provided a

comprehensive review of organizational and cross-cultural IT literature that conceptually links these two traditionally separate streams of research. Rivard and Kappos (2008) adopted a conceptualization that views culture from three perspectives viz., integration, differentiation, and fragmentation that come into play simultaneously and jointly. Using this conceptualization, they synthesized what is known about the role of culture in IS initiatives, and proposed a model of the relationships between culture, development and use processes, and an information system.

Within the discipline of ISs, the concept of organizational culture is also regarded as being very important. One of the first researcher to discuss the relationship between information technology and organizational culture was Olson (1982) whose article focuses on subtle changes in organizational behavior facilitated by technology that may affect overall organizational performance as much as individual productivity. Laudon and Laudon (1991) suggested that, "in general, organizational cultures are far more powerful than information technologies". According to Stair (1992), organization culture can have a significant impact on the development and operation of information systems within the organization. The concept of organizational culture is also frequently mentioned in various researches on information systems (Applegate, 1994; De Lisi, 1990; Olson, 1982; Schein, 1984; Straub, 1994; Zimmerman *et al.*, 1994; Jackson, 2011).

Despite the lack of recognition of the contributions of anthropology as a source discipline for IS development, some information systems researchers have recognized that anthropological concepts and methods facilitate the description and analysis of the social world in which such systems are developed and used. One of the fundamental and distinctive concept of anthropology is that of culture. Sandstrom (2004) feels that one of the common ground is the anthropological insight of culture as an information system or system of communication; conversely, many technologists are beginning to look at information as a cultural construct. Thus, an anthropological approach can humanize information technology and research practices because information is a part of an ongoing, organic cultural system and not a

commodity that can easily be divorced from its meaningful context or content.

An important and related concept to culture is that of symbolism. This concept has been widely used in anthropology to help interpret the actions of social actors, where there "is a pervasive search for meaning in cultural symbols" (Lewis, 1985). From anthropology, the symbolic approach found its way into sociology and more recently into organization theory literatures; to some extent, symbolism has now found its way into information systems literatures (Boland, 1987; Hirschheim and Newman, 1991; Kendall and Kendall, 1993; Lanzara, 1983; Robey and Markus, 1984). Hirschheim and Newman (1991) argue that the symbolic concepts of myth, metaphor and magic facilitate a much richer understanding of IS development than the conventional economic rationality model.

An important area in which anthropology is making relevant contribution to the discipline of information systems is that of research methods. The unique research method which characterizes anthropological studies is ethnography. This method is a qualitative study, over an extended period of time, of a particular organization or society. In this approach, the ethnographer "immerses himself in the life of people he studies (Lewis, 1985) and seeks to place the phenomena to be studied in its social and cultural context. In recent years, growing number of information systems researchers have recognized the value of the ethnographic method for IS research (Bentley *et al.*, 1992; Harvey and Myers, 1995; Hughes *et al.*, 1992; Lee, 1991; Lee *et al.*, 1992; Orlikowski, 1991; Preston, 1991; Suchman, 1987; Wynn, 1991; Zuboff, 1988). Bentley *et al.* (1992) highlights that ethnographic studies are helpful in informing the systems design process and may produce insights which contradict conventional thinking in systems design. Myers and Avison, (1995) point out that the concept of culture has been generally used rather narrowly in the IS literature and argued that a more critical anthropological view of the relationship between IT and organizational culture is required.

## 5. Cultural Framework of HRIS

HRIS tries to balance the conflicting criteria of usability, portability, maintainability, as well as reliability in the organization. Usability and user

satisfaction are largely dependent upon culture and play a significant role (Thong and Yap., 1996; Mangaraj and Upali., 2013). Hence, an effective HRIS should be the reflection of the organization in human resource as well as information technology perspectives and should encompass a reflective design with culture playing a pivotal role. This involves a structured set of tasks and which comprises not only the technical sub-systems, but also members and their roles comprising the social sub-system. Although, there are several factors influencing the effectiveness of HRIS, the present paper highlights the role of culture in HRIS contributing to the success of an organization. In this approach, the differences and similarities of people from different cultural backgrounds are to be considered in order to give a better understanding of the processes associated with the cultural effects (Straub, 2002). This necessitates the need to distinguish societal culture from that of organizational culture and then demonstrate their interaction in the different aspects of HRIS, wherein culture acts as an independent as well as a dependent variable so as to design an effective HRIS.

#### **a. Culture and HRIS development.**

The success of HRIS depends on the degree to which the values of various sub-groups of the organization fit with the particular values embedded in the software development innovation. A good fit between the values embedded in the software development processes and the overall organizational values will lead to a more successful implementation of HRIS. This involves a cultural sensitive approach for the various phases of development of a successful socio-technical system. In this context, societal culture and its effects can be used to make system more responsive. Although, there is a general lack of design theories regarding development of culturally sensitive socio-technical information systems in general and HRIS in particular, research methods generally used in culture studies can be utilized. For example, ethnographic research methods are used for collecting and pooling the information from the employees which precedes the actual development of HRIS.

Societal cultural values have a strong impact on organizations. It has been observed that if an organization adopts HRIS according to its

embedded culture, the results will be a high performing organization. Conversely, if an organization adopts HRIS that deviate from its dominant culture, the results will decrease the performance of the organization. Several literatures also support the argument and emphasized on the importance between cultural fit and HRIS development to manage human resource for better organizational performance (Kanungo and Jaeger, 1990; Mendonca and Kanungo, 1994). Empirical studies have indicated that national values predict organizational processes and managerial practices (Communal and Senior 1999; Hofstede & Peterson, 2000). By taking the most widely studied cultural factors described by Hofstede (1980, 1981, 1991 (a), 1991 (b)), the impact of those factors can be observed. For example, in high power distance societies where hierarchy is very much rigid, people in top management are expected to enjoy relatively more advantage in status and power. With respect to such societies the HRIS is typically designed in such a way that the employees will have little access to the information which is non-interactive in nature. On the other hand, in societies having low power distance, it is expected that the HRIS should be developed in such a way that the employees will have access to more information. Similarly high uncertainty observed in the organization in the form of lots of rules, regulations and policies. High sense of nervousness and emotions observed in the organizational environment. Differences are avoided by clear and conscious about expectation. Proper plans are prepared and communicated which focuses on tactical aspect of jobs or project. Low uncertainty avoidance organizations are more concerned with long term strategy than short term. Accepts changes and risk do not impose unnecessary rules, never biased by emotion. The HRIS should be developed accordingly to face the uncertainty situation in a systematic manner. Individualism factor plays an important role in HRIS development and implementation. The organizational employees possess such cultural factor prefer privacy at work, want that their opinion should count and give priority to their own work than relationship with others. Whereas in collectivism stress is observed on belonging. People have strong bonding with group. Opinions and votes in determined by group. Always maintains good relationship with others. In a similar manner the Masculine's in the

organization tend to be more assertive, commutative and tough. Their goals includes high earnings, facing more challenges, want advancement and recognition. In contrast feminine are more inclined towards good relation with superiors, subordinates and peers. Always prefer a good working environment with sense of security. The HRIS of the organizations should be designed and developed accordingly to meet the specific needs of employees irrespective of their gender so that organizational objectives can be achieved. These types of organizations emphasize on developing HRIS as an interactive system and allow the employees to perform various activities directly on that system (Aycan, 2005). Similarly, the cultural factor of future-orientation is the degree to which individuals engage in future-oriented behaviors (House et al., 2002). This indicates that the organizations embedded in future-oriented societies are more likely to develop advanced HRIS system in comparison with the organizations that are less future-oriented. The cultural factor individualism-collectivism refers to the degree to which societies value individual rights and opportunities versus group success and individual loyalty to the group. In collectivistic societies individuals are expected to work in groups to achieve organizational goals. In such a scenario, organizations are likely to avoid individual-based systems and will generally develop HRIS for the purpose of general benefit of all employees. Chow, Deng and Ho (2000), in a study comparing American and Chinese managers, found that Chinese respondents were more likely to share knowledge, since this was consistent with their collectivistic value system. The cultural factor affecting HRIS in uncertainty avoidance is the extent to which a society, organization or group relies on social norms, rules and procedures to reduce the unpredictability of future events (House et al., 2002; 2004). Organizations in societies are surrounded by high uncertainty avoidance today than were organizations embedded in societies a few years back which were low in uncertainty avoidance. Hence, organizations are more likely to develop HRIS which can be integrated to a wide range of systems besides being interactive in nature. Png, Tan and Wee (2001) in a multinational survey of 153 businesses found that uncertainty avoidance affected information systems adoption. Businesses in high uncertainty avoidance countries were less

likely to adopt information technology infrastructure. For them, understanding the level of fit between cultural values and HRIS is important as a basis for understanding the effects of such systems on organizational performance and argued that variation across cultural values may lead to different approaches for development of information system of organizations.

#### **b. Culture and HRIS adoption and diffusion**

Culture is an important moderating variable for the success and failure of the adoption and diffusion of information system. Many factors of national and organizational cultures affect Enterprise Resource Planning (ERP) implementation across various developing countries (Huang and Palvia, 2001). Martin's (2002) research on the three perspective of culture i.e., integration, differentiation and fragmentation provides an understanding of its multifaceted nature and how it affects the adaptation of an information system in an organization. Davison and Martinsons (2003) regard the main reason for an increased interest in studies to address the cultural issues in information systems adaptation is due to the many failures observed insuch adaptation due to a mismatch between the two. Many a times, cultural fit is a particularly neglected factor in assessing ERP implementation success (Willis and Chaison, 2007). This can be observed from a study done in China where factors of national cultural acted as barriers in ERP implementation (Avison and Malaurent, 2007). In this context, cultural groups are more likely to adopt the technology of HRIS if their own values match the values embedded with the technology. In fact, a successful HRIS diffusion requires that either technology fits organizational culture or culture to be shaped to fit the behavioral requirement of the HRIS. Thus, it is clearly evident that value orientation, be it societal or organizational, may predispose certain social groups towards either favorable or unfavorable HRIS adoption and diffusion behaviors.

Hence, understanding cultural differences plays an expanding role in adopting HRIS as organizations expand their operation beyond national geographical boundaries. Proper adoption of technological innovation of HRIS will help modern



multinational organizations in effective management of human resources. Researchers also pointed out that for better adaptation of HRIS, difference between societal culture and organizational culture must be understood and accordingly acknowledged in the development of HRIS. Studies have consistently recognized that people are the important resource of an organization for achieving sustainable competitive advantage. To perform their duties properly, information regarding internal and external environment should effectively be given to the human resource (Pfeffer, 2005). Thus, the designing of a proper HRIS to pass information to the human resource helps to achieve organizational objectives as well as the competitive advantage (Gibson et al., 2007). In other words, the successful adaptation of HRIS will help modern organizations in the effective management of human resource which will eventually lead to organizational effectiveness.

### c. Impact of HRIS on organization culture

HRIS have a profound effect on the performance of organizations, particularly in today's world, as employees now focus on proper reporting and processing which can be only be achieved by the implementation of effective HRIS, challenging the operating structure and principles of all HR-related activities of the entire organization. Leidner and Kayworth (2006) inferred that IS has the potential for use in organizational culture re-engineering efforts where such system in the form ERP system impose its own logic on organizational structures and business processes. They also pointed that different types of technological artifacts may influence certain values. Mohanty and Tripathy (2007) write that although the HRIS of National Aluminum Company (NALCO) operating in Odisha (India) is not fully as per the expectation of the HR department, it has increased the efficiency and effectiveness of the HR department to a larger extent. Hence, they have suggested some important areas for improvement of the system so as to make it more compatible with the employees' needs and expectations. According to them an integrated system should develop containing provision for all category of HR functions. To improve the HRIS effectiveness coherent approach is required between HR and system department. Attention should be given to design and develop an effective

& user-friendly system. Transparency in implementing standards of codes and procedure should be maintained. The data in the system should be updated regularly with authenticity to make it worth or valuable. Support of top management is highly essential for further improvement and implementation of system properly. They should emphasize the importance of HRIS in decision making process. It should have provision for analyzing data in order to help in strategic decision making processes. The employees should be exposed with continuous training programs to be acquainted with the systems latest innovations, which will help them for better adoptability with the system. The HRIS should be accessible to all level of employees for knowing their own information maintained by HRIS keeping the privacy and security issue intact. In yet another study, Hosnavi and Ramezan, (2010) found that employees expressed their satisfaction in three dimensions of HRIS, viz., system quality, information quality and information use which largely influence the organizational culture of the National Iranian Oil Company.

## 6. Conclusion

HRM is the management of HR which is the most important resource of an organization. Efficient and effective management of such a resource should be given top priority for organizational development, more so when work-cultures are becoming complex day-by-day. With an increasing as well as diverse work-force in the organization, it is really becoming very difficult and time-consuming to maintain and manage the employees' information manually. Data need to be collected, written in a proper format, and kept in a systematic way so that it can be given to the required user as and when required. This increases the administrative expenses of the organization and un-timely delivery of information because of the dependency on those people who maintain it. It does not mean that an organization having no computerized system does not have a HRM system. But, in such a case, the management of employees' information cannot be done as efficiently and effectively as in a proper computerized system. To overcome this difficulty, most of the organizations have shifted towards automation. The rapid development in information technology and use of personal computers supported this process to a large

extent. This has facilitated the flow of information in all the directions, both within and outside of the organization. For managing activities relating to human resources of the organizations, HRISs were introduced and as a result, various functions of the HR department that dealing with employees' information, such as employee benefits, leave management, compensation management, performance evaluations etc. became easier.

The key element for managing HR in an organization is culture, be it organizational or societal, of the employees. Hence HRM practices seem to be most vulnerable to cultural similarities and differences found across cultures. Management systems in general and HRISs in particular should consider these aspects for their design and appropriateness for higher acceptability and diffusion in the organizations. This requires the study of culture, in a holistic way for identifying the characteristics to be embedded in the HRIS for effectively managing the HR in the organization. As has been discussed, the effectiveness of this system increases when such a system considers cultural dimension apart from technical one in the design phase, as this system involves people and people management in organization and is largely culture dependent.

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## ABO and Rh frequency distribution and gene frequency among the Bhumij community of Balasore district, Odisha

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### **Abstract**

*Global distribution pattern of blood groups depends on various environmental factors, such as disease, climate, altitude, humidity etc.. Blood group is a classical marker; its knowledge remains very significant in understanding the influence of evolution causing factors. The main objective of the present study is to find out the percentage distribution and gene frequency of ABO, Rh blood type in the Bhumij community (an Austro-Asiatic population) from Balasore district. The results showed that the frequency of blood group O is highest in the studied population which varies from the other Austro-Asiatic populations.*

**Keywords:** ABO, RH, Gene Frequency, Hardy-Weinberg Equilibrium, Bhumij.

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### **1. Introduction**

ABO and Rh blood groups are the most studied blood systems among human populations due to their clinical, genetic and anthropological importance (Davey WW and Elebute EA, 1963, Bakare, 2006 and Jeremiah, 2006). The grouping of ABO and Rh factor into blood groups is based on the antigenic properties on the surface membrane of the red blood cells (RBCs) (Garratty G., 2005). All human populations share the same blood group systems; although they differ in the frequencies of specific types. The incidence of ABO and Rh groups varies markedly in different races and ethnic groups in different part of the world. The frequencies of ABO and Rh blood groups vary from one population to another and time to time in the same region. The knowledge of distribution of ABO and Rh blood groups at local and regional levels are helpful in the effective management of blood banks and safe blood transfusion services. Identification of Rh system is important to prevent erythroblastosisfetalis (Gadwalkar, 2013).

Many studies have found difference of ABO and Rh frequency among the world population (Zahra et al., 2014; Kostovski et al., 2014). Several studies have also been conducted to understand the distribution of ABO blood group frequency among the Indian population (Subhashini, 2007; Periyavan et al., 2010; Rai and Kumar, 2011; Pathania, 2011; Haloi, 2011; Pandey et al., 2012; Prakash et al., 2013; Pandey et al., 2013; Soram et al., 2014; Handoo and Bala, 2014; Rao and Shetty, 2014; Shrivastava et al., 2015; Sukumaran et al., 2016; Sah and Sahadlal, 2016). Overall distribution of ABO frequency in India shows the group B to be the commonest blood group in northern and western part of India whereas in eastern, southern and central part O is the most prevalent blood group. Cumulatively, O is the dominant blood group among the Indian population (Shekhar et al., 2014).

In the present study the ABO blood group and Rh (D) frequency distribution of the Bhumij community of Balasore district was studied and the gene frequency was also calculated to understand the micro-evolutionary forces is acting or not through Hardy-Weinberg equilibrium.

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## 2. Materials and Methods:

### Brief description of the land and people:

The Bhumijare believed to be a branch of the Munda tribe. They belong to the Austro Asiatic linguistic family. In Odisha the Bhumij population ranges from 2, 48,114 to 3, 21,592. The study was conducted in Gopinathpur Village of Nilgiri, Balasore districts covering 3 hamlets namely Nuasahi, Kendupadia and Patrasahi. A total of 187 blood samples were obtained.

### Collection and Determination of Blood samples

Each individual was requested to sign on consent

form before blood collection for the serological test. A total of 3 ml of blood sample was collected in Ethylene diamine tetra acetic acid (EDTA) vial for blood grouping and total cell count. This vial was marked with individuals name and the unique donor identification number. After collection of blood, the samples were packed with in a thermocol boxes, with ice packs and these were analysed within 24 hours. Each blood samples were grouping manually by adding anti sera-A, B and D. frequency distribution, gene frequency was calculated. Hardy-Weinberg law was studied by using Chi-Square test.

## 3. Results

Table I: Phenotypic distribution of ABO blood group among the studied population

Ethnic group	ABO blood group type frequency				Total
	Type A	Type B	Type O	Type AB	
Bhumij	46(24.6%)	55(29.4%)	62(33.2%)	24 (12.8)	187

The present study revealed that in the studied population, frequency of the blood group type O (Table I is highest (33.2%) followed by B (29.4%)

and A (24.6%) and the frequency of AB blood group is least (12.8%).

Table II: Phenotypic distribution of Rh blood group among the studied population.

Ethnic group	Rh blood group type frequency		Total
	Rh Positive	Rh Negative	
Bhumij	187(100%)	0(0.0%)	187

As shown in table II, there are no Rh Negative people found from the sample collected.

## 4. Distribution of ABO and Rh (D) allele frequency

Table III: showing the phenotype and allele frequency of ABO blood group

Ethnic Group	Total (N)	Observed Phenotype Frequency				Allele Frequency		
		A	B	AB	O	A ( $I^A$ )	B ( $I^B$ )	O ( $I^O$ )
Bhumij	187	0.246	0.294	0.128	0.332	0.184	0.240	0.576



Table IV: showing phenotype and allele frequency of Rh blood group

Ethnic Group	Total (N)	Observed Phenotype frequency		Allele Frequency	
		Rh Positive	Rh Negative	Rh Positive(D)	Rh Negative(d)
Bhumij	187	1.0	0.0	1.0	0.0

The allele frequency was calculated using maximum likelihood method. Table III and IV shows the allele frequency of ABO and Rh blood group system respectively. The frequency of O allele ( $I^o$ ) is 0.576, frequency of B allele ( $I^B$ ) is 0.240 and A allele ( $I^A$ ) is 0.184. In case of Rh system, the frequency of D allele was 1.0 and the recessive allele is 0.

Chi square test for goodness of fit between the observed and expected phenotypes was done to find if the frequencies observed follow hardy Weinberg equilibrium (Table V). In both the case of ABO blood group and Rh system the frequencies were not in Hardy Weinberg equilibrium, as the difference between observed and expected frequency was found to be statistically significant ( $p < 0.5$ ).

Table V: showing genotype frequency, observed, expected frequency, Chi square value in both ABO and Rh blood group system

<i>Ethnic Group</i>	<i>Genotype</i>	<i>Genotype Frequency</i>	<i>Observed Phenotype</i>		<i>Expected Frequency</i>		<i>Chi -square value (df)</i>
Bhumij	AA	0.034	A	0.246	A	0.246	P<0.05
	AO	0.106					
	BB	0.058	B	0.294	B	0.335	
	BO	0.138					
	AB	0.044	AB	0.128	AB	0.088	
	OO	0.332	O	0.332	O	0.332	
Bhumij	Rh+v e (DD)	1.0	Rh Positive	1.0	Rh Positive	1.0	P<0.05
	Dd	0.0					
	Dd	0.0	Rh Negative	0.0	Rh Negative	0.0	

## 5. Discussion and Conclusion

It was observed in the present study that blood group O is the most frequent blood group among the population followed by B, A and AB. And all the samples comes under Rh +ve group. Precursor substance for ABO blood group is antigen H, present on the surface of membrane of red cells and most of the epithelial and endothelial cells. The A allele codes for an enzyme that adds an N-acetyl galactosamine to the H antigen. The B allele, which differs from the former by four amino acid changes,

codes for an enzyme that adds a D-galactose. The O allele occurs most frequently in modern humans and carries a human-specific inactivating mutation which produces a non-functional enzyme, and thus the H antigen remains without further modification on the surface of the cells (Narendrakumar, 2014) As ABO blood group system is of autosomal inheritance controlled by a single gene at chromosome 9q34, the frequency of blood groups is not different in both sexes (Rudman, 2005), so we have not divided study group on the basis of male and female.

Many studies have been done to investigate the ABO blood group frequency among Indian population. Agarwal A et al showed O blood group predominance from central part of India. Blood group A predominance has been shown by Naidu and Veeraju in Brahmin community, by Datta et al in Lodha tribes of West Bengal and by Vokendra and Devi among selective tribes of Arunachal Pradesh. This difference in distribution of blood groups

represents multi-ethnic and anthropologically different origins of population. Allele O was most common in present study followed by allele B and A. these findings are in concordance with Agarwal A et al (Agarwal, 2014). When data across the world is compared blood group distribution frequencies for A, B, O and AB blood group vary among different parts of the world (Table VI)

Table VI: Distribution of ABO phenotype in different parts of India and some other Countries.

Study	A (%)	B (%)	O (%)	AB (%)
Bhumij (Present study)	24.6	29.4	33.2	12.8
Chhattisgarh	22.17	35.42	33.55	8.17
Bangalore	23.85	29.95	39.81	6.37
Kashmir	22.95	32.05	38.43	6.55
Rajasthan	22.2	36.4	31.7	9.4
South India	25.74	27.86	39.76	6.64
North (Lucknow)	21.38	39.92	29.87	9.43
Uttarakhand	28.70	32.70	28.70	10.53
Western Ahmedabad	21.94	39.40	30.79	7.86
Eastern Ahmedabad	23.30	35.50	32.50	8.80
Maharashtra (Loni)	28.38	31.89	30.99	8.72
Neighbouring Countries				
Bangladesh	23.51	39.8	27.6	9.2
Pakistan	21.20	36.16	34.14	9.05
Nepal	34.00	29.00	32.50	4.00
Australia	38.00	10.00	49.00	3.00
Africa	24.60	20.70	50.30	4.50

Blood group B has its highest frequency in northern India and central Asia. Comparison of results of present study with that of some other populations is shown in Table VI. Blood group O is the most common phenotype globally with parts of Africa and Australia showing highest frequency. Blood group A is most common in northern and central Europe. Several theories have been proposed as reason for this difference in distribution and one of them is evolutionary selection based on pathogen driven blood group antigen changes (Storry, 2009). Balgir (2005) made a field study among scheduled tribes constituting a major chunk of the total

population of India. i.e., 15 tribes viz., Bathudi, Bhatra Bhumij, Bhuyan, Gond, Kharia, Kissan, Kolha, Kondh, Lodha, Munda, Oraon, Paraia, Santal and Saora. The ABO and Rh (D) blood groups distribution showed the high frequency of B over A blood group in 12 major scheduled tribes except Bhumij, Gond and Lodha. Pandey (2012) did studies among the different tribal groups of Jharkhand and found that In general blood group B is predominant. Rh negative frequency is the highest in Santhal. On the whole Bhumij showed the influence of large range of gene flow than that of others (Pandey et al. 2012).

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## Maternal and childhealth among the ethnic groups of Turunji village of Nabarangpur district, Odisha

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### **Abstract**

*This study explores the prevalence and factors associated with the utilization of maternal and child health care services among mothers in Turunji village of Nabarangpur district, Odisha. The present study covers a sample of 50 both tribal females such as Amanatya, Bhotra and Saora and other nontribal like Gouda, Christian and Harijan females of Turunji village of Nandahandi block of Nabarangpur district. I had used different methods for data collection such as mapping, household numbering, participant observation and interview. I have interviewed those mothers whose youngest child is less than or equal to 6 years. So the age range of the participants varies. So the age range of the participants is not constant. The paper attempts to analyze various factors such as age at menarche, age at 1<sup>st</sup> conception, food preferences and taboos during or after delivery, types of delivery, place of delivery, TT immunisation of the mother and vaccination of the child.*

**Keywords:** Maternal and child health services, tribals and non tribals, Odisha.

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### **1. Introduction**

Promotion of maternal and child health has been one of the important objectives of the India's Family Welfare Programme since its inception. It is still an important component of RCH programme which seeks to integrate maternal and child health and fertility regulation interventions with reproductive health programmes. Studies suggest better pregnancy outcomes for women who receive antenatal care: they are less likely to die of maternal causes, experience stillbirth or perinatal mortality, or give birth to low birth weight babies (Bhatia 1993; Jejeebhoy 2000).

Worldwide each year, over 500,000 women and girls die of complications related to pregnancy and childbirth. Additionally, another 138,000 to 207,000 Nepalese women and girls suffer from disabilities caused by complications during pregnancy and childbirth each year, (the Maternal Health Study, 2006)..The United Nations population Fund (UNFPA) estimated that 2.89,000 women died of pregnancy or child birth related causes, 2013. The

mother's death occurs in vulnerable families and vulnerable infants. Even if they are able to survive somehow, are more likely to die before their second birth date. While in 1990, worldwide, 12.7 million children under age five died; in 2013 this number fell to 6.3 million children (UNICEF, 2015). Due to growing awareness for family planning, skilled birth attendance and emergency obstetric care, the global maternal mortality ratio (MMR) has fallen from 380 maternal deaths per 1,00,000 live births in 1990 to 210 in 2013.

Maternal health forms a very important part of the general reproductive health of women in India. In a developing country like India, poverty, illiteracy and multiple pregnancies take their toll of mother's health and that of the infant. In India, considerable attention has been paid to estimates of 27 maternal mortality, but the issue of adolescent's pregnancies which require paramount attention has been neglected (Sahoo.,2011). The scheduled tribe (ST) population is 104.2 million, which is 8.6 percent of the total population of India (Census 2011). Madhya

Pradesh, Maharashtra, Orissa, Gujarat, Rajasthan, Jharkhand, Chhattisgarh, Andhra Pradesh, West Bengal, and Karnataka are the states having a large number of ST populations. Like other social groups, the tribal women face problems related to reproductive health. Tribal mothers have incidence of anaemia, and girl child gets less than the required nutritional intake (Maiti, Unisa and Agrawal, 2005). The infant mortality rate among the ST children is 62.1 which is 57 for the other social groups. The child mortality rate among the tribes is 35.8 which is much higher than the other social groups i.e. 18.4 percent. There is a need for proper understanding of health aspects of tribal women and their specific health needs so that relevant health measures can be prepared and implemented. The present study aims to determine the health status of the mother and children of tribal and nontribal populations. In order to reduce the maternal and child mortality as well as morbidity, the domain of maternal and child health becomes very important.

The key aspects considered for the purposes are as under:

1. To study the age at menarche, regular or irregular type of menstrual cycle, age at marriage. And age at 1<sup>st</sup> conception etc.
2. To study maternal health during pregnancy.
3. To find out the antenatal and postnatal care giving practices.
4. To know about place of delivery and type of delivery.
5. To study about the post natal complication and the immunization status of the child.

## 2. Area and people

Selection of the area is very important for research. Fieldwork for this research was carried out in Turunji village and its three hamlets namely; Naikguda and Domnaikguda under Dhondra panchayat of Nandahandi block of Nabarangpur district, Odisha. The fieldwork was conducted among the tribals and nontribal populations of this village. We choose this village because we want to do fieldwork in an interior area.

On 2nd October, 1992 Nabarangpur now spelled as Nabarangpur came into being as a separate district of Odisha State. It was one of the subdivisions of Koraput district having her headquarters at Nabarangpur town now functioning as district headquarters. The area of the district is 5294 Sq. km. Its boundary stretches in the north to Nuapada and Kalahandi Districts, west to Bastar District in Chhattisgarh, east to Kalahandi and Rayagada Districts and south to Koraput District. The Nabarangpur district is located at 81° 52' to 82° 53' E Longitude and 19° 9' to 20° 5' N Latitude and stretches over an area of approximately 5294 Sq. Kms.

### Ethnography of Turunji village

As discussed earlier, the ethnographic fieldwork was carried out in three hamlets of Turunji village namely; Badagaon, Nayakguda and Domnayakguda. These three hamlets comprises of multi-ethnic groups that include scheduled tribes (Amanatya, Bhotra and Soura), caste groups (Gouda and Bindhani) and religious group (Christian).

### Omanatya/Amanatya

Omanatya are Odia speaking cultivating tribal people who live in the north of Jeypore and south of Nabarangpur. Omanatya are divided into two sections i.e. Bodo and Sano. Inter-marriage between Bada and Sana is generally not preferred. Mostly used surnames among the Amanatya tribe are Amanatya, Pujari and Randhari. According to the local people there are around 100 Amanatya families in Turunji village who have been increased from a meagre 4 families; related brothers who started living here for many generations.

### Bhattoda / Bhotra/ Bhattra

Bhotra synonymous with Bhattoda or Bhattra are predominantly found in all blocks of Nabarangpur district except Raigarh and Chandahandi. Out of 4.51 lakh populations in the state 3.25 Bhatrapopulation, live in Nabarangpur district as per 2011 census. The Bhotras are one of the numerically major agricultural tribe of the district. They speak Bhatra, a nonliteracy dialect among themselves. They speak a corrupt form of Odiya language known as Desia. There are 3 types of Bhattras namely; Bada, Majhia and Sana Bhattras. The most popular and common surnames

among them are MajhiBhottra, Nayak and Disari. Endogamy is not practiced among them.

### Saora / Saura

The Saoras also called Savaras constitute a major tribe in the State of Odisha. The Saoras are very famous for their wall paintings known as ikons, which are of religious significance.

Table I Ethnic group wise distribution of households.

Sl. No.	Name of the community/ ethnic group	Number of Households	Number of individuals
1	Amanatya	56	269
2	Bhotra	78	400
3	Saora	24	113
4	Gauda	68	310
5	Christians	33	160
6	Others	6	36
	Total	262	1288

### 3. Methodology

The present study is based on both primary and secondary sources of data collection. Primary data was collected using anthropological fieldwork technique during 20 days from February 8 to February 28. Eight students of our specialization were involved in data collection. First we filled the census form and then collected our own data individually. We use a standard questionnaire for census data collection which includes age, sex, clan, and marital status, types of marriage, education, occupation, income and expenditure of the total members of the family. We also collected data about their demographic data and socio-economic data. Then I collected information about my own topic "maternal and child health" using a questionnaire which includes mean age at marriage, menarche, 1<sup>st</sup> conception and body weight of the mother, antenatal and post natal care, delivery practice, immunisation status of mother and child. The data was collected by using different methods like scheduled questionnaire, interview and observation etc. Rapport establishment with the villagers is very necessary in fieldwork. Correct age calculation of the subject is very important, As they are basically illiterate and they donot say about their accurate age.

So I used some indirect methods for calculating the age like use of some land marks of the village. I also used participant observation and case study method during my data collection. After completion of our fieldwork. we entered the data into an excel sheet. Then the data was analysed through SPSS(16.0) and were compared through secondary data. The data for this topic "Maternal and child health" was collected from women's of Badagaon, Nayakguda and Damanayakguda hamlet of Turunji village Nabarangpur district. The present study covers 50 households. 10 students have participated in data collection.

### 4. Results and discussion

Table II Distribution of population according to mean age at menarche among the ethnic groups of Turunji village, Nabarangpur

Ethnic groups	Number	Mean age at menarche	Std. Deviation
Amanatya	15	12.27	1.033
Bhotra	15	12.47	1.060
Saora	6	13.17	.753
Gouda	8	12.75	1.165
Harijan	1	14.00	.
Christian	5	12.00	1.000
Total	50	12.52	1.054

Table II represents that the mean age at menarche among the ethnic groups of Turunji village is 12.52. The time of first menstruation is called Menarche. An enumeration of average age at menarche of girls of 24 countries gives the range as 10-18 years, sterility rate is relatively low in women of low menarchial age which increases with the increase in menarchial age, age of mother at birth, season, month of birth, diet, family size and adult body size are the factors determining the age at menarche. In the present study in the Turunji village of Nabarangpur district, Odisha it was observed that the average age at menarche of the ethnic groups is 12.52. (Table 2). The occurrence of menarche is highest between 13-15 age groups. The table 4.2 shows that the mean age at menarche in Amanatya is 12.27, Bhotra is 12.47, in Saora is 13.17, in Gouda is 12.75, in Harijan is 14 and in Christian it is 12.

Celebration and restrictions at the time of first attainment of puberty is seen in rural and urban as well as in tribal areas. In the present study celebration at puberty is seen among the ethnic

groups of Turunji village. Mostly it is celebrated in the tribes for 7 days or 9 days. They have some restrictions in food items and they prefer certain foods.

Table III Mean age at menarche among the women of different states in India and that of the tribal communities under study

Mean age at menarche in different states in India	Age in years	Source
Delhi	13.3	Rokade and Mane,2008
Kolkata	12.3	Rokade and Mane,2008
Odisha	15.2	ICMR bulletin,Oct 2003
Hariyana	13.1	Mittel and Goel,2010
Amanatya	12.27	Present study
Bhotra	12.47	Present study
Saora	13.17	Present study

Table III shows the comparison among different states of India with the studied present population. It is observed that the mean age at menarche among

the studied population is lower as compared to the other states of India. So among the studied population early onset of menarche is observed.

Table IV Distribution of population of Turunji village according to nature of Menstrual Cycle in beginning

Nature Of Menstrual Cycle Beginning	Ethnic groups						Total
	Amanatya N(%)	Bhotra N(%)	Saora N(%)	Gouda N(%)	Harijan N(%)	Christian N(%)	
Regular	13(26.0)	13(26.0)	6(12.0)	7(14.0)	1(2.0)	5(10.0)	45(90.0)
Irregular	2(4.0)	2(4.0)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	5(10.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)

The nature of menstruation is categorised into five types. These are, regular, irregular, lactate, pregnant and amenorrhea. Most of the women have regular type of menstruation cycle. Irregular type of cycle is

also seen in these communities. The table 3 shows the nature of menstrual cycle in the It is observed that 90% female have regularity in menstrual cycle.

Table V Distribution of ethnic groups of Turunji village according to age at marriage

Age group	Amanatya N (%)	Bhotra N (%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Christian N (%)	Total
11 -15	8 (16.0)	6(12.0)	1(2.0)	3(6.0)	0(0.0)	2(4.0)	20(40.0)
16 -20	7(14.0)	9(18.0)	5(10.0)	4(8.0)	1(2.0)	2(4.0)	28(56.0)
21 -25	0(0.0)	0(0.0)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	1(2.0)
26 -30	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(2.0)	1(2.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5 (10.0)	50(100.0)

Table VII Mean age at 1<sup>st</sup> marriage among the women's of different states in India.

<i>Mean age at 1st marriage in different states in India</i>	<i>Age in years</i>	<i>Source</i>
Tamilnadu	22.4	WHO and Ministry of Health and Family Welfare in India- 2011
Kerala	22.7	WHO and Ministry of Health and Family Welfare in India- 2011
Delhi	22.4	WHO and Ministry of Health and Family Welfare in India - 2011
Rajasthan	19.8	WHO and Ministry of Health and Family Welfare in India -2011
Turunji village of Nabarangpur district, Orissa	16.34	Present study

The age at which the girls are given in marriage depend on social values. Girls in tribal societies are given in marriage general after puberty. There are a few micro level studies, which deal with the age at marriage of individual tribe,e.g, female age at marriage AO Naga(16-20years), Bhil(16 years),

Khasi(13-18 years), Munda(18 years), Gond (18 years),Chenchu after puberty.As per NFHS-3(National Family Health Survey) about 17.0 % of the females in the age group 15-19 years were married.. The table 6 shows the age at marriage of different states of India and the present study.

Table VII Distribution of ethnic groups according to mean age at 1<sup>st</sup> conception.

<i>Ethnic groups</i>	<i>Number</i>	<i>Mean age at 1st conception</i>	<i>Std. Deviation</i>
Amanatya	15	17.93	5.007
Bhotra	15	16.93	1.751
Saora	6	16.83	1.169
Gouda	8	19.13	4.190
Harijan	1	18.00	.
Christian	5	19.80	6.140
Total	50	17.88	3.847

Table VII presents the distribution of population according to mean age at 1<sup>st</sup> conception. In the present study it is found that the mean age at 1<sup>st</sup> conception is 17.88.It is highest in Christian which is 19.80 and in Saora tribe it is lowest which is 16.83.However in Bhotra it is 16.93,in Amanatya it

is 17.93,in Gouda it is 19.13 and in Harijan it is 18.00.The result is significant. For better results it needs more time and more investigation. The result is significant. For better results it needs more time and more investigation.



Table VIII Distribution of population according to the intake of Iron and Folic acid tablets

Iron and folic acid tablets	Ethnic groups						Total
	Amanatya N (%)	Bhotra N (%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Christian N (%)	
Yes	14(28.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	49(98.0)
No	1(2.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(2.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)

This table VIII shows that 98% people take Iron and Folic acid tablets

Table IX Distribution of ethnic groups according to the types of antenatal check-up preferred

Ethnic Groups	Types Of Antenatal Check- Up (Government Hospital)	Total
Amanatya N (%)	15(30.0)	15(30.0)
Bhotra N (%)	15(30.0)	15(30.0)
Saora N (%)	6(12.0)	6(12.0)
Gouda N (%)	8(16.0)	8(16.0)
Harijan N (%)	1(2.0)	1(2.0)
Christian N (%)	5(10.0)	5(10.0)
Total	50(100.0)	50(100.0)

Table IX represents the distribution of ethnic groups according to the types of antenatal check-up preferred. This table shows that all the people prefer government hospitals rather than private hospitals.

Table X Distribution of population according to the types of food taken during pregnancy

Ethnic groups	Types Of Food Taken During Pregnancy		Total
	Traditional N (%)	Traditional And Medical N (%)	
Amanatya	8(16.0)	7(14.0)	15(30.0)
Bhotra	10(20.0)	5(10.0)	15(30.0)
Saora	5(10.0)	1(2.0)	6(12.0)
Gouda	5(10.0)	3(6.0)	8(16.0)
Harijan	1(2.0)	0(0.0)	1(2.0)
Christian	2(4.0)	3(6.0)	5(10.0)
Total	31(62.0)	19(38.0)	50(100.0)

The table X represents the special food items taken by the women's of ethnic groups of Turunji village of Nabarangpur district, Odisha during pregnancy. It is observed that 52% people prefer traditional practice of food habit and 38% people prefer both traditional practice of foods and the foods prescribed by doctor or any healthcare practitioner during pregnancy.

Table XI Distribution of population according to the types of food taken after delivery

<i>Ethnic groups</i>	<i>Traditional N (%)</i>	<i>Traditional And Medical N (%)</i>	<i>Total</i>
Amanatya	13 (26.0)	2 (4.0)	15 (30.0)
Bhotra	11 (22.0)	4 (8.0)	15 (30.0)
Saora	4 (8.0)	2 (4.0)	6 (12.0)
Gouda	6 (12.0)	2 (4.0)	8 (16.0)
Harijan	1 (2.0)	0 (0.0)	1 (2.0)
Christian	3 (6.0)	2 (4.0)	(10.0)
Total N(%)	38 (76.0)	12 (24.0)	5 (100.0)

The table XI shows that 76% people prefer traditional practice of food items taken after delivery. Only 24% people prefer both traditional food and the food prescribed by the doctor or any medical practitioner. Traditionally the special food items taken by them include “*Biribadhi, Masurdali and kandul*”

Table XII Distribution of population according to the Types of food avoided during pregnancy

<i>Types Of Food Avoided During Pregnancy</i>	<i>Ethnic Groups</i>						<i>Total</i>
	Amanatya N (%)	Bhotra N (%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Christian N (%)	
None	14 (28.0)	15 (30.0)	5 (10.0)	8 (16.0)	1 (2.0)	4 (8.0)	47 (94.0)
Traditional	1(2.0)	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)	1 (2.0)	3 (6.0)
Total	15 (30.0)	15 (30.0)	6 (12.0)	8 (16.0)	1 (2.0)	5 (10.0)	50 (100.0)

Table XII represents the special types of food items avoided by the women's of ethnic groups of Turunji village of Nabarangpur district, Odisha during pregnancy. It is observed that 94% women have no restrictions in food items during pregnancy.

Table XIII type of food avoided after pregnancy

<i>Types Of Food Avoided During Pregnancy</i>	<i>Ethnic Groups</i>						<i>Total</i>
	Amanatya N (%)	Bhotra N (%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Christian N (%)	
Traditional	15 (30.0)	15 (30.0)	6 (12.0)	8 (16.0)	1(2.0)	5 (10.0)	50 (100.0)
Total	15 (30.0)	15 (30.0)	6 (12.0)	8 (16.0)	1(2.0)	5 (10.0)	50 (100.0)

The table XIII implies the type of food avoided after pregnancy. It shows that all the 100% people avoided certain food items after pregnancy. They don't eat Amla, potato, tomato, chilli foods, fish etc. They believe that if they these foods they suffer from diseases like digestion problem and stomach pain.

*Table XIV Distribution of ethnic groups according to the mean body weight during last trimester of pregnancy*

<i>Ethnic groups</i>	<i>Number</i>	<i>Mean</i>	<i>Std. Deviation</i>
Amanatya	15	46.73	6.584
Bhotra	15	47.60	4.437
Saora	6	46.50	4.370
Gouda	8	47.62	3.623
Harijan	1	52.00	.
Christian	5	46.20	3.033
Total	50	47.16	4.833

The above table shows the mean body weight during the last trimester of pregnancy in all the population is 47.16.

*Table XV Distribution of ethnic groups according to the complication during delivery*

<i>Any complication during delivery</i>	<i>Ethnic groups</i>						<i>Total N (%)</i>
	<i>Amanatya N (%)</i>	<i>Bhotra N (%)</i>	<i>Saora N (%)</i>	<i>Gouda N (%)</i>	<i>Harijan N (%)</i>	<i>Christian N (%)</i>	
Yes	10(20.0)	13(26.0)	5(10.0)	6(12.0)	1(2.0)	2(4.0)	37(74.0)
No	5(10.0)	2(4.0)	1(2.0)	2(4.0)	0(0.0)	3(6.0)	13(26.0)
Total N (%)	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)

The table XV presents the complications during delivery of the women's of ethnic groups of Turunji village of Nabarangpur district, Odisha. The table reveals that 74% women have complications during fieldwork and 26% women have no complications

during pregnancy. These complications include headache, vomiting and stomach pain etc. The result is significant. For better results it needs more time and more investigation.

*Table XVI A comparative status of the types of delivery occur in different ethnic groups of Odisha*

<i>Ethnic groups</i>	<i>Types of delivery</i>		<i>Sources</i>
	<i>Vaginal (%)</i>	<i>Caesarean (%)</i>	
Ethnic groups of Turunji	92	4	Present study
Munda	100	0	Unpublished P.G dissertation(Y.Puja,20 16)
Pano	97.3	2.7	Unpublished P.G dissertation(Y.Puja,20 16)

The table XVI explains that in Munda tribes all the deliveries are normal and in Pano 97.3% is normal delivery. In turunji village 92% deliveries are normal and only 4% caesarean cases are found. The

ethnic groups of Turunji village include tribes like Amanatya, Bhotra and Saora and nontribal like Gouda, Christian and Harijan communities.

Table XVII The types of delivery done by the ethnic groups of Turunji village.

Types of delivery	Ethnic groups						Total
	Amanatya N (%)	Bhotra N (%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Christian N (%)	
not available	1(2.0)	0(0.0)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	2(4.0)
Vaginal	14(28.0)	15(30.0)	6(12.0)	7(14.0)	0(0.0)	4(8.0)	46(92.0)
Caesarean	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(2.0)	1(2.0)	2(4.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)

The table XVII presents the types of delivery done by the ethnic groups of Turunji village of

Nabarangpur district. The table shows that 92% of the total deliveries are vaginal and only 4% cases are caesarean.

Table XVIII A comparative study of different ethnic groups of Turunji village with other tribes of Odisha on the basis of TT immunisation of mother

Ethnic groups	TT immunisation		Source
	Yes (%)	No (%)	
Ethnic groups of Turunji village	100	0	Present study
Munda (Mayurbhanj)	93.33	6.67	Supriya Sahoo, 2015
Mahanta (Mayurbhanj)	80.56	19.35	Supriya Sahoo, 2015
Sabar (Mayurbhanj)	84.00	16.00	Supriya Sahoo, 2015

The above table XVIII shows the TT immunisation of mother during pregnancy. It is observed that in turunji village, all the mothers take TT immunisation. However in Munda it is 93.33%, in

Mahant it is 80.56% and in Sabar it is 84.00. The result is significant. For better result it needs more time and further investigation.

Table XIX Distribution of ethnic groups according to TT immunisation status of mother

TT immunisation of the mother	Amanatya N(%)	Bhotra N(%)	Saora N(%)	Gouda N(%)	Harijan N(%)	Christian N(%)	Total N(%)
Yes	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)
No	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(100.0)

The table XIX shows the immunisation status of mothers of Turunji village of Nabarangpur district during pregnancy. It is observed that in turunji village all the mothers take TT immunisation.

However in Munda it is 93.33%, in Mahant it is 80.56% and in Sabar it is 84.00. The result is significant. For better result it needs more time and further investigation.

Table XX Distribution of ethnic groups according to breastfeeding of the child after birth

BREAST FEEDING OF THE CHILD AFTER BIRTH				
TRIBE/ CASTE	YES N(%)	NO N(%)	Not available N(%)	TOTAL N(%)
Amanatya N(%)	13 (26.0)	1 (2.0)	1 (2.0)	15 (30.0)
Bhotra N(%)	15 (30.0)	0 (0.0)	0 (0.0)	15 (30.0)
Saora N(%)	4 (8.0)	2 (4.0)	0 (0.0)	6 (12.0)
Gouda N(%)	7 (14.0)	0 (0.0)	1 (2.0)	8 (16.0)
Harijan	1 (2.0)	0 (0.0)	0 (0.0)	1 (2.0)
Christian N(%)	5 (10.0)	0 (0.0)	0 (0.0)	5 (10.00)
TOTAL N(%)	45 (90.0)	3 (6.0)	2 (4.0)	50 (100.0)

The above table shows that 90% children take breastfeeding after birth. Breastfeeding practices have significant effects on child survival and health as well as maternal fertility. It improves the nutritional status of children and reduces morbidity

and mortality. The duration and frequency of breastfeeding have effects on the duration of postpartum amenorrhoea, birth intervals and hence fertility (NFHS-1, 1992-93).

Table XXI Distribution of ethnic groups according to the postnatal complication of the child

Ethnic groups							
Post natal complication of child	Amanatya N (%)	Bhotra N(%)	Saora N (%)	Gouda N (%)	Harijan N (%)	Ch ristian N (%)	Total N (%)
Yes	6(12.0)	11(22.0)	1(2.0)	4(8.0)	0(0.0)	1(2.0)	23(46.0)
No	8(16.0)	4(8.0)	5(10.0)	3(6.0)	1(2.0)	3(6.0)	24(48.0)
NA	1(2.0)	0(0.0)	0(0.0)	1(2.0)	0(0.0)	1(2.0)	3(6.0)
Total	15(30.0)	15(30.0)	6(12.0)	8(16.0)	1(2.0)	5(10.0)	50(10 0.0)

The above table 3.21 shows that 46% children have postnatal complications, 48% children have no complications after birth and 6% mother did not say about the postnatal complication of their children.

## 5. Conclusion

**Maternal health** is the health of women during pregnancy, childbirth, and the postpartum period". It encompasses the healthcare dimensions of family planning, preconception, prenatal, and postnatal care in order to ensure a positive and fulfilling experience in most cases and reduce maternal morbidity and mortality in other cases. Scheduled tribes have been known for their high poverty, lack

of education and low socio economic condition etc. In India, maternal knowledge of child health can be improved by an effective social support network, which includes female and high-educated people, and healthcare providers. Therefore, policymakers should promote mothers' social support networks. The basic findings of the present study:

It is observed that the females of Turunji village marry at very early age. I found that the mean age at marriage is 16.34 year which is very earlier than the age at marriage of Odisha and India. As the mean age at marriage is earlier so the age at 1<sup>st</sup> conception is also earlier which is 17.88.



- I observed that the females of the Turunji village are more illiterate and they have no idea about their age an age at menarche. The mean age at menarche is 12.52 year in this village.
- Basically the mother prefers the traditional foods during or after pregnancy. After delivery they specially eat “masuradali, kandul, biribadhi”. They have also restrictions in food habit after delivery. They donot eat Amla, potato, tomato, chilli foods, fish etc.
- The people of Turunji village have also traditional belief system. They 1<sup>st</sup> go to the local traditional healer (*Disari*) during pregnancy.
- They have no much more pain during or after delivery. The general problems occur during pregnancy are vomiting, headache, sometimes stomach pain and weakness.
- The NFHS -3 and the DLHS-3 reports reveals that the proportion of delivery without any ANC in India was 22.8% among non-tribal women and whereas it was as much higher as 37.8% among tribal women. It is further estimated that 49% of all the non-tribal deliveries and 82.3% tribal deliveries were at home.

The present study shows mostly normal delivery and one caesarean case found because they do very hard work. The medical report shows that all the deliveries are done at hospital. But in reality it is found that in some cases the deliveries done at home and after delivery they go to the hospital without cutting the umbilical cord of the baby for getting money from the government. The result is significant. For better results it needs more time and more investigation.

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## Association study of alcohol consumption with perceived stress among Munda and Pana communities of Jajpur district, Odisha

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### Abstract

*Addiction to alcohol is harmful not only for individual but also for the family and the society at large. Alcoholism is a complex problem determined by multiple factors, including psychological components. The present study was conducted on Munda and Pana communities in Sukinda block of Jajpur district, Odisha to find perceived stress among alcohol dependents and non-dependents. The analyses show the respondents dependent on alcohol scored high on stress.*

**Key words:** Alcohol consumption, Perceived stress, Munda, Pana.

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### 1. Introduction

Throughout the world among all beverages, rice beer is an essential part of life of several aboriginal communities (Panda et.al., 2014). In India, rice beer commonly made by the indigenous people in Bihar, Jharkhand, Odisha, Madhya Pradesh and Chhattishgarh states (Kumar, 2006). In Odisha, since long, preparation of both fermented and distilled beverages have been made by fermenting different varieties of rice. All over the state different tribal communities primarily prepared these kinds of beverages.

The term "stress" often is used to describe the subjective feeling of pressure or tension (NIH, April 1996). Stress is a physiological response to demanding external stimuli that can result in feelings of danger and anxiety and could be defined as a risk factor for individual harm (Park et.al., 1999). The response to stress is often accompanied by risky behaviours, such as smoking, alcohol consumption, and overeating (Torres et.al., 2007).

In a survey with 1,000 samples in South Korea, subjects with extremely high stress were found to have 3 times more seriously alcohol dependence than those with high stress, and subjects with higher

levels of stress demonstrated greater consumption of alcohol (Ko et.al., 2011). Moderate consumption of alcohol is a common means to relieve stress; however, these behaviours may result in increased consumption of alcohol if the perceived stress becomes even greater (Lee et.al., 2011).

The association of alcohol consumption and stress has been studied among various populations in India. Among military personnel deployed in North East Region of India indicates that those who intake alcohol specifically to reduce stress reported significantly higher stress level than those who do not consumes alcohol (Nagle et.al., 2009).

**Among** Indian IT professionals the individuals who were professionally stressed were found to have 5.9 times higher prevalence of harmful alcohol use compared to those who were not professionally stressed (Darshan et.al., 2013).

However, no such study, has been reported from Odisha. Therefore, the present study was undertaken to investigate the association of stress and intake of alcohol among the Munda (scheduled tribe) and the Pana (scheduled caste) communities in Sukinda block of Jajpur district, Odisha.

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In the last two decades Sukinda block has grown as a planned Industrial area. It has affected the lifestyles of both Munda and Pana communities inhabited there. The main occupation of the Munda community is daily wage labor either in the agriculture field given to them by their land lord or most of the days they do daily labor work in the industry. Both male and female do the labour work. The amount of land owned by most of the families is not sufficient to meet all their requirements. Some particular women in the village sell *Handia* (the rice beer which is prepared from fermented rice) or *Rassi* (a special upper part of *handia*). On the other hand pana which is a SC community has the traditional occupation of agriculture. Mostly men are engaged in the agriculture which is based on rice cultivation and women work at their home. A large number of Munda and Pana families are declared as family living below poverty line with very low socio-economic status.

## 2. Methodology

The present study was conducted in Sukinda block of Jajpur district, Odisha. It was done during the period of January 2016 to March 2016. Total sample of 170 individuals from two groups, one is a tribal community, Munda (n=80) and another one is schedule caste group, Pana (n=90). Subjects of both male (n=96) and female (n=74) above the age of 18 were considered for the present study. Both qualitative and quantitative data were collected for the present study. Socio cultural question related to alcohol consumption was collected through personal interviews. Following standardized questionnaires related to alcohol consumption and perceived stress were used.

1. Alcohol Use Disorders Identification Test (AUDIT) for alcohol consumption.
2. Perceived Stress Scale (PSS) by Cohen et al, 1983 for perceived stress.

AUDIT was developed by World Health Organization (2001) as a simple method of screening for excessive drinking. The **Perceived Stress Scale** was developed to measure the degree to which situations in individual's life as stressful (Cohen et.al., 1983).

Psychological tests and genotype data were analyzed using SPSS 20.0 for windows. The basic

statistical tests involved with reference to psychological questionnaire involve were mean, standard deviation, test of significance such Chi-square test, and one way ANOVA.

## 3. Results

Perceived stress is the feelings that an individual has about how much stress they are under at a given time period. The extent of stress in the individuals were accessed using psychological questionnaire called the perceive stress scale (PSS).

*Table 1 comparison of PSS scores between alcohol dependents and non-dependents in both the communities.*

<i>PSS(Mean Score± Standard Deviation) Both communities together</i>	
AUDIT	PSS
Dependence (69)	19.54±5.78
Nondependence (101)	17.07±6.94
DF=1,168, F value=5.910, p value= 0.016	

Out of total 170 subjects from both the communities 69 were found to be alcohol dependent. The mean score in individuals dependents on alcohol is 19.54 for PSS and individuals with alcohol non-dependence score is 17.07 for PSS respectively. The differences in the mean value scores of stress were statistically significant between alcohol dependents and non dependents of both the community.

*Table 2 comparison of PSS scores between alcohol dependents and non-dependents in Pana community.*

<i>PSS(Mean Score± Standard Deviation) Pana</i>	
AUDIT	PSS
Dependence(19)	17.21±4.52
Nondependence(71)	18.80±5.21
DF=1,88, F value=1.470, P value=0.229	

The mean score in individuals dependents on alcohol is 17.21 for PSS and individuals with alcohol non-dependence score is 18.80 for PSS respectively. However the difference in the mean value scores of stress was not found to be statistically significant between alcohol dependents and nondependents of Pana community.

Table III comparison of PSS scores between alcohol dependents and non-dependents in Munda community.

PSS(Mean Score± Standard Deviation) Munda	
AUDIT	PSS
Dependence (50)	20.42±5.99
Non-dependence(30)	12.97±8.70
DF=1,78, F value=20.53, P value= 0.000	

The mean score in individuals dependents on alcohol is 20.42 for PSS and individuals with alcohol non-dependence score is 12.97 for PSS respectively. The differences in the mean value scores of stress was also found to be statistically significant between alcohol dependents and nondependents of Munda community.

#### 4. Discussion

In most of the tribal communities alcohol consumption is a part of culture and also their food. *Handia/rasi* is the local beverage of Munda community. Both male and female members consumes *handia/rasi* on daily basis. They consume other varieties of local beverages like *mahuli* (prepared by fermented *mahula* flower), *tadi* (palm wine), *aska-40* (a cheap variety alcohol) and occasionally they take international brands like beer, no-1, whisky and rum etc. socio-cultural contexts play the role between alcohol consumption and perceived stress. For Munda people *handia* is not only a beverage but also their food, a part of culture and sometime plays as medicine for jaundice disease. The Munda people are daily labour, they need their local beverage like *handia/rasi* for doing hard work and release their stress. They believe that alcohol will help to reduce the stress in their lives, but it is most likely to be used in response to stress.

On the other hand The male members of Pana community are consuming some amount of *handia/rasi*, *mahuli* and high amount of beer, whisky and rum. Although 78 % of pana population was found to be non alcohol depend but similar level of stress was observed among alcohol dependents and non dependents. It is due to non dependent may be relying on other substance abuse then alcohol as alcohol non depended samples (n=71) are more than alcohol depended samples (n=19). Traditional

alcohol intake is not found among Pana community. But the *handia* consumption is limited to male members. Except *handia/rasi* they consume other kinds of alcohol. Alcohol is a taboo for females to consume. This pattern of alcohol dependence and perceived stress could be attributed to some other kind of substance abuse probability gundi (a form of nicotine) which is taken both by male and females to relieve stress (Sahoo et.al., 2016). Thus the pana community shows low alcohol dependence cases but equal perceived stress condition among alcohol dependence and non dependence.

#### 5. Conclusion

Stress is considered a major contributor to the initiation and continuation of alcohol or other drugs use as well as to relapse. Alcohol is reportedly the world's third-largest risk factor for disease burden. This study helps us to understand the reason behind increases of stress level and alcohol consumption among both the communities. Perceived stress is a significant contribution to alcohol dependence in the Munda community. But in the Pana community it is not significant because a few members are consuming alcohol rather people in pana community were found to take other psychoactive substance that is nicotine. The low socio-economic status is one of the main causes of increasing alcohol or nicotine dependency in these communities which was found to increase stress than relieving it.

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## A Study on Age at Menopause, Menopausal Symptoms and problems among Ethnic groups of South Odisha.

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### Abstract

*Present study aimed to evaluate the age and menopausal symptoms between the four ethnic groups. This study was conducted among the four ethnic groups- three, were tribal group (Amantaya, Bhotra, and Saora) and other one was "Gouda" caste population in the village of Nabarangpur district, of South Odisha. Data were collected from 45 study participants. (Amantya-15, Bhotra-14, Saora- 6 and Gouda-10). All the participants selected for the study were aged between 45-55 years have attained natural menopause (not because of any medical reasons) at least one year prior to the date of study, were still in wedlock and had at least one surviving child. Age at menarche, age at marriage and age menopause data were collected by recalled method. Descriptive statistics used for analyzing the percentage of sociodemographic strata. The result revealed that psychosomatic symptoms being more prevalent than vasomotor complaint in both the tribe and caste participants and there were no significant difference between menopausal age in both caste and tribe participants. Present study concluded that early menopause found in both tribe and caste population.*

**Key words:** Age at Menopause, Menopausal symptoms, Ethnic group, Participants

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### 1. Introduction

Menopausal age and menopausal symptoms varies from woman to woman and among different ethnic groups. The worldwide, the estimate for the median age at menopause ranges from 45 to 55 years. (Biri, Bakar, Maral, karabacak and Bumin. 2005; Kaufert and Syrotaik 1981; Kaw, Khunnu & Vasishta. 1994, ku.etal 2004; Meschia et al, 2002. Mohammad, Sadat Hasheme & Farahani, 2004; Sidhu & Sidhu 1987, Syamala & Sivakami, 2005) with women from western countries having higher menopausal age compared to other parts of world (Beard, 1976. Holte 1991, Wright 1981). Several studies of Indian women have reported ages at menopause ranging between 40 and the late 40s (Dasgupta and Ray, 2013; Sharma et al., 2007; Singh and Ahuja, 1980). Age at menopause may have profound implications for subsequent morbidity and mortality (Jacobsen et al., 2003). The early age at menopause

carries osteoporosis (Nagata C et al 1998) and cardiovascular disease while the late age at menopause is associated with increased risk of endometrial and breast cancers. (de Graaff J, Stolte Lam 1978 & Kavale G, Heuchj, 1988). Several studies have shown that frequency of menopausal symptoms of Indian women varies with culture and sociodemographic status. (T.S Syamala & M Sivakami 2005). During menopause, women may experience vasomotor, urogenital and psychological symptoms as well as sexual dysfunction. A wide array of symptoms and signs are observed in women during menopause. The common symptoms associated with menopause and estrogen deficiency include: hot flashes, excessive perspiration, mood swings, depression, anxiety, insomnia, urinary symptoms like frequency, vaginal dryness, leucorrhoea, purities, backache, muscle weakness, joint pain, memory loss, dementia, dental problems, skin changes and

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etc Many of the above symptoms are age related and aggravated by stresses of life. Indian women living in rural areas (72% of the population and urban areas both cite having urogenital symptoms and general body ache and pains. Interestingly, women in urban areas complain more about having hot flashes, mood swings, psychological problems and intercourse challenges. (T.S Syamala & M Sivakami 1999).

Few studies addressed the menopausal age and menopausal symptom of any indigenous ethnic group (tribe). However the prevalence of symptom differs widely in different societies. The indigenous ethnic group maintains homogeneity in the form of practicing endogamy and in maintaining traditional cultural practices. They differ from the other ethnic groups in terms of their biological and cultural practices such as mating structure and social tradition. This inequality in social and cultural characteristics is likely to affect the reproductive characteristics, including reproductive aging or menopause of the indigenous groups differentially. Under this circumstance, the present study aimed to find out the age at menopause and prevalence of menopausal problems between tribe and caste population of Turunji village, Nabarangapur District of South Odisha.

## 2. Methodology and Study area

The present study was conducted in Turunji village, Nabarangapur District Odisha. Nabarangpur district which is in the northeastern corner of the Deccan plateau. The selections of the village have been choosed operational convenience. This is one of the village where both tribe and caste population staying together. We selected this village because we found maximum number of Bhotra population staying in village. We selected predominantly found in all blocks of Nabarangpur district except Raigarh and Chandahandi. Out of 4.51lakh populations in the state 3.25 Bhatra populations, live in Nabarangpur district as per 2011 census. We decided to cover all the (Amanatya, Bhotra, Saora and Gouda) Communities of Turunji village residing in Nabarangapur District, Odisha. Data on attitudes and perception towards menopause have been collected by using case study technique from postmenopausal women, belonging Hindu ethnic groups. All the participants selected for the study are

aged between 45 and 55 years.

### Study Population

Data were collected from the 45 postmenopausal participants who had attained natural menopause (not because of any medical reason) at least one year prior to the date of study, are still in wedlock and have at least one surviving child.

### Sample size

<i>Sl No.</i>	<i>Community</i>	<i>Sample size</i>
1	Amanatya	15
2	Bhotra	14
4	Gouda	10
5	Saora	6
Total		45

### Data collection Technique

A pretested structured questionnaire was used for the collecting of quantitative data on the sociodemographic features (age of participant, education, and working status of women) reproductive history includes (age at menarche, marital status of, duration of breast feeding of last child), menstrual history, and lifestyle of participants includes consumption of alcohol or tea/coffee and use of tobacco. Menopausal symptoms of the participants were collecting with the help of menopausal symptoms list that is Vasomotor (Hot flushes, Night Sweating), Vaginal (Uterine prolapsed, Vaginal atrophy), Psychosomatic symptoms ( Dizziness, Rapid heartbeat, Numbness of extremities, Tiredness, Irritability, Headache, Sleep Disturbance, Muscle and Joint pain, Faint, Breast pain), Psychological Symptoms ( Depression, tension, Forgetfulness, Poor concentration, ) Urinary symptoms (Dysuria, Increased urine frequency, Urine peak during cough & laugh), Other problems ( Post menopausal bleeding, Fracture, Loss of sexual desire). This question set on the canvassing the West Bengal study. We adopted questionnaire which was used in the study of West Bengal. (Ray et al, 2015). The West Bengal and Odisha shares certain cultural and biological similarities.

The present study is conducting during the period of 6th February 2017 to 6<sup>th</sup> April 2017. For the present research work necessary ethical clearance were taken and was approved by the Utkal University, Odisha. The approval of families and clearance from village heads also taken and the purpose of visit were also explained. Respondents who participated voluntarily were considered in the present study and confidentiality was maintained.

### 3. Data analysis

Data were analyzed by the using of SPSS 20(statistical package for social science).

Descriptive analysis( frequency and mean variable) were performed to carried out the percentage of socio demographic features, reproductive history and mean variable standard deviation of marriage and menopause are also analyzed by the descriptive method. And the simple descriptive statistics was carried out to understand the significant percentage of menopausal symptoms (muscle and joint pain, headache, vaginal symptoms, psychological depression, urinary symptoms) and other life style factors (tobacco chewing, consumption of alcohol or black tea).

### 4. Result

Table I Socio demographic features of participants  
Age wise distribution of participants

Age group	Amantya (N%)	Bhotra (N%)	Soara ( N%)	Gouda (N%)	Total (N%)
41 -45	1 (1.9)	5 (35.7)	1 (16.7)	0	7(15.5)
46 -50	7 (46.7)	3 (21.4)	0	1 (10.0)	11 (24.4)
51 -55	2 (13.3)	5 (35.7)	3 (50.7)	3 (30.3)	13 (28.8)
56 -60	4 (26.7)	1 (7.1)	0	3 (30.3)	8 (17.77)
60+	1 (6.7)	1	2 (33.3)	2 (20.0)	6 (13.33)
total	15 (28.8)	1 (28.6)	6 (11.5)	10 (19.2)	45 ( 100.0)
Employment Status of women					
Employed	1 (6.7)	1 (7.1)	1 (16.7)	1 (10.0)	4 (8.8)
Home maker	14 (93.3)	13(92.9)	5 (83.3)	9 (90.0)	41 (91.1)
Educational status					
Literate	1(6.7)	2 (14.3)	1(16.7)	1(10.0)	4 (8.8)
Non literate	14 (93.3)	12 (85.7)	5 (83.3)	9 (90.0)	41 (91.1)
Regular exercise					
Regularly	5 (33.3)	4 (28.5)	2 (33.3)	5 ( 50.0)	16 (35.5)
Occasionally	2 (13.3)	2 (14.28)	0	0	4 (8.8)
No	8 (53.3)	8 (57.1)	4 (66.6)	5 ( 50.0)	25 (55.5)
Total	15 (33.3)	14 (31.1)	6 (13.3)	10 (22.2)	45 (100.0)

Table I shows that major percent of participants are fallen in menopause at the age of 46-50. Majority of the participants were home maker. And they are not doing any other regular physical exercise after the age 40. They were

mostly engaged in the agricultural field in the rainy season. Most of the tribal participants were obliterated. Nuclear family type mainly seen in that ethnic group.

Table 2 Reproductive history of participants.

Participants responds by recalled method	Amantaya		Bhotra		Saora		Gouda	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mean age at menarche	11.5	8.34	12.14	5.34	13.0	8.9	11.90	5.34
Mean age at marriage	14.13	2.58	15.00	4.97	15.67	5.48	13.80	2.58
Mean age menopause	49.53	1.90	45.29	2.97	46.67	2.33	45.70	7.95
History of menstrual	N (%)		N (%)		N (%)		N (%)	
Regularity	15(100.0)		14(100.0)		6 (100.0)		10(100.0)	
Irregularity	-		-		-		-	
Bleeding length (days)								
2-3	-		-		1(1.9)		1(1.9)	
3-4	3 (20.0)		-		-		-	
4-5	12 (80.0)		11 (78.57)		4(3.8)		2(38)	
5-6	-		3(5.8)		-		6(11.5)	
6above	-		-		1(1.9)		1(1.9)	
Experience of fetal loss	4(26.66)		-		1(1.9)		2(3.8)	
Ever used Contraceptive pills(yes)	-		2(14.2)		-		-	

Table II revealed that the mean age of menarche of the tribal women was higher than that of the caste participants. These two groups differed significantly at the age of marriage. Early attainment of menarche and early marriage was shown in caste participants than that of the tribal women. In general the mean age at menopause was is 45.77 years. All the participants were did not use oral contraceptive

pills in their life experience. Same percentage of fetal loss has been found both tribal (Bhotra) and caste participant. 90 percent of participants were suffering from menopausal complication after the menopause. Regarding the menstrual cycle 99% of women had regular menstruation. The majority participants had bleeding length 4-5 days.

*Table III Menopausal symptom of participants*

<i>Menopausal symptoms</i>	<i>Severe</i>	<i>Moderate</i>	<i>Mild</i>	<i>No</i>
Hot Flushes	3 (5.8)	11(21.6)	7(13.5)	31(59.6)
Night sweating	3 (5.8)	10(19.2)	7(13.5)	32(61.5)
Dizziness	11 (21.6)	12(23.4)	12(23.4)	17(32.7)
Rapid heartbeat	1(1.9)	4(7.7)	5(9.6)	40(80.8)
Numbness of extremities	6(11.5)	6(11.5)	4(7.7)	36(69.2)
Irritability	1(1.9)	6(11.5)	3(5.8)	42(80.5)
Tiredness	2(3.8)	4(7.7)	11(21.6)	35(67.5)
Headache	2(3.8)	12(23.4)	6(11.5)	32(61.5)
Sleep Disturbance	8(15.4)	11(21.6)	12(23.4)	21(40.2)
Muscle joint pain	17 (32.7)	18(34.7)	6(11.5)	11 (21.6)
Breast pain	10 (19.2)	8(15.4)	0(0.0)	34(65.5)
Dysuria	1 (1.9)	3(5.8)	3(5.8)	45(80)
Increased urine frequency	12(23.4)	14(26.9)	17(32.7)	9(17.3)
Urine peak during cough & laugh	1(1.9)	5(9.6)	15(28.8)	31(59.6)
Uterine prolapsed	0(0.0)	0(0.0)	0(0.0)	0
Vaginal atrophy	0(0.0)	0(0.0)	0(0.0)	0
Depression	4(7.7)	4(7.7)	2(3.8)	42(80.8)
Tension	3(5.8)	7(13.5)	8(15.4)	34(65.5)
Forgetfulness	1(1.9)	3(5.8)	5(9.6)	43(82.7)
Poor concentration	1(1.9)	5(9.6)	0(0.0)	46(88.5)

Table III revealed that have participants have moderate range of hot flushes and night sweating due to the early onset of menarche and early conception among the ethnic group. Majority of the participants suffered from the Muscle and joint pain. 32.7 percent of women's have severe muscle and joint pain and 34.7 percent of participants have

moderate muscle and joint pain. Osteoporosis (muscle and joint pain) is the common problem among the post menopausal women. It affects because of the unawareness about the disease due to the poor educational and economic status and might be their dietary habit. Severe increased urine frequency also found in all the participants.



Table IV Shows the Life Style in Different Ethnic Group of Turunji Village

Life style	Category	Ethnic groups			
		Amantya N(%)	Bhotra N(%)	Gouda N(%)	Saora N(%)
Consumption of coffee/tea	Regularly	13(25.0)	14(26.9)	10(19.2)	6(11.5)
	Occasionally	2(3.8)	0(0.0)	0(0.0)	0(0.0)
Consumption of alcohol	Regularly	1(1.9)	4(7.7)	0(0.0)	0(0.0)
	Occasionally	7(13.5)	2(3.8)	2(3.8)	3(5.8)
	No	7(13.5)	8(15.4)	8(15.4)	3(5.8)
Tobacco chewing	Regularly	17.3)	9(17.3)	8(15.4)	6(11.5)
	Occasionally	3(5.8)	0(0.0)	0(0.0)	0(0.0)
	No	3(5.8)	5(9.6)	2(3.8)	0(0.0)
Perceived present health status	Excellent	1(1.9)	4(7.7)	0(0.0)	0(0.0)
	Good	12(23.1)	8(15.4)	7(13.5)	6(11.5)
	Moderate	2(3.8)	1(1.9)	2(3.8)	0(0.0)
	Bad	0(0.0)	1(1.9)	1(1.9)	0(0.0)
Perceived stress in life	Serious	1(1.9)	2(3.8)	1(1.9)	0(0.0)
	Moderate	4(7.7)	5(9.6)	4(7.7)	1(1.9)
	No	10(19.2)	7(13.5)	5(9.6)	5(9.6)

Our present study participants (all groups pooled) were not smokers. Consumption of tea is highly shown in this ethnic groups. Table-4 reveals that total (94.2%) of Participants are consumed regularly black tea (Dikasini) in ethnic groups. (3.8%) of Amanatya participants are occasionally consumed tea and (1.9%) of Bhotra participants are occasionally consumed tea. And the total (71.2%) of Participants are Chewing Tobacco regularly in Amantya, Bhotra, Gouda and Saora communities and 7.7% participants are Chewing tobacco Occasionally in Amantya, Bhotra, Saora and Gouda communities.

## 5. Discussion

The study investigated a small community based sample. Analysis of the result revealed that scores for both the age at menopause and menopausal problems of menopausal women. The mean age at menopause is  $44.68 \pm 2.765$  year. Yanadi tribal woman in Nellore District of Andhra Pradesh (T, 2014) and the mean age at menopause among Bengali Hindu women ranges from 44.0 years to 45.0 years (Dasgupta and Ray, 2013; Som and Ray, 2012) which was relatively similar to the present

study of age at menopause. The mean age of menopause in India is 44.3 years. From India, some scattered studies have focused on estimating age at menopause and menopausal symptoms, but there has been no published literature on this topic from eastern India. Few Indian studies have attempted to determine the tribe and caste difference in menopausal age and symptoms.

Menopause may have profound implications for subsequent morbidity and mortality. Early studies show that early onset of menopause are greater risk of being cardiovascular disorder, and osteoporosis while late menopause late menopause carries a higher risk of breast and endometrial cancer. The mean age at menopause observed in our study is 45.77 years. A wide range of mean age at menopause in Indian women 40.32 to 48.84 years. And development countries from 48.0 to 51 years have been shown in the table 4. Mean age at menopause in the present study corresponded with the Bengal women from West Bengal (Dasupta D, Ray S. 2009). This difference may be probably because of community ethnic variation. Dietary habit, life style and environment may play important role.

Table-V Shows the Mean age at Menopause in Different areas of India

<i>Tribe/ Caste /Ethnic Group / Community</i>	<i>Mean age at Menopause</i>	<i>Source</i>
Amanatya	45.93	Present study
Bhotra	45.29	Present study
Gauda	45.70	Present study
Saora	46.67	Present study
Tribal communities of Nabarangpur (cumulative)	45.77	Present study
Yanadi Tribal Women of Andhrapradesh	44.68	Previous study by Chandrika T & Adilaxmi T (2014)
Iruliga Tribal women of Mysore District. Karnatak.	46.63	Previous study by B.Daskshayani and etal (2007)
Bengali speaking Hindu(rural) ( West Bengal Calcutta	46.94	Previous study by D.Gupta & S. Ray
Bengali speaking Hindu(urban) ( West Bengal Calcutta)	44.92	Previous study by D.Gupta & S. Ray
Lodha tribe in ( West Bengal Calcutta)	41.69	Previous study by D.gupta,P.karar,S.Ray and N.Ganguly.
Schedule caste ( West Bengal Calcutta)	40.65	Previous study by D.gupta,P.karar,S.Ray and N.Ganguly.
Women of Assam	40.32	Singh & Ahuja
Kaibarta (Assam)	42.95	Sengupta,1993
Deshastha Bramin Maharashtra	43.46	Kulkarni& Joshi [6]
Singhpho women	43.65	Kar &Mahanta
Sikligar women, Punjabi	43.71	Balvir,1985
Choudary Women Kangra	43.84	Sharma &Singh
Arora women Punjabi	43.96	Singh & Ahuja
Sindhi women Delhi	44.60	Gosh & Kumari
Punjabi women	44.68	Singh & Ahuja
women from rural north India	44.1	Singh & Arora
women from Mumbai	44.7	Shah R <i>et al</i>
Hindu Kalita women	44.94	Bagga A[
Maharashtrian Brahmin	45.84	Rakshit S
Ahom women of Dibrugarh in Assam	47.10	Sengupta & rjkhowa
Assam Women	47.50	Kaw et al [16]
Among labanas North West India	47.68	Mastana
Brahmin women Himachal	48.84	Sharma & Singh
Bengali women West Bengal	45.22	Subha Roy

### Studies from outside India

Kim YH et al	Urban area of Korea	48.29
Malacara JM et al	States of Mexico	48.0
Mckinlay et al	South East Asian women	51.0

One of the caste participants is suffering from severe Muscle and joint pain (Bata roga) after her menopause. And she visit occasionally to the general doctor for her treatment. And due to financial problem she stops private clinical treatment and follows the herbal treatment. She used (Builuli and Mustard oil) for curing her Muscle and joint pain( Bata Roga). They collect that Builuli from the soil. The review of literature shows that, low calcium diet, lack of exercise and vitamin D deficiency may be the major factors for muscle and Joint pain.

Another case study of present study shows that all the participants were born their babies at home. Till now home delivery mostly seen in that village. Previously they were not preferred any antenatal care. One professional Dhari is present in that village for home delivery. She also trained her niece for this work. The unhygienic condition, dietary habit may be the important factors for early menopause. In this context it has been stated that regular consumption of black tea and alcohol may be the factors of increased urine frequency.

### 6. Conclusion

In present study we found a strong relationship between the years of attaining menopause with the menopausal problems. Changing of life style, dietary habits, unhygienic condition of living pattern, and lack of awareness may be major causes of onset of early menopause and menopausal problem among these ethnic group.

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## Assessment of Knowledge, Attitude and Awareness towards Sick Cell Disease among People of Nine Villages of Koraput District: A Psychosocial Study

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### Abstract

*Sickle cell disease (SCD) is a genetic disorder with an estimated 5,200 live births each year. Although SCD has been described in India in numerous ethnic groups, it is most prevalent in tribal community. Prevalence of Sick Cell gene is 5 to 34 % in tribal community, who have a high prevalence of socio-economic disadvantage and are frequently medically underserved. These show the big burden on the public health of India. The vital purpose of this study is to explore the psychosocial responses made by families in adjusting to the painful reality of having a family member with SCD, psychosocial attitude of the people affected with SCD, the awareness and general knowledge of sickle cell disease among a non-probability sampling of a selected population in Koraput district which is one of the most backward districts of the state and predominantly tribal populated one. Major data were collected among 78 participants in which 43 individuals are patients and 35 subjects are their family members with the help of schedules, discussion, observation and interview. In addition to this, data was collected on several demographic variables, including sex and age of patient, family income, religion, education, ethnic group, living arrangements and occupation, and response to knowledge of sickle cell anaemia. Results indicated that 48.7% of the samples have a good knowledge and awareness about SCD and this level is statistically more significant among the SCD affected individuals than their family members.*

**Keywords:** Sickle cell disease (SCD), awareness, attitude, general knowledge, Koraput.

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### 1. Introduction

Sickle cell disease (SCD), also known as sickle cell anaemia, or Drepanocytosis is a group of genetic disorders that is characterized by the development of abnormal haemoglobin (Hgb S), abnormal red blood cells, and the resultant complications. SCD is one of the most common monogenic disorders globally with an autosomal recessive inheritance. James Herrick (1910) in his work confirmed the elongated shape of a red blood cell. Herrick is the first person to discover SCD. Adeyemo et al. (2015) conducted a cross sectional study on "health related quality of life and perception of stigmatization in adolescents living with sickle cell disease in Nigeria". The study was conducted on 160 adolescents, which included 80 participants with SCD and 80 participants without SCD. Health surveys were distributed to

participants to measure how stigmatization affects the health related quality of life (HRQL). The results of the study shows that participants with SCD have lower HRQL than those without the SCD. Ballas (2009) mentioned that the management of SCD ranges from frequent acute pain episode requiring hospitalization, the use of intensive care units and facilities, surgical and nonsurgical treatment, and multidisciplinary method to management. There are different indicators used to evaluate the yearly health care cost among individuals with SCD, these include: hospital admissions, clinic visits, doctors' appointments, emergency department appointments, diagnostic procedures (scans, laboratory, and radiography) cost, and prescription cost (Ballas, 2009). It is estimated that the age lifespan of male and female with SCD is 42–45

years, and the lifetime cost is said to be about \$2,696,400 for male in a total of 24 years, and \$3,145,800 for adult female (Ballas, 2009). Ninety-seven percentage (97%) of the hospital admission was related to painful crises, giving the average annual costs for health care to be \$725,037 in 2008 (Ballas, 2009). Kauf et al. (2009) conducted an updated study on the total cost of medical care that is estimated to serve children and adults living with SCD. Among the 4,294 individuals who participated in the study, the monthly per patient average cost was \$1,946; for adults between the ages of 30 to 39 average cost per patient- month was at \$2,853 and children between the ages of new born to nine years were at \$892 per patient-month. Rees et al. (2010) stated that the managements of SCD include educating those with the disease, their parents and caregivers. Education includes monitored nutrition, growth, and development of the individuals with SCD. Management of SCD also includes the administration of treatments including, pneumococcus and influenza vaccinations, and provision of medications. GR Serjeant et al. (2001) sited about the natural history of sickle cell disease in his article "sickle cell disease". He discussed about the nature of sickle cell anaemia in patients of African and Indian origin.

There is no definitive supporting literature related to study on individuals living with SCD in Koraput. The literature review provided insight on previous studies that have been performed by other researcher in relation to factors affecting SCD. Furthermore, it provided detail analysis of the studies and the relating factors with emphasis on their effect on SCD. With that being said, in this aspect of the literature review, previous researchers have done very little research and less research has been conducted in the last five years.

The objectives of the study are to explore general knowledge, attitudes, beliefs and awareness of sickle cell disease among the studied people.

## 2. Materials and Methods

The study involved the utilization of various tools for information assimilation. Major data were collected through primary sources with the help of discussion, observation, schedules and interview method. Some schedules are modified and some schedules are developed. Additional information

was collected from secondary sources through discussion and literature review. Analyses of data were done by using SPSS and Microsoft Excel software.

Koraput was purposefully selected for study because this district is one of the most backward districts of the state and predominantly tribal populated one and there is not a single work done before regarding sickle cell anaemia. Hence, Koraput district is taken as the sample of the present study.

The villages were selected accordingly the availability of SCD patients in that village. More priority was given to those villages which have more numbers of SCD patients and more remote, where medical facilities are not easily assessable. And these villages were selected through several pilot surveys.

*Table-I: Name of the studied villages*

<i>Village Name</i>	<i>GramPanchayat Name</i>
Nuaguda	Rajpalma
Chakraliput	Rajpalma
Rajpalma	Rajpalma
Padmapur	Padmapur
Panasput	Padmapur
Mohanapada	Padmapur
Gopalput	Padmapur
Chikapar -2	NAC
Jabapatraput	Kundura

In this study, the data were collected from the individuals of 28 households who have affected in SCD in 9 villages of Koraput district. For this study totals 78 samples were included from which 43 subjects are SCD affected individuals, and 35 samples are family members and parents of the patients. The name of the studied villages and panchayats are mentioned in the table-I.

## 3. Results and Discussion

The purpose of this study was to explore the psychosocial responses made by families in adjusting to the painful reality of having a family member with sickle cell, psychosocial attitude of the people affected with SCD, the sickle cell trait of studied people, knowledge, attitudes, beliefs of patients living with SCD, and general knowledge and awareness among the studied people in Koraput district.



Table-II: Demographic information of the participants of the study

DEMOGRAPHICS	MALE		FEMALE		TOTAL	
	No.	%	No.	%	No.	%
Number of participant (Including 43 patients)	38	48.7	40	51.3	78	100.0
Age group (in year)						
0-5	2	5.26	0	0	2	2.56
6-10	2	5.26	7	17.5	9	11.54
11-15	3	7.89	2	5	5	6.41
16-20	4	10.53	6	15	10	12.82
21-25	2	5.26	6	15	8	10.26
26-30	7	18.42	5	12.5	12	15.38
31-35	5	13.16	5	12.5	10	12.82
36-40	3	7.89	4	10	7	8.97
41-45	4	10.53	5	12.5	9	11.54
46-50	5	13.16	0	0	5	6.41
50 and above	1	2.63	0	0	1	1.28
Marital Status						
Married	28	73.68	27	67.5	55	70.51
Single	10	26.32	13	32.5	23	29.49
Caste/Sub-caste						
SC	30	78.95	35	87.5	65	83.33
ST	8	21.05	5	12.5	13	16.67
Religion						
Hindu	27	71.05	32	80	59	75.64
Christian	11	28.95	8	20	19	24.36
Occupation						
Unemployed	10	26.32	13	32.5	23	29.49
Employed (private)	4	10.53	0	0	4	5.13
Cultivation	8	21.05	0	0	8	10.26
Business	4	10.53	0	0	4	5.12
Labour	12	31.57	0	0	12	15.38
House wife	0	0.00	27	67.5	27	34.62
Annual household income (in rupees) =x	Number of household			Percentage		
50,000<x<1,00,000	10			12.82		
x≥1,00,000	66			84.62		
Average household income = 66,907 / -(SD=13636.11)	2			2.56		

### Awareness of Sick Cell Disease

To verify the awareness of sickle cell anaemia 78 subjects were included. Numerically, 74 (94.87%) of the subjects were aware of sickle cell anaemia and 71(91.03%) of the subjects were indicated hearing of sickle cell trait. This implies that average 92.95 % of total subjects are aware of both sickle cell anaemia and sickle cell trait.

*Table-III: Frequency and Distribution of Awareness of Sick Cell Disease.*

Questions	Yes		No		Total	
	No.	%	No.	%	No.	%
Have you ever heard of sickle cell anaemia?	74	94.87	4	5.13	78	100
Have you ever heard of sickle cell trait?	71	91.03	7	8.97	78	100

(n=78)

The onset of awareness of sickle cell disease among the subjects in the sample is presented in Table-IV. By analysing the data it explores that most of the individuals i.e. 50% of the total subjects had known about sickle cell disease before 7 months to 1 year.

*Table IV Frequency and Distribution of Extent of awareness of Sick Cell Disease*

Time period	Frequency	Percentage
Less than 6 months ago	13	17.56
7 months to 1 year	35	47.30
2 to 3 years	12	16.22
4 to 5 years	10	13.51
6 to 7 years	4	5.41
Total	74	100.00

Several sources were generally indicated by the subjects in relating the original source of awareness of sickle cell disease. It was found that a large number of the subjects learned of sickle cell disease from the doctor. As out of 78 subjects, selected for awareness programme, 43 subjects are patients, and the remaining are their family members and relatives, therefore it increases the probability of source of learning about sickle cell anaemia from the doctor. (Table-V)

*Table V Frequency and Distribution of Sources of Awareness of Sick Cell Disease*

Source of learning	Frequency	Percentage
Doctor	58	78.38
Friend	2	2.70
Other	13	17.57
No answer	1	1.35
Total	74	100.00

### General knowledge of sickle cell disease:

Table-VI shows the distribution of the general knowledge of sickle cell disease. Although most respondents had become aware of sickle cell disease only recently, there was an overall general knowledge and understanding- of the disease. Not all of the subjects in the sample were able to clearly differentiate between sickle cell anaemia and sickle cell trait. Many individuals unable to answers these questions, which implies they have a little knowledge regarding to SCD.

Table VI Frequency and Distribution of the General Knowledge of Sickle Cell Disease

Sl. No.	DESCRIPTION	TRUE		FALSE		NO ANS.		TOTAL	
		No.	%	No.	%	No.	%	No.	%
1.	Most people who have sickle cell anaemia are under 20 years of age.	45	57.69	23	29.49	10	12.82	78	100
2.	Sickle cell anaemia is a disease of the blood.	21	26.92	45	57.69	12	15.38	78	100
3.	People do not get sick when they have the sickle cell trait.	36	46.15	31	39.74	11	14.10	78	100
4.	Sickle cell anaemia is a disease of the aged.	22	28.21	40	51.28	16	20.51	78	100
5.	Both sickle cell anaemia and sickle cell trait are inherited.	42	53.85	23	29.49	13	16.67	78	100
6.	Sickle cell anaemia is highly contagious.	38	48.72	36	46.15	2	2.56	78	100
7.	Sickle cell anaemia is a very serious and often fatal disease.	50	64.10	28	35.90	0	0.00	78	100
8.	A person can have sickle cell trait and not know that they have it.	45	57.69	27	34.62	6	7.69	78	100
9.	Sickle cell anaemia is caused by "wild" living	31	39.74	26	33.33	21	26.92	78	100
10.	Sickle cell anaemia is a disease that usually strikes black people.	48	61.54	22	28.21	8	10.26	78	100
11.	There is no cure for sickle cell anaemia or sickle cell trait.	40	51.28	30	38.46	8	10.26	78	100
12.	A person can't catch sickle cell anaemia like mumps or measles	40	51.28	20	25.64	18	23.08	78	100
13.	A person is born with sickle cell anaemia	41	52.56	28	35.90	9	11.54	78	100

**Attitude and belief of sickle cell disease:**

Table-VII represents the distribution on opinions relating to issues on hereditary disease, illness in children, mass screening for sickle cell anaemia, and

issues on sickle cell anaemia. As mentioned before that total seventy-eight subjects are included. Both frequency and percentage value of the issue given by the subjects are installed in the table.

*Table-VII: Opinions on Attitude of SCD*

Sl. No.	Statements	Strongly Agree=1	Slightly Agree=2	Slightly Disagree=3	Strongly Disagree=4	No Answer=0	Total
1.	All people should be tested for hereditary disease	77 (98.72%)	0	0	0	1 (1.28%)	78 (100%)
2.	Most parents care more about their healthy children than they do about their sick children.	0	4 (5.13%)	26 (33.33%)	47 (60.26%)	1 (1.28%)	78 (100%)
3.	People with sickle cell disease should not be allowed get married.	5 (6.41%)	25 (32.05%)	20 (25.64%)	24 (30.77%)	4 (5.13%)	78 (100%)
4.	It is a mother's duty to do her best to avoid any disappointments for her children.	15 (19.23%)	46 (58.97%)	12 (15.39%)	5 (6.41%)	0	78 (100%)
5.	Most parents with sickle cell anaemia children love them more than they love their other children	11 (14.10%)	42 (53.85%)	21 (26.92%)	4 (5.13%)	0	78 (100%)
6.	If a family member has sickle cell anaemia or the sickle cell trait, it should be kept a secret.	6 (7.69%)	1 (1.28%)	16 (20.52%)	54 (69.23%)	1 (1.28%)	78 (100%)
7.	Sometimes I feel that the sickle cell anaemia subject is just one more example of white supremacy and the black man's burden.	14 (17.95%)	36 (46.15%)	10 (12.82%)	12 (15.39%)	6 (7.69%)	78 (100%)
8.	Children with sickle cell anaemia or sickle cell trait should not be allowed to play with those children who do not have sickle cell anaemia or sickle cell trait.	2 (2.55%)	12 (15.39%)	16 (20.52%)	47 (60.26%)	1 (1.28%)	78 (100%)
9.	The future is gloomy for the family with a member having sickle cell anaemia. trait	5 (6.41%)	54 (69.23%)	7 (8.97%)	8 (10.26%)	4 (5.13%)	78 (100%)
10.	Most doctors don't know enough about sickle cell anaemia and sickle cell	0	9 (11.55%)	51 (65.38%)	16 (20.52%)	2 (2.55%)	78 (100%)

11.	Having a child with sickle cell anaemia causes many problems in a marriage. The family having a sick child faces unbearable financial hardships. All people regardless of race should be required by law to be tested for hereditary disease before they are allowed to marry	57 (73.07%)	11 (14.10%)	9 (11.55%)	0	1 (1.28%)	78 (100%)
12.	Mass screening for sickle cell disease is being used to stop the growth of the black population.	0	13 (16.67%)	11 (14.10%)	47 (60.26%)	7 (8.97%)	78 (100%)
13.	People with sickle cell anaemia should be sterilized	11 (14.1%)	46 (58.98%)	19 (24.36%)	0	2 (2.56%)	78 (100%)
14.	A family is drawn closer together if someone in the family has sickle cell anaemia	2 (2.56%)	48 (61.54%)	14 (17.95%)	10 (12.82%)	4 (5.13%)	78 (100%)
15.	Healthy brothers and sisters are cheated if a family member has sickle cell anaemia	0	13 (16.67%)	15 (19.23%)	48 (61.54%)	2 (2.56%)	78 (100%)
16.	Black people have no choice in their life	4 (5.13%)	19 (24.36%)	42 (53.85%)	9 (11.53%)	4 (5.13%)	78 (100%)
17.	The name sickle cell anaemia should be changed	0	6 (7.69%)	6 (7.69%)	65 (83.34%)	1 (1.28%)	78 (100%)
18.	Sickle cell anaemia means someone with bad blood.	58 (74.36%)	8 (10.26%)	8 (10.26%)	2 (2.56%)	2 (2.56%)	(100%)
19.	If sickle cell disease was found predominantly among the white population, more research would have been done	53 (67.95%)	4 (5.13%)	6 (7.69%)	4 (5.13%)	11 (20.10%)	78 (100%)
20.	Having a child with sickle cell anaemia is a disgrace to the family.	0	21 (26.92%)	50 (64.10%)	7 (8.98%)	0	78 (100%)
21.	Public education about sickle cell anaemia would help people plan and prepare for their own families.	50 (64.1%)	17 (21.79%)	9 (11.55%)	0	2 (2.56%)	78 (100%)

22.	The law should have no authority over a person's right to marry or have children.	0	15 (19.23%)	10 (12.82%)	53 (67.95%)	0	78 (100%)
23.	Screening programs for sickle cell disease is necessary for providing better health care and counselling services.	57 (73.07%)	13 (16.67%)	8 (10.26%)	0	0	78 (100%)
24.	Parents should give more attention to their sick children because they have fewer opportunities to participate in normal childhood activities.	65 (83.33%)	13 (16.67%)	0	0	0	78 (100%)
25.	People having sickle cell trait should be prevented from having children. Sickle cell anaemia and sickle cell trait is being used by politicians to get votes	0	32 (41.03%)	33 (42.31%)	9 (11.53%)	4 (5.13%)	78 (100%)

### Understanding of Sickle Cell Anaemia of Different Individuals:

Table-VIII represents both the patients understanding of his illness and that of the other

members of the family. For this study total 78 subjects were included among which 43 individuals are patients. The number of parents, siblings, grandparents and other members are 17, 15, 2 and 1 respectively.

*Table VIII Distribution on Understanding of Sickle Cell Anaemia of Different Individuals*

Category	Good		Fair		Poor		Dont Understand		Not discussed	
	No	%	No.	%	No.	%	No.	%	No.	%
Patient (n=43)	22	51.16	12	27.91	6	13.95	3	6.98	0	0
Parents (n=17)	8	47.06	6	35.29	2	11.77	0	0	1	5.88
Siblings (n=15)	7	46.67	6	40.00	2	13.33	0	0	0	0
Grandparents (n=2)	0	0	2	100	0	0	0	0	0	0
Other members (n=1)	1	100	0	0	0	0	0	0	0	0
Total (n=78)	38	48.72	26	33.33	10	12.82	3	3.85	1	1.28

Increased financial burdens due to frequent and extensive hospitalizations and medical care, and infrequent or inadequate insurance coverage were suggested as factors creating difficulties for the families. Therefore many families rely on traditional medicines. Further research can explore

all these above facts. As I mentioned before understanding level is more in case of SCD affected individuals than the other family members, which implies after the diagnosis they came to know more about the disease. Hence there exists lack of awareness among the community.



#### 4. CONCLUSION AND SUGGESTIONS

The purpose of this study was to explore the psychosocial responses made by families in adjusting to the painful reality of having a family member with sickle cell, psychosocial attitude of the people affected with SCD, knowledge, beliefs of patients living with SCD, and awareness among the studied people in Koraput district.

In conclusion, there appeared to be a not satisfactory general knowledge and awareness of sickle cell disease in the identified target samples. One very important issue in this study is that, the studied individuals have no knowledge about biological inheritance patterns and the cause of SCD. But overall understanding level of SCD among the studied people is statistically significant, with many interesting comparative responses to the attitudinal survey. Within all the study conducted by the peer-reviewed authors, there were no studies conducted on a combination of psychosocial attitude, general knowledge and awareness among SCD patients and their family members in Koraput.

In response to collected data from the families experiencing sickle cell anaemia, and from the search of literature, the following recommendations are made:

- In the studied area it was found that all most all persons marry without testing their blood and also they prefer to marry their nearer people and relatives that lead to a greater probability to be a carrier or affected with SCD. Hence village wise awareness programmes should be implements in the sickle cell belts.
- All persons experiencing genetic disease have the option to choose genetic counselling and sufficient community education to know they have this choice.
- That all genetic counselling include supportive family therapy and education over a sufficient period of time, so the family can integrate the information into their own life systems.
- That community educative effort is initiated to help parents learn and- understand more about sickle cell anaemia.

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## Urban Transformation of Cities: A Case Study of Bhubaneswar city

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### **Abstract**

*Cities are indispensable to nations as they are the hubs of economic growth and innovation. Cities have been witnessing a growing middle - class population explosion urbanization. By the year 2050 approximately 70 percent of the global population is projected to living cities. India is also experiencing this trend with and exponential growth of urban population owing to more employment and entrepreneurial opportunities and good quality of life. The story of urbanization in India in historical times is a story of spatial and temporal discontinuities. The earliest urban developments were confined to the Indus valley and the adjoining parts of Rajasthan, Punjab and, to some extent, western Uttar Pradesh while the other parts of the country remained outside the pale of urbanization. In the early historical period, urbanization took place in the middle Gagnetic plains and in the southern part of the Indian peninsula whereas the areas in between had no know cities. During much of the historical period, vast parts of the country were untouched or only partly affected by urbanization. The present paper highlights that although urbanization in Odisha prior to independence of the country was only three percent which has now risen to around seventeen percent in the last decade, its capital city Bhubaneswar has evolved from a small temple town, as an administrative city, to its selection as a smart city in 2016. The paper discusses the urban spacio-temporal transformation of the city of Bhubaneswar in the light of the global transformation of urban areas.*

**Key words:** urbanization, transformation, cities, smart city.

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### **1. Introduction**

The twenty-first century is likely to be dominated by urban living in a way that we have not experienced before. Over half the world's populations are now city dwellers. By 2025, according to World Bank estimates, 88 percent of the world's total population growth will be located in rapidly expanding urban areas and 90 percent of that urban growth will be absorbed by the developing world (World Bank 1996). Having said this, it is also important to appreciate that cities contain enormous diversity. Crucial in creating these differences have been the pace at which cities have grown, their historical roots and the layers of physical and social structure that have given rise to the present social and physical infrastructures and practices. At the present day, we have the phenomenon of the incredibly fast growth

of areas such as Pudong in China, the new economic zone of Shanghai, which has gone from green fields and farming in nine years to an urban area of 1.8 million people (Shanghai: Pudong New Area Press Office 1998). This new area is being promoted as the financial, information, and manufacturing hub of the increasingly market-oriented Chinese economy. At the other end of the spectrum, we have centuries-old cities in Europe where the additions and refurbishment to the urban landscape have occurred much more gradually over time. The urban world are now more interconnected than they have ever been before through new systems of communication that has developed and shaped the present 'information age'.

Transformations have occurred at every level of the global economic, political and social structures in

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the ways that people fashion their everyday lives. Though people share a global culture today, yet, at the same time, they live out their lives in 'local places' – in houses, neighborhoods, cities, regions and nations. Transformation implies changes over time and thus an appreciation of the importance of the history of any particular city's development. The present urban fabric results from successive generations of settlers leaving their mark in both the physical structure and in the political, economic and social institutions. To understand the present thus requires some reflection on the past course of urban growth and development. These urban settlements have been through a number of transformations since it emerged in human history. The first settlements arose at a time when the capacity of societies had grown such that they could become more settled and permanent. A move from hunting and gathering towards agrarian production occurred leading to surplus production and the emergence of new classes within the population who had greater wealth and a more differentiated set of tasks and lifestyles. There was thus the need for an administrative system to complement the family and clan structures which had provided the basis of social organization. Cities are relatively recent developments emerging around 3000–4000 BC in the Nile valley and Mesopotamia of the Fertile Crescent. They first became significant as places of trade and governance – activities, which were to continue to be significant for decades to come. Later, around 2000 BC, cities also emerged in Crete, the Yellow River area of China, Greece, and the Indus valley. In South America, the Mayan Aztec urban settlements date from the first millennium AD (Carter, 1983). As the settled parts of the world grew in Europe, urban areas and cities became a feature of the landscape. Over time, they grew from small settlements for trade and fortification into grander political, economic and cultural centers. London, for example, in Roman times was a site of imperial activity. With the fall of the Roman Empire, its importance waned and it was some centuries later when it started to become again a center of trade, commerce, and political power. The division was sharp between the city of London, a place of trade and merchants and the newer city of Westminster, the site of the court and Government. Early discussions about a city reflected these aspects and thus emphasized the city as a political

entity and as a marketplace for trading and wealth generation. Many cities were city-states and, as such, wielded considerable economic and political power in the centuries before nation-states became the dominant geopolitical entities (Weber 1899).

The major transformation that created the most rapid shift in patterns of settlement from the country to the city was the rise of the modern industrial city (Giddens 1987). The Industrial Revolution of the eighteenth and nineteenth centuries ushered in the modern world, a world where manufacturing production was the driving force of societies. The new wealthy and powerful were not the aristocrats and landed gentry or the merchants and their guilds, but industrial capitalists making the new commodities of an industrial age. The rise of industry required the harnessing of new resources and new forms of energy to drive machinery in the growing number of factories. New locations thus became significant. Labor was required for the factories and housing developed for workers close to the new sources of employment. Industrial cities grew rapidly providing sharply differentiated residential locations for the new workers and new bosses (Weber 1899). Thus urbanization was the dominant spatial process of the nineteenth and an early twentieth century's in the industrializing world. Britain, for example, in 1801 had 85 percent of the population still living in rural areas. By the middle of the nineteenth century, this had changed and more people lived in urban areas than in the country and almost one third lived in towns with a population over 50,000 (Mellor 1977). Power and wealth shifted from the older port and merchant cities to the new industrial cities. The discovery of the new world and migration were also to change the population distribution and impact on city growth (Elliott and McCrone 1982).

In the latter part of the twentieth century, a further transformation took place from the industrialized modern system of cities based around wealth created from large-scale commodity production for a mass marketplace, to a new system based around the generation of wealth from information services which are globally organized. Cities now compete in an international system where there are new hierarchies of power and opportunities from the core global cities of New York or London or Tokyo where the world's information and the financial

super highway is centered to regional and local centers. The various centers intersect with the global system in a variety of ways creating the differences and local variations which are visible across the cities of the world (Friedman 1995). Although all cities are increasingly drawn into a system of global relations, local identities have survived and are part of what, in the end, creates their competitive advantage which increase the quality as well as the quantity of life and has become an important global issue (Sassen, 1991). Globalization has been a key factor in urban transformation in the last two decades of the twentieth century. Globalization is not a product but an interrelated set of processes, economic, social, political, cultural and ecological, that are continuing to shape the world in which we live. These globalizing processes crucially affect the city as this is the place where most people live. For some, globalization has brought increased homogeneity, for others the result is difference and heterogeneity. For some, global processes have impacted upon the local in ways that have reduced our ability as individuals, families and communities to shape our lives. For others, resistance is still possible and in fact a very significant part of the global world. Exploring the dimensions of city transformation from the industrial modern city to the global city will require an interrogation of these claims and can be addressed through an examination of the way the city has been reshaped over the second half of the twentieth century (Knox, 1996).

In developing the cities, the agendas are likely to be different. Some are still passing through the industrializing phase of their development but are doing so at a much greater pace than was the case for western cities. Many of them are also experiencing a faster rate of growth of their population than of their economic capacity leading to many migrants occupying squatter and marginal forms of housing and getting by in the informal economy rather than the formal. The imperative to growth and the need to be part of the 'globalizing economy' for many of these cities are just as strong as it is for the older cities of Europe, and the restructuring that has occurred and continues has led to both social and spatial inequalities and new forms social of exclusion. Some studies on urban transformation tend to rely less on the search for causes and look more towards the contextual and contingent aspects of change. They are more likely to be grounded in

the study of the local and the everyday life of the urban dwellers. They are less concerned with predicting the pattern of change and more focused upon the meaning attached by individuals and groups to their place – their home, community, neighborhood, and city (Featherstone 1991). Thus, the latest set of transformations of this century has centered on the shift to the knowledge and information industries which are less dependent on being physically located within particular regions. Their raw materials are ideas and knowledge and thus require research-centered institutions and access to knowledge flows. Much of these are now information technologies, ones associated with computers on the Internet and the World-Wide Web. The new forms of wealth creation are however not evenly spread across the globe and questions of access and control are still significant.

### **History of Urbanization in India**

The Indian subcontinent shares with Mesopotamia and Nile Valley a long history of urbanization. The first phase of urbanization in the Indus valley is associated with the Harappan civilization dating back to 2350 BC. The cities of this civilization flourished over a period of more than 600 years up to about 1700 BC after which there are no evidence of urban development till around 600 BC, when there are towns and cities associated with the two major, but closely related, cultural streams of India, namely the Aryan civilization of the north and the Dravidian civilization of the south. From this period onwards, for about 2500 years, India has had a more or less continuous history of urbanization. However, we know from historical evidence that there were both periods of urban growth and periods of urban decline. Thus cities grew in number and in size during the Mauryan and post-Mauryan period (from 300 BC to AD 600), both in northern India as well as in the extreme south. Cities declined and were largely neglected during the post- Gupta period that is from AD 600 to about AD 1000 in northern India. In southern India, on the other hand, urbanization attained its zenith during the period from AD 800 to 1200. Urbanization on a subdued scale flourished in northern India under the influence of Muslim rulers who came to India from Afghanistan and beyond from around AD 1200, and attained the second climax during the Mughal period when many of Indian's cities were established. The early part of



British rule saw a decline in the level of Indian urbanization while during the latter half of British rule, Indian cities regained some of their lost importance. In the future, several new towns and cities were added, in addition to generating newer urban forms in the existing cities. The post-Independence period has witnessed urbanization in India on a scale never before achieved.

Many well-known cities of prehistoric and historic times exist today in the form of small mounds or ruins such as Mohenjodaro, Harappa, Naland, Taxashila. In most historical cities like Pataliputra, Madurai, Kancheepuram, Varanasi, and Delhi, the past has been partly or totally obliterated, while in some cases, the old structure and street layouts are still in evidence. The beautiful temples of southern cities belong to the 12 or 13<sup>th</sup> centuries, while the monuments of the Mughal period belong to the 16<sup>th</sup> and 17<sup>th</sup> centuries. In Varanasi, which is perhaps India's oldest existing city, there is no trace of structures dating back to more than 300 years. The cities of Nasik, Jaipur, Moradabad, Kanpur, and Shimla testify to their widely different socio-cultural origins. The emergences of industrial cities such as Bokaro, Bhilai and Rourkela have added another dimension to the already variegated nature of Indian urbanization.

On the basis of the temporal discontinuities in Indian urbanization, Ramachandran (1989) has divided the urban history of India into five time periods which are as follows:

1. the prehistoric period – 2350 to 1800 BC,
2. the early historical period – 600 BC to AD 500,
3. the medieval period – AD 600 to 1800,
4. the British period – AD 1800 to 1947, and
5. the post-Independence period.

The first phase of urbanization in the Indian subcontinent dating back to 2350 BC began in the Indus Valley region even though, prior to this, there is sufficient archaeological evidence of Paleolithic and Neolithic settlements in northern, central and southern India and in the border regions of Afghanistan and Baluchistan. The evidences of the practice of agriculture, domestication of animals, wheel-thrown pottery, painted wares, stone and

later, copper and bronze implements were clearly marked in these areas. These evidences show a fairly thorough understanding of the city development, such as the spatial extent of the cities, the outline of their streets, the types of constructions and residences and the materials of which they were made. Concrete evidence of writing in baked tablets provides additional information about the social cultural life of the people. Any civilization is the product of its people. The persons of different racial types- Proto-Australoid, Mediterranean, Mongoloid and Alpine- point towards a composite culture. The Harappans were primarily an agricultural people who settled on fertile plains where flood waters provided means of natural irrigation. The twin cities of Mohenjodaro and Harappa represent the climax of urban development extending over more than an approximate area of two square kilometers and had a population of around 30,000 persons. The city consisted of two component parts: (1) a citadel built on high ground and always located on the Western side of the city. It was fortified and consisted of a number of large halls and palatial residences for the nobles and high priests, a great bath and state gallery, thus, representing the capital area. (2) the lower city built on a grid iron pattern where streets were aligned east-west and north-south. The city had an elaborate drainage system, with covered drainage channels along the street and manholes for periodic cleaning. The house drains were connected to the street drains and after partial purification in soak-pits, the sewage was drained into the river. Water supply for the city population was available from brick-lined wells. The lower city housed residences of the ordinary people of the city. Other smaller towns like Lothal, Kalibangan, Rangpur etc, functioned as regional centers. The Harappan cities flourished till about 1700 BC when their general condition deteriorated and progressively declined.

The second phase of urbanization in India began around 600 BC. The architect of this phase was the Aryans in the north and the Dravidians in the south. The parallel and independent urban developments are later culturally interlinked by large-scale migration of Aryan people to southern India, particularly the Brahmins, Jain, and Buddhist monks, starting from around 300 BC. These migrations initiated a process of Sanskritization of the Dravidian south, resulting in the emergence of a

composite culture. This phase of urbanization is important as it became a permanent feature in India and is substantiated by great literary texts in the three periods namely post-Vedic period, Mauryan-period and post- Mauryan period . These periods indicate the early origins urbanization with its climax in the Mauryan period the earliest cities during this phase Hastinapura, Sravasthi, Kapilavastu, Ujjain, Mahishamati, Champa, Rajgir, Ayodhya, Mathura, Taxshila, Pataliputra, Varanasi and Kausambi whose locations were supported by both literary and archeological evidence in the North. The major cities in the South were Puhar, Uraiur, Korkai, Madurai, Musuri, and Vanji. The city was the center of urban administration as well as a center of manufacturing industry. An advanced system of guilds of merchants and industrial labors regulated the manufacture of goods. The urban society was stratified with caste and occupation being the primary indicator of status. The use of iron was important in many ways for setting the stage for the urbanization as it widened the area of settlement, generated large food supply by the use of iron ploughs, lead to the manufacture of horse-driven chariots for warfare and ox-driven carts for transportation, and increased mobility helped trade and commerce.

The decline of an urban center that began in the 5<sup>th</sup> century AD during Gupta period, and continued during the succeeding centuries in northern India, which witnessed political disintegration of large empires and unstable dynastic regimes. The decline of Buddhism gave rise to the revival of Hinduism. The concept of Bharatavarsha now included the entire South as well as the North. Sankaracharya of Kaladi in the 8<sup>th</sup> century AD, who contributed in large measure to the revival of Vedic religion, traveled widely over the country and established four monasteries in the four corners of Bharatavarsha – Joshimath in the Himalayan region, Puri in Odisha, Dwarka in Gujarat Sringeri in Karnataka. These centers have emerged as an urban place of great religious importance wielding enormous influence all over India. The most significant aspect of these places is their continuity through the history of present times. During the period, the decline of urban centers in the North was paralleled by the emergence of powerful Hindu Kingdoms and urban centers in South in India. Urbanization in North India, on the other hand, further suffered from

Muslim invasion from the Northwest. The story of urbanization during this period is a story of turmoil in the North and rapid growth in South.

During the medieval period, urbanization in the South received a strong stimulus and numerous cities came into existence. A major feature of urbanization was closely identified with the rise of dynasties and kingdoms as well as influence of Brahmanical religious customs and rituals. This explains the dominance of the temple and the religious-political elite of southern cities. The major kingdoms in the south during this period were Chalukyas of Karnataka, Ishvaku of Krishna-Godavari region, Pallavas of Kancheepuram, Rashtrakutas of Malkhed, Hoysalas of Belur and Kakatiyas of Warangal. Important cities include Vatapi, Nagarjunakonda, Dharanikota, Vijayawada, Rajamahendravaram, Nellore, Trichirappalli, Tanjore etc. A major feature of the societies is the presence of temple gopurams which served as the focal center of the city. The upper castes lived in concentric circles around the temple while the lower castes lived in the periphery of the city and were not allowed to come near the temple. The streets leading outwards from the gopurams were used for commercial activities and linked the inner city with the peripheral rural regions beyond the city.

In the north this period marks a major political as well as cultural shift in the Indian urbanization. The Muslim dynasties included the Slave dynasty followed by the Khiljis, Tughluqs and Lodis. For the first time Islamic influence made its impact on the urban landscape. Mosques, forts, palaces reflect Islamic art and values during this period. A new Muslim urban culture arose with the kings, nobles and military at the apex. Persian became the court language and fashions were determined by Persian customs and manners. The city and the country side were largely alienated from each other during this period. The Mughal period (AD 1526-1800) stands out as a high watermark of urbanization in India and saw the revival of the older established cities, the addition of new cities and the building of an impressive array of monumental structures. The Mughal Empire covered the whole of northern India from Assam to Gujarat including present Pakistan and Bangladesh. The empire divided into provinces which contained many cities, small towns and large villages. The urban system was dominated by 16 large



cities such as Agra, Sikri, Delhi, Ahmedabad, Cambay, Ellichpur, Burhanpur, Ajmer, Ujjain, Mandu, Awadh, Lucknow, Aaranasi, Jaunpur, Bihar, and Cuttack. At the southern fringe of the mughal empire, the Marathas, the Bahmani kingdoms, Vijayanagar Empire and Nizamof Hyderabad stimulated urban growth Golconda, Hyderabad, Bijapur, Aurangabad and Pune are outstanding example of the urban development during this period. The capital cities- Delhi , Agra, FatehpurSikri- were the largest and most impressive. A major characteristic of Mughal cities building of forts were the entire royal entourage lived. The ordinary people lived outside the fort. The chowk constituted the main market which was the home of the craftsmen and local industry selling a variety of goods and also the mosque or Jama Masjid, which is the symbol of Islamic culture. The palaces were large structures while the outer city was divided into mohallas or localities with narrow streets. All cities had an outer wall for defending the cities from invaders and gates for regulating entry the cities had planned network of roads and streets. A major factor contributing to urbanization during this period was the growth of traditional industries which was an urban activity and the market were full of goods of high quality. A number of trading centers carried out external trade to West Asian, South-east Asian, and European markets.

The European phase of India's urban history has its beginnings, ironically, in the period during which Mughal supremacy was at its height. The Portuguese were the first to establish new port towns of Panaji (1510) and Bombay (1532). They were followed by the Dutch- Machilipatnam (1605) and Nagapattinam (1658) and in French- Pondicherry (1673) and Chandranagore (1690). The British established themselves in Madras (Chennai) (1639) and Calcutta (1690). These port towns were used as trading centers. It is only in the early 19<sup>th</sup> century and that the British established a firm territorial hold in India, and continued to exercise unquestioned sway over the entire country. The course of urbanization after 1800 in all parts of India was determined by British colonial economic policies and social attitudes. Around 1800 India had 16 cities and about 1500 towns located western and southern India while eastern India was least urbanized. The first Census taken by the British in 1872 showed decline from 11 percent in 1800 to

8.7 percent in 1872. This decline was primarily due to the negative attitude towards the traditional industries of India.

The major contributions of the British to the Indian urban scene were (1) the creation of the three metropolitan port cities, which emerged as the leading colonial cities of the world, (2) the creation of a chain of hill stations in the Himalayan foothills and in south India, and the introduction of tea and coffee plantations which produced a number of small settlements with distinct urban characteristics in Assam and elsewhere, (3) the modification of the urban landscape of the existing cities with the introduction of (a) the Civil Lines and (b) the Cantonments, (4) the introduction of the railways and modern industry which led to the creation of new industrial township such as Jamshedpur, Asansol, Dhanbad and so on, and (5) the improvements in urban amenities and urban administration.

Urbanization has entered a new and more important phase in the post-Independence period. In contrast with the British period, which witnessed a period, which witnessed a period of urban stagnation, the post-Independence period is notable for rapid urbanization, particularly of the one-lakh and million cities. There has been nearly a threefold increase in India's urban population, from 62 million in 1951 to 159 million in 1981. The proportion of urban population to total population has increased at a slower pace from 17.6 percent in 1951 to 23.7 percent in 1981. The major changes that have occurred in India's urban scene in the post-Independence period are: (1) The influx of refugees and their settlement, primary in urban areas in northern India, (2) The building of new administrative cities, such as Chandigarh, Bhubaneswar and Gandhi Nagar, (3) The construction of new industrial cities and new industrial township near major cities, (4) The rapid growth of one-lakh and million cities, (5) The stagnation and in some cases decline, of small towns, (6) The massive increase in squatter and the proliferation of slums in the million cities and the emergence of the rural-urban fringes and, (7) The introduction of city planning and the general improvement in civic amenities.

There has been a steady increase in India's urban population over the decades. The population has

increased to 31 percent from 26 million in 1901 to 377 million in 2011. Urbanization in India presents a contrasting picture – a large urban population with low urbanization and showing a growth of 2.76% per annum during 2001-2011. The annual exponential growth - rate of urban population and rate of urbanization show that urban population of India was about 79 million in 1961, which constituted about 18% of the total population. The average growth rate of the urban population was 2.32% during 1951-61 which accelerated up to 3.79% during 1971-81. This was the highest urban growth since independence. After 1981, the urban growth rate decelerated to 3.09% during 1981-91 and further declined to 2.75 during 1991-2001. However, the declining growth- rate was reversed during 2001-2011. The number of urban centers increased from 3,126 in 1971 to 5,161 by 2001 and to about 8000 in 2011. According to the 2011 census, urbanization has increased faster than expected. This has reversed the declining trend in the growth rate of the urban population observed during the 1980 and 1990. Also, for the first time since independence, the since independence, the absolute increase in the urban population was higher than that in the rural population. This has huge implications on infrastructure and provision of other civic amenities in urban area. Census of India classifies urban centers into six categories based on population ranges. In each size class there can be some fast growing cities and towns and some slow growing. One feature of India's urbanization is the growth of large and metropolitan cities. This is a challenge on India's urbanization. In 1901 only Calcutta had more than a million populations, the number increased to 12 by 1981, to 23 by 1991 and to 35 in 2001 At the Census 2011, there are 468 such UAs/Towns. The corresponding number in Census 2001 was 394. The 53 metropolitan cities contain 19.24 percent of the total urban population of India. However, as a proportion of the entire population of India the 53 metropolitan cities account for just 6 percent of the total population. One aspect of metropolitan growth is that there is very favorable spatial spread of these large cities that may help in achieving the goals of balanced urban development. Today Mumbai is the most populous city of the country followed by Kolkata, Chennai and Delhi. These four cities have remained at the top of India's urban hierarchy. (SAAP, 2017-18).

## 2. Urbanization Trend in Odisha

Ever since the occupation of Odisha by the British in 1804, the administration of the province had been characterized by alternating rebellions, droughts, floods and famines. On April 1<sup>st</sup> 1936 Government of India promulgated the Constitution of Odisha order under Section 298(i) (b) of the Government of India Act of 1935. This heralded the birth of Odisha as the eleventh province of British India. The occasion marked the culmination of the Odisha movement for a separate province on a linguistic basis. Following India's independence, the area of Odisha came to be almost doubled and the population increased by a third, by the addition of 24 former princely state. In 1950, Odisha became a constituent state in the Union of India.

According to 1941 census, only three percent of the total population in Odisha lived in cities and towns as against 13.86% for India. Though the percentage of urban population is less in Odisha, the pace of urbanization in the State between 1941 and 2011 was low compared to the pattern for the country as a whole. In the 2011 census, the proportion of population living in urban areas in Odisha was 16.68% compared to 31.16% for the country. Odisha ranks 31<sup>st</sup> in list of most urbanized states of the country, while in terms of actual urban population, the state ranks 11<sup>th</sup> in the list of state with largest urban population. Based on 2011 census figures, the urban areas in Odisha are classified into six categories with a total of 223 towns, as illustrated in the Table 1: The size of population of people engaged in non- agriculture activities and industrial areas have been considered as the major criteria for the constitution of urban local bodies (ULBs). Odisha does not have a metropolitan city as per 2011 but in future Bhubaneswar and Cuttack with 881,988 and 658,989 population are like to join the metropolitan category.

Table 1 : Classification of Towns in Odisha

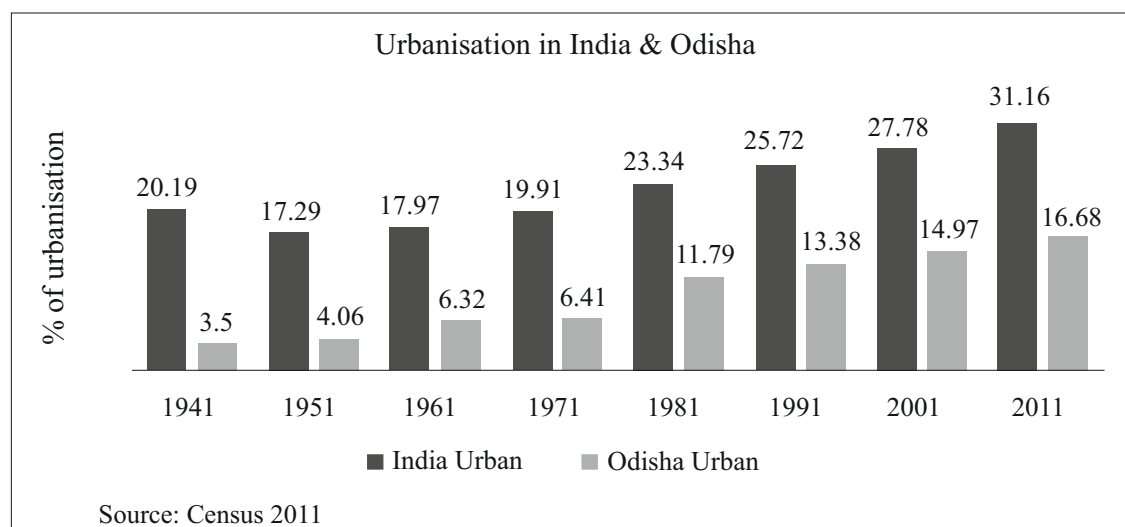
Category of Towns	No. of Towns
Class I Cities (Population 100,000 or more)	101
Class II towns (Population 50,000-99,999)	14
Class III towns (Population 20,000-49,999)	43
Class IV towns (Population 10,000-19,999)	49
Class V Towns (Population 5,000-9,999)	78
Class VI towns (Population 4,999 and below)	29
Total	223
Source : Census 2011	

*1 Including Rourkela ITS due to its population size but previously not included due to its status*

Figure : 1 illustrates the urbanization trends in Odisha showing the percentage urban population of India, compared to the urban population of the State for the period 1941-2011. Prior to 1951, there were only 39 urban centers in Odisha, which has increased

to 138 (2001) and 223 (2011). The percentage of population living in urban areas in the state has gone up from 3% (1941) to 14.97% (2001) and 16.68% (2011). Table 2: shows the growth trend of nine developing cities in Odisha from 2001 to 2021. Figure 2: shows the Graph of the growth trend increasing from 1971 to 2021.

*Figure:1 Trends of Urban Population Percentage in Odisha*

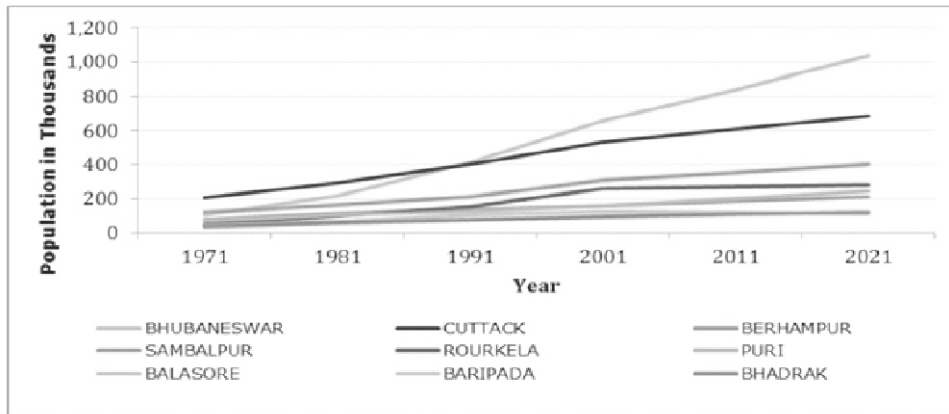


*Table : 2 Growth trends in Odisha Cities*

Town	class 2001	class 2011	C_status	Pop-1971	Pop-1981	Pop-1991	Pop-2001	Pop-2011	Pop-2021
Bhubaneswar	I	I	M.Corp.	105,491	219,211	411,542	658,220	843,402	1,033,816
Cuttack	I	I	M.Corp.	205,759	295,268	403,418	534,654	610,189	684,226
Berhampur	I	I	M.Corp.	117,662	162,550	210,418	307,792	356,598	404,912
Rourkela	I	I	M.Corp.	47,076	96,000	152,690	259,553	310,976	284,952
Puri	I	I	M	72,674	100,942	125,199	157,837	200,564	245,556
Sambalpur	I	I	M.Corp.	74,458	112,631	134,824	157,253	335,761	210,651
Balasore	I	I	M	46,239	65,779	101,829	127,358	118,162	110,265
Baripada	I	I	M	28,725	52,989	69,240	100,651	109,743	118,393
Bhadrak	II	I	M	40,487	60,600	76,435	92,515	107,463	122,286

Source: Census 2011

Figure : 2 Growth Trends in Odisha Cities



Source: Census 2011

### 3. Transformation of Bhubaneswar As an Urban City

Categorized as a tier-2 city, Bhubaneswar replaced Cuttack as the capital of Odisha in 1949. Designed by Otto Königsberger in 1946, Bhubaneswar, along with Jamshedpur and Chandigarh, is known as one of India's first planned cities. Due to the presence of reserve forests in the north-western part and flood plains in the eastern part, the city has grown more towards the south-west. Currently, the Bhubaneswar Municipal Corporation (BMC) is spread over an area of 135 square kilometers, covering 67 administrative wards. According to Census 2011, the city has a population of 885,363 people, with a 'slum' population of 163,983 people (18.5 percent).

#### Brief History of Bhubaneswar

Bhubaneswar is the capital city of the state of Odisha. Renowned as the city of temples, has been a place of religious and cultural efflorescence through the ages and today the city reflects a unique harmony between antiquity and urbanity. A number of puranas, historical monuments, shrines and other ruins throw ample light on the rich cultural heritage of Bhubaneswar. The name Bhubaneswar comes from the word 'Thribhuvaneswar' which means 'The Lord of the Universe'. Ancient Sanskrit literature mentions Bhubaneswar as Ekamrakshetra (mango forest), named after the mango groves in the area, which developed around the Lingaraj temple which

was erected to commemorate the Svayambhu Lingam (phallus made out of natural stone) that stood under a mango tree. Bhubaneswar which first witnessed prolific activity of temple building in the seventh century A.D., experienced several changes earlier in its physical form, ethnic composition, religious character and its role as a subcontinental socio-religious center from one century to another. The city's character alternated among different religion namely Buddhism, Jainism, Shaivism and Vaishnavism which found a home in Bhubaneswar.

The history of Bhubaneswar began during the Mauryan period under emperor Ashoka (269- 232 B.C), who chose a hill outside of Bhubaneswar for the promulgation of his rock edicts, including the two special Kalinga edicts, and for erecting a pillar. The excavations at Sisupalagarh, five kilometers to the southeast to Bhubaneswar, take the origin of the old city back to the fourth or third century B.C, lending credence to the belief that the city of Tosali, the regional administrative capital of Ashok, might have been situated in the neighborhood of Dhauligiri, eight kilometers south of Bhubaneswar. Political events in Odisha after the close of the Mauryan period became diffuse, involving different dynasties and people. The next phase in the history of this city was the rule of king Kharavela (159 B.C) of the Chedis dynasty under whose patronage the Hatigumpha and Ranigumpha inscriptions in the twin hills of Khandagiri and Udayagiri indicate the stronghold of Buddhism and Jainism in Odisha.

Buddhism reasserted itself in Kalinga under the Murunda dynasty in the third century A.D, however, when parts of Bihar and Odisha came under the rule of Murunda kings. A controversy remains as to whether the Guptas ( A.D.320-550) occupied Odisha or not. Early history unequivocally maintained that there is no evidence to prove that any part of Kalinga was included in the Gupta Empire. A more recent study has argued that there are evidences to show that the Guptas were in occupation of at least the coastal districts of Odisha. In spite of the controversy, the sheer size of the Gupta Empire must have exerted enormous influence on Kalinga. The discovery of copperplates and sculptures bearing the Gupta dates points to the presence of Gupta cultural influence in Odisha. Moreover, the conversion of the Buddhist pillar into a Shaivite phallic emblem in the fifth century points to a struggle between the two faiths. The Hindu cultural renaissance continued till the seventh-century when the Shaivite Gauda king Sasanka ruled Kalinga. A devout Shaivite, he built several Shivate temples on the ruins of Buddhist monuments in the Bhubaneswar. Tradition credits him with erecting the famous Lord Tribhuvaneswara (The Lord of the three worlds) temple, from which the city derives its name. Though none of the monuments built by Sasanka have survived, it is probable the eleventh century Lingaraja temple in Bhubaneswar was built on the ruins of the Tribhuvaneswara temple.

There was a sudden outburst of temple building in Bhubaneswar in the seventh century, of which the best preserved Parasuramesvara temple built by Madhavaraja Sailodbhava II of Kongoda (modern Ganjam) who was feudatory of the Gauda king Sasanka. The political fragmentation of Kalinga that followed the death of Sasanka resulted in the rise of three separated kingdoms of Odra, Kongoda, and Kalinga. The Sailodbhava kingdom included both Bhubaneswar and Puri which has been determined by the discovery of Sailodbhava copperplates from the two areas. The Bhauma-karas succeeded the Sailodbhava, occupying Bhubaneswar sometime before A.D. 736, built many temples here. Bhauma-kara rule challenged the caste and the orthodox practices of Shaivites in Bhubaneswar. During this period, tantric (occult) practices entered Shaivism and Mahayana Buddhism which fosters tantrism became the dominated religion in the region. They

renovated Shaiva temples in Bhubaneswar and introduced Buddhist images and motives in these temples. This period also witnessed the rise of Shakti ( power) cult for the first time in the region. The syncretism of Shaktism, Shaivism and Mahayana Buddhism is best reflected in the sculpture of the Vaital temple.

For nearly a hundred after the end of Bhauma-kara rule around A.D. 830, Bhubaneswar underwent yet another period of political uncertainty. In the first half of the tenth century, the Kesari kings of the Somavamsi dynasty ruled Kalinga. The Kesari dynasty was brahmanical and under its patronage Shiva worship prospered for over two centuries. Three Kesari kings -Yayati, Ananta and Lalatendu – used royal resources to complete the monumental Lingaraj temple at Bhubaneswar. The Kesaries are also credited the building of the Jagannath temple at Puri which became the center of the worship of Vaishnavism . However, nothing of the original temple have survived and the present temple was built in the twelfth century by Anantavarman Chodaganga of the Ganga dynasty. The Kesaries also performed Ashvamedha ( horse sacrifice) at Chaudwar now modern Cuttack, which became their capital. Kesari rule brought Odisha under one administration and the royal support for art and architecture and tolerance of different cultures culminated in distinctive Odishian culture.

The vacuum created by the end of the Kesari dynasty was finally filled up by the Ganga dynasty in the last quarter of the eleventh century who revolutionized the religion in Odisha as they were the patron king of Vaishnavism. Anantavarman Chodaganga built many monuments and temples including the famous Jagannath temple at Puri. The Gangas had their capital at Cuttack, adopted local culture, supported Odia language and succeeded to make Kalinga to unified Kingdom. The religious syncretism of their age came to bear its imprint on art, architecture and literature. The great Sun temple at Konark bears the stamp of this syncretism, its many sculptures celebrating Shiva, Jagannath and Shakti cults. Even the Lingaraj temple at Bhubaneswar came under the influence of the new religious creed of Harihar, representing both Shiva and Vishnu. An inscription in the Jagamohana (audience hall) of the Lingaraja records a grant by a Ganga for the maintenance of a perpetual lamp in the temple and the Ganga are

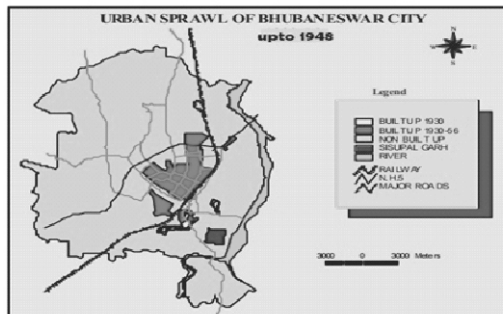


believed to have added two new chambers to the temple, the natamandira (dance hall) and the bhogamandapa (dining hall) and are believed to have introduced some other Vaishnavite features during renovation. A reduced Odisha remained under Hindu rule until the middle of the sixteenth century, after which it yielded first to the Mughals, then to the Marathas, and finally to the British in the beginning of the nineteenth century. The end of Hindu rule in Odisha also brought an end to the period of temple building in Bhubaneswar.

### The Temple Town (Up to 1948)

The old temple town had been the seat of a continuous culture of about 2,500 years. It covers an area of 510 ha and comprises of 4 villages namely Kapil Prasad, Bhubaneswar, Goutam Nagar and Rajarani. The old city is featured by a conglomeration of temples, monuments, Mandaps, heritage ponds etc. Initially, the old city had 1000 temples and at present, the total temples are limited to 320.

Map no1: Bhubaneswar 1948



Source: Odisha forest department Draft report

Majority of the existing temples are deteriorating rapidly and the precious stone carvings are also in damaged condition. The temple town of Bhubaneswar presents a mixed land use pattern with a congregation of residential, commercial, industrial and institutional uses in a single locality.

- Ribbonated development along major roads is prevalent with complete lack of planning.
- Inadequate road network system, results in traffic congestion in almost all roads of the old city. Moreover, inadequate parking space for vehicles also adds to the above problem. The roads are very often narrow with little possibility of widening as building have been constructed

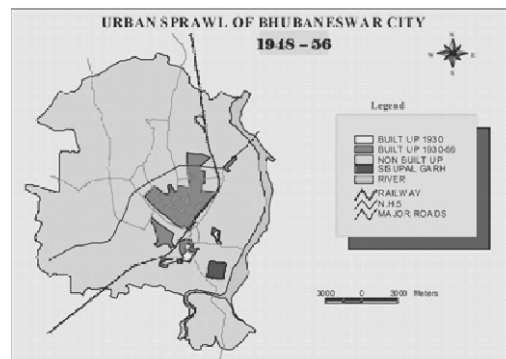
on either side leaving vast open lands behind.

- The open spaces are vacant and very often inaccessible. The interstices which were vacant till recently and could have been planned for land-scaping around the temple / monuments are fast getting filling up as a result of pressure of population on land.
- Due to pressure of development, these finest architectural and sculptural elements are slowly dominated by modern development and the same is gradually reducing its importance. In many cases the visibility of temples lost due to modern construction.

### The “New Capital” (1948 – 56)

On 13th April 1948, Bhubaneswar got back its status when the foundation stone of the present capital township was laid by Pandit Jawaharlal Nehru, after a gap of 1600 Years. The present old temple town was formed and was confined to an area of 956 Ha. Later on, Bhubaneswar was born as the new capital of Orissa in close proximity of the old temple town, the Master Plan for the new township was prepared by the famous architect Dr. Otto. H.Koenigsberger in 1954 on the basis of the concept of neighborhood unit planning.

Map no2: Bhubaneswar 1948-56



Source :Odisha forest department Draft report

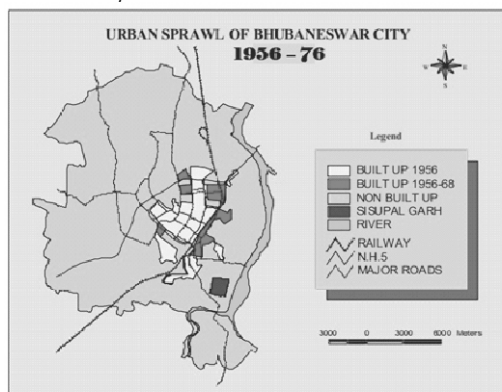
The capital town was planned in 1948 and was built between 1948 and 1961 at a respectful distance from the temple town with no conscious steps taken to preserve the individual identities of each. The city grew fast and the intervening areas were filled up quickly. Today the “New Capital” presents a sharp contrast with distinct areas earmarked for residential, commercial, and institutional and such



other uses. It comprised 6 units namely Units – I, II, III, IV, V and VI. With unit V earmarked for administrative functions, the other units were planned as residential neighborhoods with the accent on horizontal rather than vertical growth.

- *There is a total absence of provision of areas for a number of urban activities such as industrial, institutional etc. which were not envisaged then.*
- *With an absence of economy in allotting land for different uses, the development spread over large areas, with even residential quarters allotted in much larger areas than was necessary.*
- *Such a sparse development pattern resulted in much lower density of population, then was desirable and involved higher unit cost of infrastructure development.*

Map no 3: Bhubaneswar 1956-76



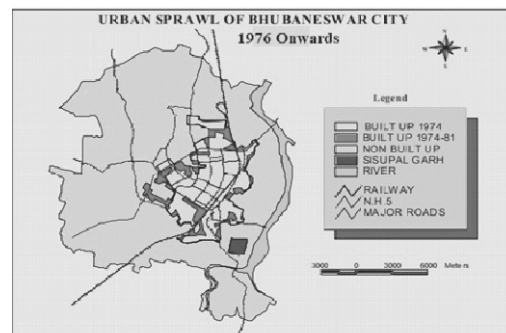
Source: odisha forest department draft report

### Growth of Institutions (1956 – 76)

During 1956-76 major administrative activities like secretariat, heads of departments and similar government offices came up in Bhubaneswar. The salubrious climate, availability of suitable land attracted a number of state level and regional institution such as Vanivihar, Sainik School, the Regional Research Laboratory, the Orissa University of Agriculture and Technology, the Government Press, the Institute of Physics and several industrial units like C.R. Factory, OMFED Chilling Plant, the Industrial Estate at Bomikhal and subsequently at Pandara were also established.

Also with the growth of population the need for developing residential areas both in private and organized sectors led to developments of Sahid Nagar (Unit – II), Satya Nagar (Unit – X), Surya Nagar (Unit – VII), Acharya Vihar and Lewis Road Housing Colony (Jayadev Nagar). The growth of Bhubaneswar during this period is shown in figure But in location of these institutions, the perspective growth of some of the major functions of the city, and the inter-relationship among the different city functions do not seem to have been considered. Much larger areas have been allotted to some of the

Map no 4: Bhubaneswar 1976 onwards



Source: Odisha forest department Draft report

### Developments in Organized Sector(1976 Onwards)

Constitution of the Bhubaneswar Regional Improvement Trust (BRIT) in 1976 and subsequently the Bhubaneswar Development Authority (BDA) in 1983 and the role of institutional finance for mass housing in the organized sector appears to be a landmark in this phase of city's growth. The following major schemes and multistoried buildings were executed during the period:

- Housing Board Colony, VSS Nagar
- BRIT Colony, Laxmisagar
- BRIT Colony, Nayapalli
- BRIT Colony, Baragarh
- Chandrasekharapur Improvement Scheme
- GGP Housing Colony
- Palaspalli Duplex Complex

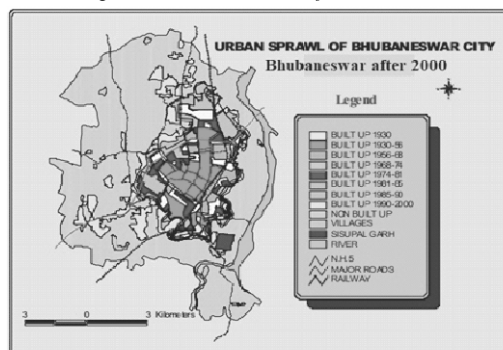
- Housing Board Colony at Kapilprasad
- Housing Board Colony at Baramunda
- Housing Board Building
- IDCO Tower
- CRP Market

In all such cases economy of space and cost had influenced the structure as well as their immediate environment. Shortage of Government land and economy of scale contributed to construction of multistoried flats at Chandrasekharpur and buildings like IDCO tower, Housing Board Building, IPICOL Building etc. This phase also witnessed construction of number of market complexes like BRIT market at Laxmisagar, BDA's Suryakiran Market, Municipal market and Housing Board markets at Saheed Nagar, Ashoka Market at Station Square, Ruchika Market Complex at Baramunda and Municipal Market at Old Town. In all such constructions the availability of institutional finance and demand for office/commercial space have played a key role towards a balance of space, economy and design. Although articulate and organized, these developments in the organized sector have followed the availability of government land. While inducing the pace of growth in the nearby areas in private holdings, the execution of housing schemes have not succeeded in articulating the development in such areas in desired manner. Many of the housing schemes in the organized sector are subsidized in terms of cost of roads, open space and infrastructure but in the nearby private areas cost of infrastructure is charged to the individual development leading to inadequacy of roads, open spaces and other infrastructure. A disparity in quality of environment prevails in many of the private areas adjoining the housing scheme areas executed in the organized sector.

### Bhubaneswar after 2000

The city which was planned originally for 40, 000 people with an area of 1684 Ha of land is now accommodating about 10 lakhs people with an area of about 135 sq km. The shape of the present city has assumed nearly a rectangular form which shows the signs of development of the town on a vast unutilized undulating plateau. The city has extended in seven different directions during the last few decades by engulfing the fringe villages.

Map no5: Bhubaneswar after 2000



Source: Odisha forest department Draft report

This extension has got varied length and dimensions from the core of the original town, which has been supposed to lie at the Lingaraj temple area from the centre of growth of the original temple town, the present town has extended maximum towards north i.e. about 22.5 km. towards village Patia. Its extension towards north-west is about 14.5 km., west 11 km., south-west 8 km., south 6.5 km and east 9.5 km. Virtually it has no growth towards south-east due to the location of the flood plains of Kuakhai and Daya River. Presently the city has been extended up to the Chandrasekharpur in the north and beyond Daya West Canal in the south. In the east, the development is confined to the Daya West Canal. In the west, the city has expended well beyond the Chandragiri Junction. The land between Day west Canal and the Kuakhai is put to the agricultural use, which is rapidly being put to Brick kiln. The present township of Bhubaneswar sprawls over 233 sq. km. comprising of total number of 2312 revenue villages. The shape of the city is almost dumbbell shape. Its boundary in the south, southeast and east are somewhat irregular. The city is divided into 30 wards under the Bhubaneswar Municipal Corporation control. There are also 204 more villages along the rural periphery, which are coming under the direct sphere of influence of the city.

### Bhubaneswar as a smart city

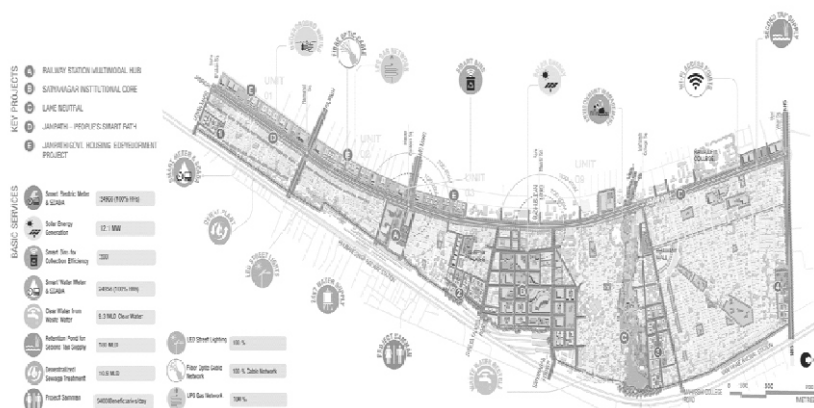
The Smart Cities Mission is a bold new initiative by the Government of India to drive economic growth and improve the quality of life of people by enabling local development and harnessing technology as a means to create smart outcomes for citizens. The Indian government's smart city initiative has specified several possible funding sources –both

of services for a better quality of life to the Bhubaneswar. The functions of the BMC include water supply, drainage and sewerage, sanitation, solid waste management, street lighting, and building regulation. Bhubaneswar Development Authority (BDA) is responsible for the statutory planning and development of the Bhubaneswar Development Planning Area (BDPA). It takes care of planned development in peri-urban area and at present its jurisdiction extends to 1110 Sq. Kms. and 556 revenue villages. BDA is responsible for creating development plans, regulating development and use of land, undertaking works pertaining to construction of housing colonies, commercial complexes and providing public amenities like water supply, drainage, sewerage, and transportation, social facilities etc.

- Good governance
- Planning
- Legislation and policies
- Financing
- Public and private cooperation
- Education, training and development

Bhubaneswar's Area based Development proposal envisions to retrofit and redevelop 985-acres centered on main Railway Station in heart of the city to a vibrant 24×7 destination 'The Bhubaneswar Town Centre District (BTCD). As a signature intervention reflecting the city's image, the area will be a walk-able , well-connected mixed-use area with public realm investments visible in its streets, public spaces and buildings ; A model of low-impact carbon neutral development using innovations in transportation and green infrastructure ; A model for achieving social equity by planning with children at the centre ; An economic engine supporting region's knowledge industry and providing pro-business environment. Bhubaneswar Smart City, 2013.

Map no6 : Proposed Area for Bhubaneswar Town centre (BTCD)

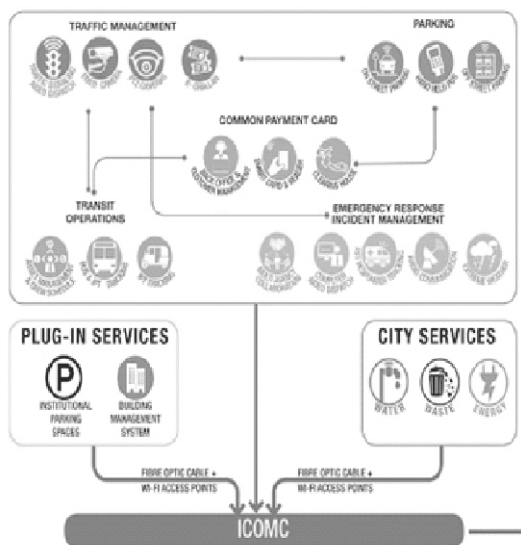


Source: *Bhubaneswar smart city.org*

## Pan city smart solutions

The pan-city smart solution is aimed to benefit the entire city through application of ICT and resulting improvement in local governance and delivery of public services. Intelligent City Operations and Management Centre (ICOMC) will result in safe mobility, responsive city operations and management along with optimisation of capital expenditures by providing real time data support. ICOMC as a solution, has provisions for core multi-layer digital infrastructure, complementary physical infrastructure and change management initiatives. This will have six basic components viz. Traffic Management, Parking, Transit Operations, Common Payment Card, Emergency Response & City Incident Management and Centralised Command & Control Centre. Bhubaneswar Smart City proposal envisages to take up 57 projects strategically aggregated into ten Implementation Modules (IM) for bidding so as to reduce time and cost overruns. This aggregation was done after consultation with all stakeholders especially line departments, domain experts, contractors and vendors; and on basis of convergences, inter linkages, precedence mapping, financial timelines and dependency networks.

Chart No1: pan city smart solution



Source : Bhubaneswarsmartcity.org

- Build basics
  - ♦ Citizen's connect Initiative
  - ♦ "I support my city" volunteer program
  - ♦ Town center online
  - ♦ One map
  - ♦ Project Bhubaneswar urban knowledge center
- Transit Oriented Development
  - ♦ Railway station multimodal square MLCP
  - ♦ Satya Nagar institutional core
  - ♦ Satya Nagar MLCP
  - ♦ Lake Neutral
- Urban Mobility
  - ♦ Janpath people's Smart path
  - ♦ Project URBS urban
  - ♦ BBSR Cycle highway
  - ♦ Pubilice bike sharing scheme
  - ♦ E-rickshaw project
- Housing
  - ♦ Janpath Government housing redevelopment
  - ♦ Mission Abass
  - ♦ Rental housing for construction workers
  - ♦ Project Kutumb
- Social development
  - ♦ Museum of Urban history
  - ♦ I am BBSR initiative
  - ♦ Neighbourhood watch
  - ♦ Senior citizen district contact program
  - ♦ Safe refuge points for women safety
  - ♦ E- Promary health care for all
- Economic development
  - ♦ Invest BBSR
  - ♦ Project Swabhimaan
  - ♦ Street vendors improvemnet project
  - ♦ Project Kusum
  - ♦ Multimedia digital learning in schools
- Basic serives
  - ♦ 24\*7 water supply
  - ♦ Water recycling project
  - ♦ Decentralized STPs
  - ♦ 24\*7 Energy supply
  - ♦ Underground electric wiring
  - ♦ Waste-let's recycle
  - ♦ Project samman
  - ♦ City gas distribution dusting
  - ♦ City fibre ducting



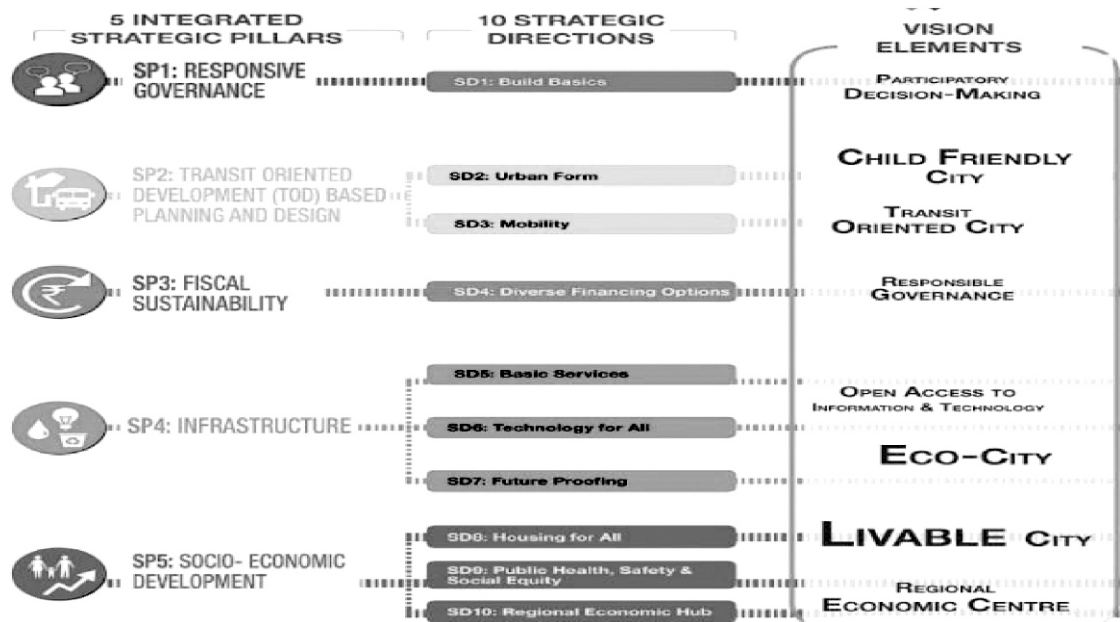
- Technology for all
  - ♦ Intelligent city operations & Management center (ICOMC)
  - ♦ City Wi-Fi project public internet access centers digital literacy initiative
- Future proofing
  - ♦ Energy efficiency initiative – DELP
  - ♦ LED street lighting energy efficient water pumps solar city program – roof top micro solar power
  - ♦ Rain water harvesting
- Intelligent City Operations and Management Centre (ICOMC)
  - ♦ Traffic management
  - ♦ Parking
  - ♦ Transit operation
  - ♦ Common payment card

- ♦ Emergency responses and city incidence management system
- ♦ Command and control center.

### Strategic Plan

To move towards a more livable city, the plan focuses on creating a model of sustainable urbanization based on New Urbanism principles. Bhubaneswar's Strategic Plan is built on five strategic pillars-Responsive Governance, Transit Oriented Development (TOD) Based Planning and Design, Fiscal Sustainability, Infrastructure and Socio-economic Development. These five strategic pillars are guided by ten Strategic Directions corresponding to UNDP's "Sustainable Development Goals" which are the key strategies for the plan and together provide the foundation for creating a more inclusive, resource-efficient, and technology enabled future for the city.

Table no2 : Strategic Planning for Bhubaneswar



Source: Bhubaneswar smart city.org

#### 4. CONCLUSION

Cities account for the majority of greenhouse, gas emissions and energy consumption across the globe. As cities are economic growth drivers, urbanization is projected to increase further in the near future which will drive the depletion of non renewable resources as well as add to the extent of carbon –dioxide emissions. To cope with rising urbanization and climate change issues, innovations and digital technology must be leveraged to minimize energy consumption and improve quality of life sustainability covers not only environmental aspect but also social equity and the economy. The history of urbanization in India reveals four processes of urbanization at work throughout the historical period in India which are as follows:

- a) the emergence of new social relationships among people in cities and between people in cities and those in villages through a process of social change.
- b) the rise and fall of cities with change in the political order
- c) the growth of cities based on new productive process, which alter the economic base of the city and
- d) the physical spread of cities with the inflow of migrants who come in search of a means of livelihood as well as a new way of life.

These four processes are also evident in the history of urbanization in the Odisha. The paces of urban towns have steadily increased over the year and according to the census 2011, there are a total of 223 towns in Odisha. Although there are no metropolitan city in the state, both Bhubaneswar and Cuttack are inching their way to attain the metropolitan state by the next census enumeration. As per a recent statistics, the population of Bhubaneswar in 2016 was 905,339 and the forecasted population of the city in 2017 was 917,766. The city of Bhubaneswar has a great potential not only for human contacts but also for exchange of knowledge, transfer of technology, sharing of experiences and increase in business opportunities, growth in employment and livelihood potentials leading to a more sustainable urban management. Urban governance entails the commitment, collaboration, coordination and synergy between different

stakeholders at all levels. The selection of Bhubaneswar as a smart city will lead to the marriage of innovation with technology which will go a long way in optimizing the management of resources and infrastructure and, at the same time focus on inclusiveness and a greener environment.

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## Growth pattern of Height and Body weight during Childhood and Adolescence: A Cross-sectional Study on three rural populations of Odisha.

Jagatdarshi Badamali<sup>1</sup>  
K.C. Satapathy<sup>2</sup>  
P.K. Patra<sup>3</sup>

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### Abstract

*Child malnutrition is becoming a risk factor for illness during adolescence and is responsible for about one-third of child deaths globally and also in India. Now some present studies shows it is increasing in tribals . This present study attempts to examine the growth pattern of height and body weight of both boys and girls of Turunji village aged 5 to 16 years. A total number of 155 rural children were recruited from 3 schools of Turunji for the study. The present study was conducted at Turunji village of Nabarangpur district. Anthropometric measurements were taken to assess growth and nutritional status. Means and percentile curves were used to examine the pattern of growth which help to compare the nutritional status with other studies. Values of <5th percentile of body mass index (BMI) for age were considered as indicators of under-nutrition. The height and weight of the study participants were compared with ICMR values. Results reveal that 50.96 per cent of the school children's found in underweight category, weight of 34.19 per cent children found in normal category and 8.38 per cent and 6.45 per cent are found in over weight and obese categories respectively.*

**Key words:** Height, weight, , BMI, tribal children, Odisha.

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### 1. Introduction

The growth of children in a population reflects their nutritional status and indirectly determines their living standard. The development of an national growth standard for the screening, surveillance and monitoring of school-aged children and adolescents has been motivated by 2 contemporaneous events, the global surge in childhood obesity and the release of a new international growth standard for infants and preschool children by the international parameters. There are National parameters as well as international parameters like ICMR, WHO, NCHS to compare the growth pattern. Growth is also influenced by dietary pattern, expenditure behind food and general health condition of an individual. Slowing or cessation of growth is one of the first observable responses to nutritional in adequacy.

There are also some genetically and environmental factors which are responsible for linear growth and development like BMI, dietary habits. A well designed growth study may provide a powerful tool to identify the health and nutritional status of any population or community (Tiwari et al., 2007).

Many studies demonstrated that growth pattern may vary between rural and urban residence (Eveleth and Tanner, 1990 and Graham et al., 1980). Adair et al., (1993) is of the opinion that environmental and cultural factors are responsible for urban-rural difference. In view of the above present study is an attempt to examine the growth pattern on Turunji school children's. According to the World Health Organisation (WHO) globally, 30% of children under five are estimated to be stunted and 18% have low weight-for-height, and 43 million children are

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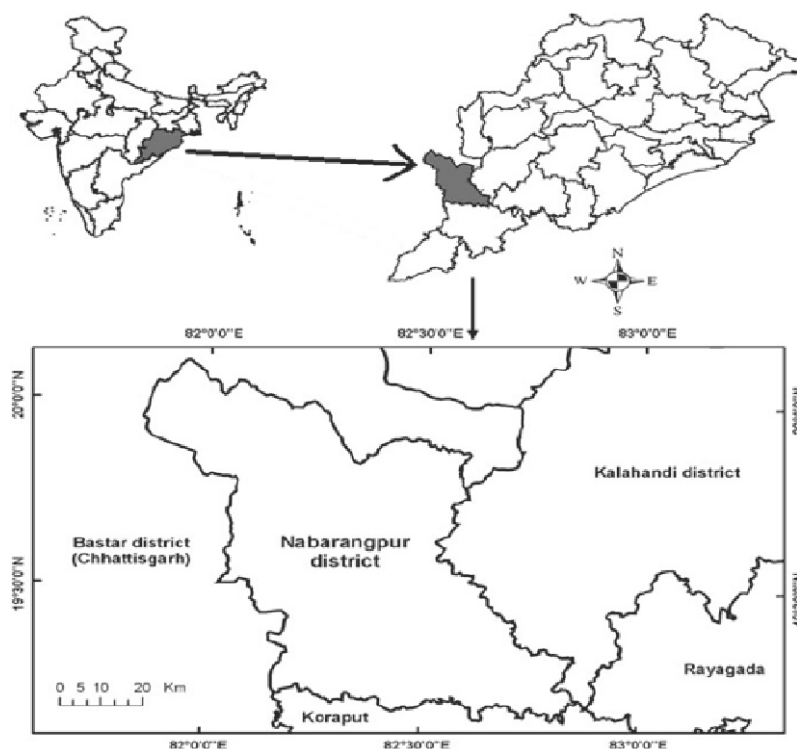
overweight. Optimal breastfeeding could save the lives of 1.5 million children under five every year. Nearly nine million children die every year from preventable diseases and infections: the largest killer being Diarrhoeal disease. There are over 2 billion cases of diarrhoeal disease every year and is the leading cause of malnutrition amongst children under five (WHO). In developing countries, with India being one of them, the proportion of overweight and obese people now coexist with those who are undernourished. According to the World Health Organization estimates, by the year 2020, non-communicable diseases will account for approximately three quarters of all deaths in the developing world.

## Materials and Methods

### Area and People

The state of Odisha is the homeland of 62 different tribal communities (Census of India 2011. The

present study included 3 tribes (Amanatya, Bhotra and Saora) living in the Nabarangapur, district of Odisha, India. The study was conducted in the village Turunji of Nabarangpur district and the village has three hamlets i.e Badagaon, Naikguda and Damunaikguda. Badagaon and Naikguda is dominated by Amanatya, Saora's were Sparsely living both in Badagaon and Naikguda and the Bhotra's dominated over Damunaikguda of Nandahandi Block. The duration of the study was from 8<sup>th</sup> February 2017 to 28<sup>th</sup> February 2017 and the data were collected earlier field work for M.Sc. . For calculating the age of children's, class wise data were taken which makes easier to calculate their age. Anthropometry and weight were taken simultaneously by using Anthropometric rod and weighing machine respectively. Mean, standard deviation, standard error of mean and percentile value were calculated by using Microsoft Excel 2007 and SPSS version 20.0.



Map- 1 Location of Nabarangpur district, in Odisha map

## Ethical statement

*This research has been carried out in conformity with the ICMR's 'Ethical Guidelines of Biomedical Research on Human Participants (2006)'. The subjects who had voluntarily participated were considered.*

## Sample

*The study comprised the growth pattern of both boys and girls having a total sample size of 155 rural children's from Turunji village of Nabarangapur district, Odisha, out of which 84 are males childrens and 71 are female childrens.*

## Selection of the study participants

The Childrens have been selected purposively. The place of our study is Nabarangpur District, Odisha on which we emphasized three tribes namely Amanatya , Saora and Bhotra. Also two communities namely Gouda and Harijan are also present in the area. So the total ethnic group of the childrens were measured randomly. Materials for the present study was collected from three schools of turunji village of nabarangpur district. This study is a part of Msc fieldwork conducted by specialization having Biological anthropology students of Utkal university, vanivihar,

Bhubaneswar. Here only height and weight of the school childrens(5 to 16 years of age) were considered. Altogether 155 childrens were measured. Age of childrens was determined from the school records.

Standing height was measured to the nearest cm using anthropometric rod. Weight was measured by manual weighing machine. To assess child nutrition percentile values of BMI for age were calculated. In this connection CDC growth chart developed by the Indian council of medical research (ICMR, 2000) was compared.

## Results and discussion

Cross-sectional growth of height of Turunji school boys is presented in Table 1 and fig 1 respectively. The mean values of the measurements increased steadily from 5 to 16 years. Highest increment in stature is found between 14 - 15 years (19.66cm) and then in latter no growth seen. It is observed at the age of 5 - 6 years the increased stature seen is 14.69 cm, then percent of growth has increased at the age of 5 - 6 that is 15.07 then the next increment is in between 15 - 16 that is 13.86. The growth spurt seen in between 14 - 15 age group is an ideal type of increment in height.

AGE	N	Mean	Std. Error of Mean	Difference between mean(cm)	Per cent growth per annum
5	2	97.45	1.85	-	-
6	9	112.14	1.18	14.69	15.07
7	10	117.47	2.58	5.33	4.75
8	8	121.30	1.91	3.83	3.26
9	8	127.36	1.77	6.06	4.99
10	13	128.75	1.57	1.39	1.09
11	7	131.12	1.80	2.37	1.84
12	10	140.15	1.83	9.03	6.88
13	10	142.66	3.46	2.51	1.79
14	1	141.80	0.00	-0.86	0.60
15	3	161.46	0.84	19.66	13.86
16	3	156.00	5.58	5.46	3.38

Table 1.Age wise height(cm) among school boys of Turunji(Nabarangpur), Odisha

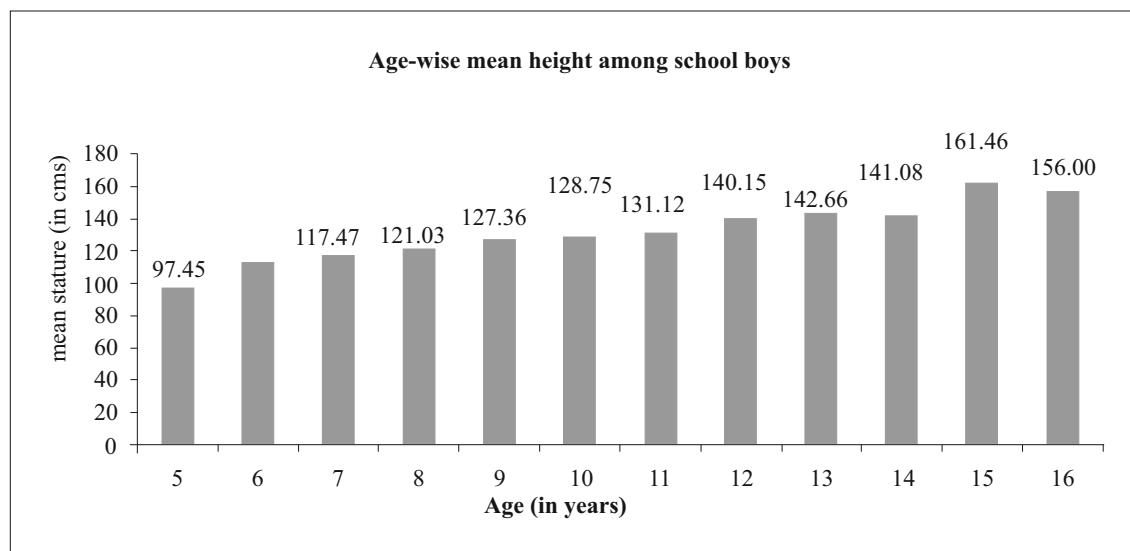


Figure 1. Age wise height (cm) among school boys of Turunji (Nabarangpur), Odisha

AGE	N	Mean	Std. Error of Mean	Difference between mean(cm)	Per cent growth per annum
5	5	107.08	1.18	-	-
6	12	111.30	1.01	4.22	3.94
7	14	115.13	1.42	3.83	3.44
8	9	121.25	0.61	6.12	5.31
9	13	127.07	1.78	5.82	4.80
10	5	129.06	1.40	1.99	1.56
11	3	138.06	3.72	9.00	6.97
12	6	142.56	2.14	4.50	3.25
13	1	146.00	.	3.44	2.41
14	1	147.00	.	1.00	0.68
15	2	147.05	0.45	0.05	0.03
16	-	-	-	-	-

Table 2. Age wise height(cm) among school girls of Turunji(Nabarangpur), Odisha

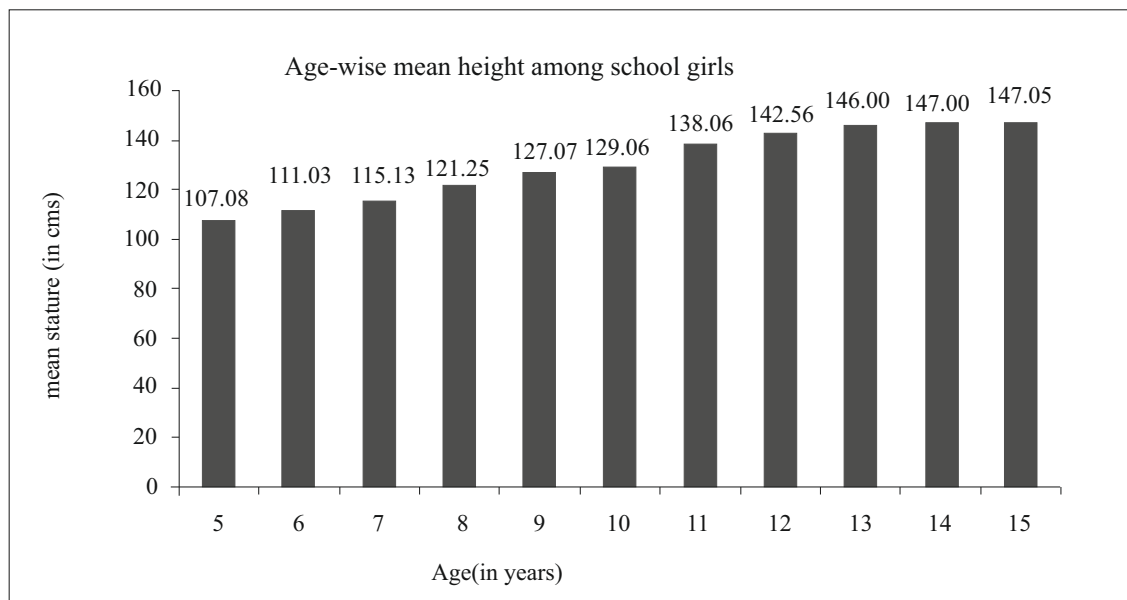


Figure 2. Age wise height(cm) among school girls of Turunji(Nabarangpur), Odisha

To considering the cross-sectional study of girl child of the same age group it seen the highest increment of girl child is at the age between 10-11 years (9.00 cm) and before in between the age of 7-8

age groups it is found as 6.12. The percent of growth rate is high at the age of 10-11 age groups that is 6.97.

AGE	N	Mean	Std. Error of Mean	Difference between mean(kg)	Per cent growth per annum
5	2	13.00	1.00	-	-
6	9	17.00	.23	4.00	30.76
7	10	18.85	1.03	1.85	10.88
8	8	20.87	.69	2.02	10.71
9	8	22.37	.94	1.50	7.18
10	13	23.50	.82	1.13	5.05
11	7	24.85	1.14	1.35	5.74
12	10	29.00	.77	4.15	16.70
13	10	29.60	2.00	0.60	2.06
14	1	34.00	.	4.40	14.86
15	3	43.33	1.66	9.33	27.44
16	3	43.00	2.08	-0.33	-0.76

Table 3. Age wise weight(kg) among school boys of Turunji(Nabarangpur), Odisha



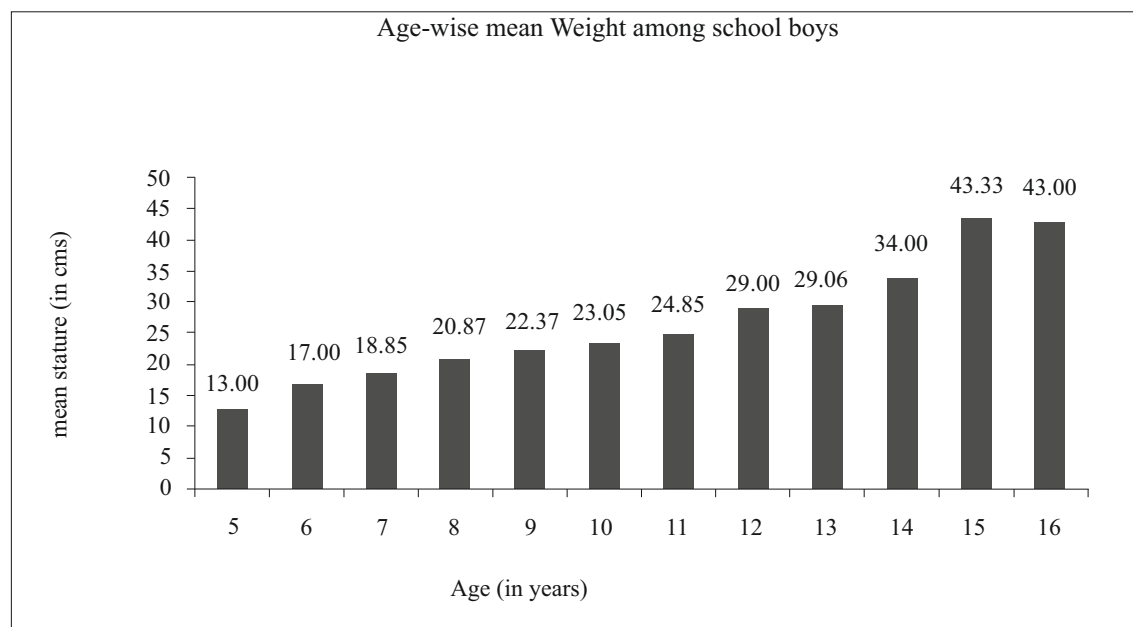


Figure 3. Age wise weight(kg) among school boys of Turunji(Nabarangpur), Odisha

Growth of Weight of Turunji School Boys is presented in Table 3 and Figure 3 respectively. Like height mean values of weight increased steadily from 5-16 years. Highest increment in Weight is found between 14-15 years (9.33 kg) and next

highest is in between 13-14 years (4.40 kg). Total increment between 5-16 years is found to be 30 kg. Altogether four growth spurts are observed. These are between the ages of 5 and 6 years, 11 and 12 years, 13 and 14 years and 14 and 15 years.

AGE	N	Mean	Std. Error of Mean	Difference between mean(kg)	Per cent growth per annum
5	5	16.20	0.48	-	-
6	12	16.45	0.29	0.25	1.54
7	14	17.89	0.61	1.44	8.75
8	9	19.94	0.47	2.05	11.45
9	13	22.46	1.09	2.52	12.63
10	5	25.20	0.37	2.74	12.19
11	3	28.33	0.88	3.13	12.42
12	6	31.66	2.09	3.33	11.75
13	1	33.00	0.00	1.34	4.23
14	1	32.00	0.00	-1	-3.03
15	2	37.00	3.00	5.00	15.625
16	-	-	-	-	-

Table 4. Age wise weight(kg) among school Girls of Turunji(Nabarangpur), Odisha

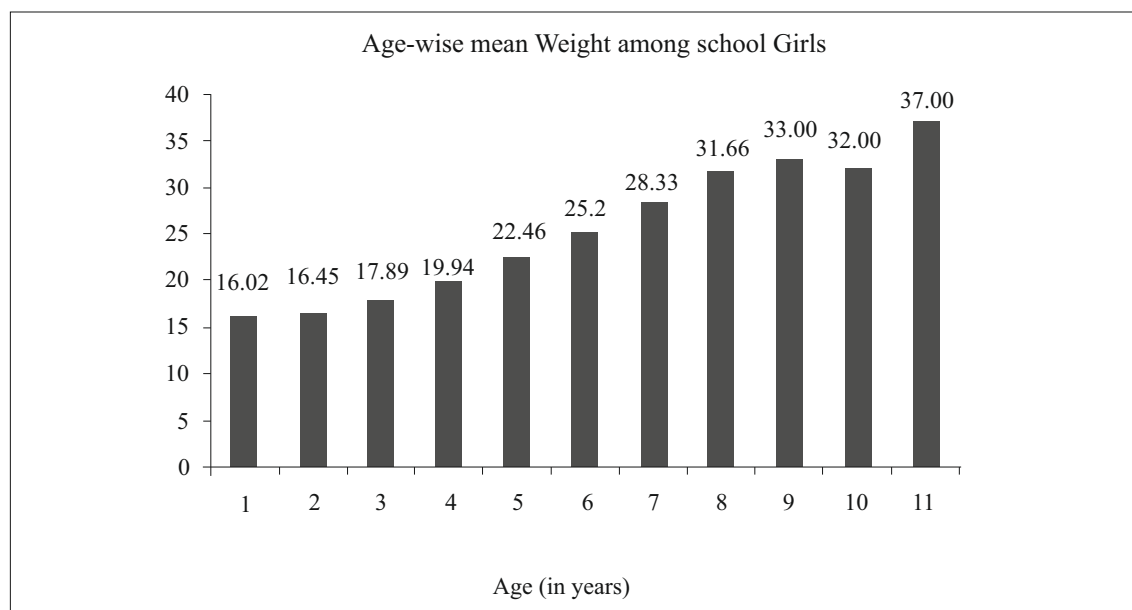


Figure 4. Age wise weight(kg) among school Girls of Turunji(Nabarangpur), Odisha

Similarly the Weight of Turunji School girls is presented in Table 4 and Figure 4 respectively. Here also the mean values of weight increased steadily from 5-15 years. Highest increment in Weight is found between 14-15 years(5.00 kg) and next highest is in between 11- 12 years(3.33 kg). Here

total increment between 5-16 years is found to be 20.8 kg. Here in between 10 and 11, 11 and 12 and 14 and 15 age groups the growth spurt is found.

Comparison of Height and weight of the present study with that of Indian urban boys(ICMR , 2000)

Table 5.Comparison of height (cm) of present study with Indian Rural study (ICMR , 2000)

Age in years	Turunji school boys	Indian rural boys (ICMR, 2000)	Turunji school girls	Indian rural girls (ICMR, 2000)
5	97.45	105.80	107.08	105.20
6	112.14	111.70	111.30	111.10
7	117.47	117.40	115.13	117.00
8	121.30	123.20	121.25	122.40
9	127.36	129.20	127.07	128.60
10	128.75	132.90	129.06	132.60
11	131.12	137.50	138.06	137.80
12	140.15	142.90	142.56	143.10
13	142.66	148.70	146.00	148.20
14	141.80	154.50	147.00	152.20
15	161.46	159.50	147.05	153.50
16	156.00	164.90	-	154.20

It is seen that Turunji school boys having 6 - 7 age groups are taller as compared to Indian rural boys i.e. 112.14 and 117.47 respectively. Boys attaining the age of 15 are also taller than Indian rural boys. Similarly 5 - 6 age groups girls are taller than Indian

rural girl's i.e. 138.06. It is also seen that girls at the age of 11 are taller than Indian rural girls. Which show that at the age of childhood and maturity both the boys and girls are taking their peak value in their growth spurt.

Age in years	Turunji school boys	Indian rural boys	Turunji school girls	Indian rural girls
5	13.00	16.30	16.20	15.90
6	17.00	17.90	16.45	17.70
7	18.85	20.40	17.89	20.20
8	20.87	23.0	19.94	22.90
9	22.37	25.80	22.46	26.20
10	23.50	27.50	25.20	28.20
11	24.85	31.40	28.33	32.30
12	29.00	34.60	31.66	36.20
13	29.60	37.20	33.00	39.80
14	34.00	41.0	32.00	42.90
15	43.33	45.70	37.00	45.30
16	43.00	50.90	-	47.20

Table 6. Comparison of Weight (kg) of present study with Indian Rural study (ICMR, 2000)

It may be seen from table 6 that Turunji school children's both boys and girls have of less weight as compared to Indian rural children's it means Indian rural children's are heavier than Turunji school children's. The difference is noted to be small in the 5 age group of turunji school girls i.e. 16.20. The mean value of weight is how ever higher than Turunji School childrens.

### Child Nutrition

To assess child Nutrition(5-16 years), height and weight for 155 childrens(both boys and girls) are measured. Percentile values of BMI for age were calculated. In this connection ICMR, 2000 growth chart are compared with the study area Turunji school childrens. BMI according to percentile values were furnished in Table 7.

Age in Years	N	Percentile Value			
		<5th (Underweight)	5th-85th (Healthy weight)	85th-95th (Over weight)	≥ 95th (Obese)
5	7	4(57.14)	3(42.85)	0(0.00)	0(0.00)
6	21	17(80.95)	4(19.04)	0(0.00)	0(0.00)
7	24	18(75.00)	6(25.00)	0(0.00)	0(0.00)
8	17	10(58.82)	7(41.17)	0(0.00)	0(0.00)
9	21	12(57.14)	7(33.33)	2(9.52)	0(0.00)
10	18	7(38.88)	9(50.00)	2(11.11)	0(0.00)
11	10	3(30.00)	5(50.00)	2(20.00)	0(0.00)
12	16	4(25.00)	7(43.75)	0(0.00)	5(31.25)
13	11	4(36.36)	4(36.36)	0(0.00)	3(27.27)
14	2	0(0.00)	1(50.00)	1(50.00)	0(0.00)
15	5	0(0.00)	0(0.00)	4(80.00)	1(20.00)
16	3	0(0.00)	0(0.00)	2(66.66)	1(33.33)
Total	155	79(50.96)	53(34.19)	13(8.38)	10(6.45)

Table 7. BMI for age(5-16 years) Figures in parenthesis indicates percentage values

The Distribution or frequency of underweight Children's are found 50.96 in underweight category similarly 34.19 found in healthy weight category and 8.38 and 6.45 are found in over weight and obese category. From the above table it is clear that majority of the children are coming under underweight category and healthy weight category is following by it. The underweight found more in 5, 6, 7, 8, 9, 10, 13 age groups which ranges up to 36.36 to 80.95 per cent. Then it is seen in the healthy weight category 5, 8, 9, 10, 12, 13, 14 age groups ranges up to 33.33 to 50.00 per cent. However 80.00 per cent children's from 15 age group, 50.00 per cent children's in overweight category and 31.25 per cent and 33.33 per cent children's from 12, 16 age groups respectively comes in obese category.

### Conclusion

Growth and development is influenced by socio-economic condition, environment and genetic potential of the individual. The present study conducted among children of Turunji village of Nabaragpur district, Odisha shows that there is a pace of increment of height and weight among the boys and girls with respect to age. The children up to 9 years of age exhibits a consistent in terms of height and weight when compared with national averages (Table 5 & 6). However, adolescences are lagging behind the national averages in term of mean height and weight with respect to age and sex. This is may be due to lack of proper nutrition during the adolescent stage which needs further investigation.

### Acknowledgement

We are thankful to all the participants who volunteered for the present research work. We are also thankful to the Head, P.G. Department of Anthropology, Utkal University and Govindalaya, Nabarangpur for their all type of support during fieldwork.

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## Impact of Forest Proximity on Livelihoods and Food Security of Forest Dependent Tribal Communities

Soumendra Sarangi<sup>1</sup>

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### **Abstract**

*The present paper discusses a method of assessing the role of forest and its proximity in coping with livelihoods and food insecurity as experienced by forest- dependent households. Several variables reflecting the status of livelihoods and food security including income from forest, forest use for coping with livelihoods stress, dietary diversity etc were compared between households with high, moderate and low proximity to forest. Households with higher proximity to forest illustrated higher income from forest and increased use of forest resources during phases of livelihoods and food insecurity.*

**Keywords:** Forest, livelihood, food insecurity.

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### **1. Introduction**

Even though forests contributes significantly to livelihoods and food systems of nearly 1.6 billion people ( FAO, 2014) including tribal and forest dwelling communities spread all over the globe, yet the wide range of contributions made by forests to livelihoods and nutrition remain poorly understood( Vincetti, et al, 2013). Much of this gap in research information is currently being reviewed with a new perspective owing to increasing vulnerability of conventional agriculture to climate change and potential role of forest in supplementing and diversifying the food base through multifunctional landscape approach ( Bhaskar, et al,2015). In fact, mounting evidence indicate that forests with wide range of ecosystem services not only enhance agricultural productivity in adjacent fields( Mitchell et al, 2014) but also provide sustainable food base and income for thepoor forest-dependent communities. New researches also suggest emerging link between forest food, food security and nutrition (Arnold et al., 2011, Jamnadass et al,2011 Vincetti et al.2013, Ickowitz et al,2014, Sunderland et al, 2013) and highlight the role played

by diverse forest foods like fruits, leafy vegetables, nuts, plant foods etc in micronutrient deficiency ( Stephenson et al, 2010, Powell et al,2011, Vincetti, et al,2008, ), especially in developing countries where forest food can constitute essential source of nutrition for poor and remote tribal population ( Sunderlin et al,2008, Colfer et al,2008).

The importance of forests further enhances as a safety net for poor forest-dwelling and tribal communities during crop failure, seasonal crop production gape and other periods of food stress (Blackie et al, 2014, Keller et al, 2006, Shackleton and Shackleton, 2004). Despite such growing attention on the link between forests and livelihoods of forest dwelling communities, many studies are qualitative studies under specific contexts confined to particular regions and a large number of studies are also based on analysis of existing literature (Larsen et al, 2010, Pagdee et al, 2006) excepting a few like the recently published PEN studies on a comparative analysis of 33 multi - scale case studies in developing countries including India( Angelsen et al, 2014)

While there is a growing recognition that forests play important role in livelihoods and food security of forest-dwelling tribal communities, the complex, interconnecting and overlapping processes through which these marginalized communities draw a wide range of services from forests, even during phases of extreme food and livelihood insecurity, still remains to be fully understood.

The present study focuses on how livelihood and food security of forest-dependent tribal communities tend to vary with varied access to forest and specifically measures households based on their proximity to forest leading to differential use of forest resources to cope with livelihoods and food insecurity.

### **Background and Research question**

The hilly tribal areas in the eastern region of India including the area selected for the proposed study with higher proportion of forest invariably show much higher dependence of tribal population on forest both socio-culturally and economically. These are also the areas that are marked by poor infrastructure development, low employment opportunities, poor access to basic services like health, education, drinking water facilities etc. In the absence of other opportunities, forest produces play important role in the livelihood and food security of millions of poor forest dwellers. The present paper poses the research question –“Do increased proximity and access to forest reduce food and livelihood insecurity among the forest dependent tribal communities?” and finds an answer to this question.

### **Study Area and People**

This study was conducted in two of the most socio-economically backward and adjacent tribal districts namely Keonjhar of Odisha and West Singhbhum of Jharkhand states. Both the tribal districts are marked by higher incidence of poverty, presence of higher proportion of tribal population and forested landscapes. Both West Singhbhum and Banspal block of Keonjhar are included in the fifth scheduled of the Constitution of India there are special laws for protection of land and forest rights of tribals. Most of the forest areas in the both states including the areas covered under the study was owned by the state and governed under the MOEF, Government of India. The tribal communities

covered under the study included predominantly Hocommunity from West Singhbhum and Bhuyian, Santhaland Juang communities from Keonjhar.

### **Methods**

This study was a longitudinal study conducted in two phases over two years' time. While the first phase started in June 2014 and lasted until May 2015, the second phase was completed between June 2015 and May 2016. Both quantitative and qualitative methods were used to collect information on wide range of variables, resource use, seasonality etc. A structured interview schedule consisting of questions on livelihoods, food security and consumption/expenditure was used to elicit information from sample households. The detail information on livelihoods consisted of information on all sources of livelihood with special emphasis on forest based livelihoods including information on income from forest, role forest in coping lean season, exchange of forest produce for accessing food etc. Many studies on forest based livelihoods increasingly use these standardized information to reflect on the link between forest and livelihoods (Angelsen et al, 2014, ). HFIAS (Household Food Insecurity Access scale) was used as a proxy measure to assess the status of food in security among surveyed households.

The consumption /expenditure survey was used to collect information on proportion of monetary expenditures on food in relation to total expenditure and details of consumption pattern among the sample households. The 7 days and 24 hours recall method was used to record information on consumption of variety of foods from 13 selected food groups. Apart from details on quantities of consumption, source of accessing food, cost and durability of food was also collected. The sample of 300 households for the present study was selected out of a larger sample of women and their children below two years of age spread across 60 villages each in two districts for community based intervention (CARING) aimed at improving nutrition and growth. Proximity of households to forest was classified on the basis of their distance from forest. Households that were located within 0 to 2km were put in the category of High Proximity (HP) and households that were located within 2-4km were kept within Moderate Proximity (MP). Finally households that were located more than 4km away from forest were put in the category of households with Low Proximity (LP).



## Analysis

The analysis was based on the comparison between mean values of variables like annual income from forest, months of NTFP collection, Number of HH engaged in forest produce collection, frequency of use of forest for coping with livelihood and food stress, frequency of exchange of forest produce with food etc between households with Higher Proximity, Moderate Proximity and Low Proximity to forest. The status of food security was analysed on the basis of information collected through HFIAS scale and consumption pattern of specific food groups. While the HFIAS scale indicates the status of food insecurity and is being increasingly used as a most standard tool for measuring existence and frequency of food insecurity conditions, the dietary diversity scores have been validated as proxy measures for macro and /or micronutrient adequacy of the diet for several age/sex groups (Smith et al, 2007, FAO, 2013). Both the indicators used for measuring food security are comprehensive standard tools and inversely correlated.

## Results/Findings

### (A) Livelihood Status and Strategies

The livelihoods Strategies adopted by all the households included several livelihoods activities like agriculture, livestock rearing, agriculture paid labor, daily wage labor, collection and selling forest produce, selling of alcohol etc. It was observed that majority of households followed these livelihood options in various combination as strategies to adapt to scarce resources. For example, agriculture was practiced by 87% of households, collection and selling of forest produce followed by 82% HH, Livestock rearing by 75% HH, daily wage labor by 68% and agriculture paid labour was continued by 71% of households. From among these options, some combinations like Agriculture, collection and selling of forest produce and livestock rearing featured among nearly 60% of Households consistently along with some other varying combinations. These observations were consistent with many other findings that highlight diversified strategies adopted by rural households to meet basic needs and cope with livelihood uncertainties arising out of unforeseen shocks/vulnerabilities (Ellis, 1998 cited in Belcher et al, 2014).

### (B) Forest dependence among different groups based on productive assets

Land was considered as an important asset by majority of the household surveyed but largest proportion of households (40%) happened to be marginal farmers with less than 2 bighas of land and could obtain only 6 months of their food needs from agriculture. The qualitative information obtained through focussed group discussion and community meetings indicated that such shortfall in food among landless families and marginal farmers was mostly supplemented by selling and consumption of forest produces. This was further supported by quantitative information that showed 84% such marginal farming households with small landholding were engaged in collection of NTFP and 65% of which were engaged in forest produce collection for all 12 months in a year. Likewise 87% of the landless households found to be engaged in NTFP collection and their average annual income from selling NTFP was higher (8000Rs) than any other group possessing land. In comparison to more vulnerable social groups like landless families and marginal farmers, only 28% of the families with higher proportion of land were engaged in collection of forest produces for all 12 months. A clear pattern thus seemed to be emerging where forest dependence increased with reducing land size and decreased with productive assets like increasing land size and livestock.

### (C) Variation in income from forest and availability of forest produce based on proximity and access to forest

Forest played an important role in the livelihoods of majority of households as large proportion (83%) of households accessed forests for collection of various forest products ranging from fuel woods, leaves, fruits, mushrooms, other NTFPs etc. even though level of dependence varied among families based on their proximity to forest. Forest Access and collection of forest produce was highest (98%) among households with Higher Proximity to forest and lowest (74%) with Low Proximity to forest. It was observed that the average annual income from forest through sale of NTFP was highest (5140 Rupees) among households located nearer to forest (HP) and lowest (3350/-) among households which are located farther away from forest (LP).

### **(D) Role of forest in coping with livelihood and food insecurity during lean season**

The availability of variety of forest products for consumption, exchange with food and earn income from selling forests produces led families to rely more on forests at the time of food shortages and livelihood stress experienced during lean season. Such reliance of families on forests was measured through different indicators like incidence of exchange of NTFP items with food, reliance on forest during lean season, income from selling of NTFP etc. The data revealed that 50% of the households from High Proximity (HP) area used forest produces for coping with livelihood and food stress during lean season compared to 29% of Households from areas of Moderate Proximity (MP) and 13% households from areas of Low Proximity (LP). Apart from incidence of higher reliance among households from HP area on forest during lean season, it was found 33% of the households from High Proximity area exchanged Char, Mahua and other NTFPs with food item like rice compared to only 4% of households from Low proximity area (LP) exchanging NTFPs with food. The focussed group discussions with household exchanging Forest produces for food indicated that such food accessed through forest produce exchange meet their food requirements of 3-4 months during extreme food shortage experienced after festivals and other times. This indicated that forest played a bigger role in coping with livelihoods and food stress among Households from HP area compared to other households from areas of MP and LP.

### **(E) Status of Food Insecurity among different groups based on proximity and access to forest**

A detail comparison between status of food insecurity of households from HP and LP showed that households from higher proximity to forest showed lower food insecurity. It was observed that fewer households in areas from HP had to limit their food diversity in comparison to households from LP due to limited resources. Several other conditions of food insecurity like limiting size, number and quantity of foods by family members due to limited resources was higher (Varied from 20-30%) in households from LP in comparison to households from High Proximity areas. Besides this, the dietary diversity and consumption of specific foods like fruits, green and leafy vegetables among households

from HP areas was higher than households from areas of LP.

### **(F) Forest proximity and Community led Conservation and Management of forest resources**

It was found that the involvement of families in conservation and management of community forest was much higher among households with high proximity (HP) to forest compared with households with moderate (MP) and Low proximity (LP). Analysis of the data revealed that 44% of families having high proximity (HP) were involved in such conservation and management of forest resources compared to 31% of families having moderate proximity (MP) and 11% of families having low proximity (LP). Increased access and return from forest among HH with high proximity also prompted the community to protect and manage the forest resources through local institutional arrangements.

### **Discussion**

The Tribal households selected for the present study from two of the poorest forested Tribal regions illustrated much higher dependence on forest (85%) in different form though the nature and level of dependence tended to vary based on proximity, access to forest, land size etc. While the dependence on forest in the form of collection and selling of NTFP, consumption of forest food, fuel and fodder etc was much higher among the more vulnerable groups like landless and marginal farmers, the extent and level of dependence on forest showed a decreasing trend with increasing status of productive assets like land and livestock. The vulnerable groups exhibited engagement of more number of family members for collection of forest produce for more number of months in a year compared to households owning higher productive assets. These findings add to the existing literature that highlights the importance of forest as an important livelihood option and higher dependence of more vulnerable groups on forest by supporting with empirical data collected over two years. Apart from adding to the literature on forest dependence and livelihood, the present study add a new dimension by analyzing the role of forest in coping with food and livelihood insecurity among forest dependent community during lean season and other

times of vulnerability based on proximity and access to forest. The study findings relating to increased role of forest in coping with livelihood and food insecurity is highly relevant to the newly enacted legislation of “ The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of forest Rights) Act,2006”. It lends support to the assumption made in the preamble of law that emphasizes on importance of forest rights of Tribal in relation to their food insecurity. These findings could strengthen policies for better implementation of this empowering legislation.

### Conclusion

The findings of the present study showed that households having higher proximity to forest showed higher average annual income from forest, increased dependence on forest during lean season and times of food and livelihoods insecurity and increased exchange of forest produce with food compared to households having moderate and lower proximity to forests. Findings of the present study based on empirical data of small sample of three hundred households among Ho community from West Singhbhum in Jharkhand and Bhuyian, Santhal and Juang communities from Keonjhar in Odisha indicate how increased proximity to forest help the more vulnerable Tribal communities to cope with livelihood and food insecurity during lean period experienced by them periodically ranging from July to October every year. Apart from the lean period, the study also showed that forest is being used as an

important resource for livelihood insecurities throughout the year.

Another important aspect revealed by this study is that households with higher proximity to forest were engaged more in community led forest conservation and management initiatives than compared to households with moderate and lower proximity to forest. These causal relationships revealed by the present study indicate a linkage between forest proximity and use of forest by forest dependent Tribal communities which can be explored further on a wider scale.

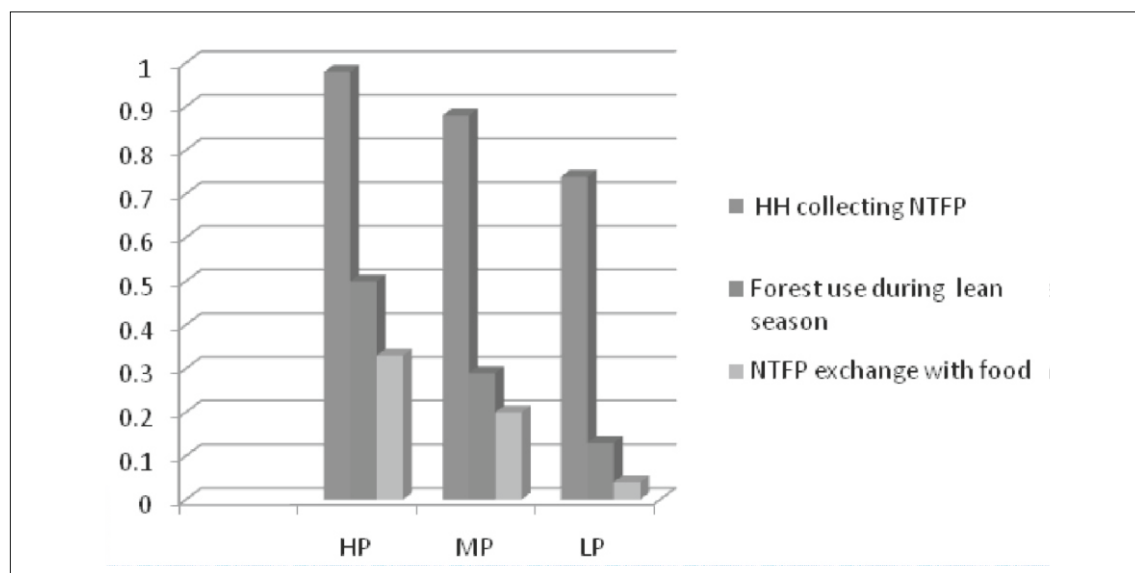
### Acknowledgements

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Table I Livelihood Indicators

Livelihood Indicators	Mean Value		
	High Proximity (HP)	Moderate Proximity (MP)	Low Proximity (LP)
Annual Income from NTFP ( Rupees)	5140/ _	4146/ _	3350/ _
% of HH engaged in NTFP collection	98%	88%	74%
No of months of NTFP collection in a year	9	10	8
Quantity of fuelwood consumed (Per Month)	216.6 Quintal	152 Quintal	142.44 Quintal
% of HH used forest for coping with lean season	50%	29%	13%
% HH that exchanged NTFP for food	33%	20%	4%



Graph I Use of forest produce for livelihood based on forest proximity

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## Prevalence of Undernutrition among three Tribes of Nabarangpur, Odisha.

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### Abstract

*Document pertaining to the prevalence of undernutrition among the tribes of Odisha is scanty. Under these circumstances, this paper attempts to examine the nutritional status of the Amanatya, Bhotra and Saora tribes of Nabarangpur district of Odisha. 200 adult individuals from three hamlets of village Turunji, Nabarangpur district of Odisha were studied. Height and weight were recorded and the Body Mass Index was calculated using the standard protocol. Internationally accepted BMI guidelines were followed to access the nutritional status. The present study reveals a high percentage of Chronic Energy Deficiency (CED) or under nutrition among the Saoras (44.44% males and 33.33% females) and Amanatyas (50% of females) as compared to the Bhotras (7.6% males and 16.6 % of females). From the total individuals studied, 24% found to suffer from under nutrition. This implies that these tribes are under serious nutritional stress. Gender difference in nutritional status is observed in all the groups. Several socio-economic factors, such as uncertainty of food supply, lack of adequate health care facilities and awareness, their belief system and cultural practice, less income were responsible for this higher prevalence of CED among these tribes. Thus, appropriate nutritional intervention programs by the government and non-government organisations to uplift these tribal populations are imperative.*

**Key words:** Nutritional Status, Body Mass Index, CED, Undernutrition, Tribe, Odisha

### 1. Introduction

Nutrition remains a major health issue in India for centuries. In recent past, India has made a considerable progress in social and economic aspects but the improvement in nutritional status has been less impressive (Griffith and Bentley, 2001). In general, various tribal populations are among the most underprivileged people in India. This because of their geographical isolation, uncertainty of food supply, lack of adequate health care facilities and awareness and their belief system and cultural practice. To have a comprehensive idea about the development process of a community, it is very much essential to have the knowledge of nutritional status of the community. Undernutrition is a major health issue in developing countries like India. The basic causes of undernutrition and infections in developing countries are poverty, poor hygienic

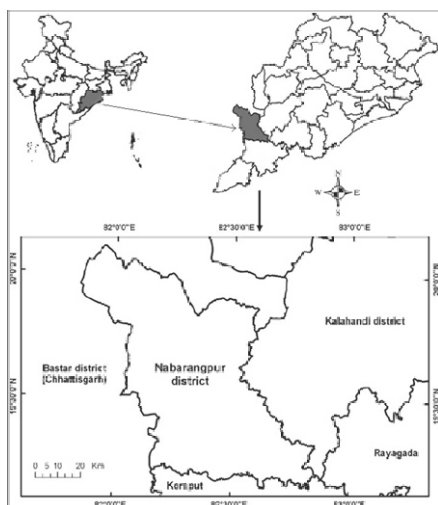
conditions and access to healthcare facilities (Mitra, 1985; WHO, 1990). Assessment of nutritional status is considered as a measure of health. Body Mass Index (BMI) is the most widely used method of assessing the nutritional status as it is in-expensive, non-invasive, and suitable for large scale survey (Lohman et al., 1988; Ferro-Luzzi et al., 1992; James et al., 1994). BMI is generally considered a good indicator of not only nutritional status but also the socio-economic condition of a population, especially adult population of developing countries. Keeping in view the points, the present study attempted to determine the nutritional status of the Bhotra, Amanatya and Saora Tribes of Turunji Village in Nabarangpur District, Odisha. The study further attempts to compare the nutritional status of the participants with the other tribal populations of Eastern India and to investigate the factors influencing nutritional status of these communities.

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## Area and People

The tribes of Odisha account to 22.8% of the states total population. There are 62 tribal communities in Odisha, 13 out of which are categorized as Particularly Vulnerable Tribal Groups (PVTG). Nabarangpur is a tribal dominated district of Odisha where 55.8% of total population of the district are tribes with 48 different tribal communities. Its boundary stretches in the north to Nuapada and Kalahandi Districts, west to Bastar District in Chhattisgarh, east to Kalahandi and Rayagada Districts and south to Koraput District. The district is home to about 13 tribal communities constituting 97.07% of the total tribal population of the district. The rest 35 categories of tribes constitute only 2.93% (Odisha District Gazetteers, Nabarangpur, Gopabandhu Academy of Administration [Gazetteers Unit], General Administration Department, Government of Odisha, 2016). Bhotra, Gond, Paroja, Kandha, Amanatya, Saora and Holva are some tribal groups of the district. The primary occupation of the tribe of Nabarangpur is mainly daily agricultural and manual labours. Their traditional occupation used to be settled cultivation, gathering, and fishing. Many people travel to cities like Jeypore, Malkangiri, Nabarangpur, and nearby states like Chattisgarh and Andhra Pradesh for the purpose of unskilled labours. To summarize, the tribes of the district are very much lagging behind in socio economic aspects and have a very low literacy rate.



Map 1: Geographical location of Nabarangpur District, Odisha

**Bhotra:** Bhotra synonymous with Bhottada, Bhattra and Dhottada are widely distributed in Koraput and Kalahandi districts of Odisha, Bastar area of Madhya Pradesh. Out of 4.51 lakh populations in the state 3.25 lakh Bhatras live in Nabarangpur district as per 2011 census. The Bhotras are one of the numerically major agricultural tribe of the district. They are primarily settled agriculturists and cultivators.

**Amanatya:** Amanatyas, also known as Omanatya, Omaito and Omanaito are Odia speaking cultivating tribal people who live in the north of Jeypore and south of Nabarangpur. They are dominantly found in the undivided Koraput district. Their population accounts to 28736 in Odisha out of which 17,463 are in Koraput, and 10746 in Nabarangpur district as per 2011 census. Amanatya are largely found in Nandahandi block of Nabarangpur district. Settled cultivation is the mainstay of their subsistence economy. It is supplemented by wage earning, animal husbandry, forest collection, hunting, fishing and khali stitching etc.

**Saora:** The Saoras also called Savara, Saura, Sabara, Sahar, Saur and Sora is a major tribe in the State of Odisha. The tribe having reference in the epigraphic records and ancient literature of India is very widely distributed throughout the State of Odisha. They are mostly concentrated in Gajapati, Sambalpur, Puri and Rayagada districts. In Nabarangpur district, their population is 7369 with a Male population of 3531 and female population of 3838. The Saora depend upon land and forest for their subsistence. In recent times settled agriculture has taken precedence over shifting cultivation.

## Study Design

Fieldwork for this research was carried out in Turunji village under Dhondra Panchayat of Nandahandi block of Nabarangpur district, Odisha. The village is divided into three hamlets namely Badagaon, Naikguda and Damunaikguda. Out of these three settlements, Badagaon is the biggest and is inhabited by scheduled tribal communities such as Amanatya / Omanatya, Bhattra/ Bhotra and Saura, scheduled caste communities such as Gauda and Biswakarma / Lohar (ironsmith), other religious group such as the Christians.

## Materials and Methods

The present study was undertaken to understand the pattern of height, weight, Body Mass Index (BMI) among the three tribal communities such as Bhotras, Amanatyas and Saoras of Turunji Village in Nabarangpur District, Odisha. For the present study data were collected from 200 individuals consisting of 100 males and 100 females. Individuals who voluntarily participated in the survey were only considered in the present work. Necessary ethical clearance were made at the institutional level to conduct this research. Anthropometric measurements such as height and weight were taken to compute the Body Mass Index of these individuals. Anthropometry is an important tool for assessment of nutritional status of individuals or of a community. Hence, measurements such as height and weight were taken and Body Mass Index was calculated to evaluate the extent of malnutrition in these three tribes. The primary information about the subject who participated in the study, like name of the tribe, and sex was recorded in a structured schedule. Standard techniques were followed while taking all the anthropometric measurements. Standing height and weight was measured to the nearest 0.1 cm and 0.1 kg respectively. Stature was measured by using anthropometric rod and weight was by using manual weighing machine. Circumference measurements were taken using a measuring tape and skin fold measurements were taken by using skinfold calliper. Body mass index (BMI) is calculated as the weight in kilograms divided by the square of the height in meters ( $\text{kg/m}^2$ ). Nutritional status was evaluated using WHO guidelines (1995). The following cut-off points were utilized: CED: BMI <18.5; Normal: BMI = 18.5–24.9; Overweight: BMI  $\geq$  25.0. Two trained anthropologists were involved during the

data collection process. One anthropologist took all the measurements while the other entered all the data in the data sheet in order to avoid measurement and data entry bias.

*Data on socio-economic conditions of the village were collected from each households using a questionnaire/schedule (National Family Health Survey (NFHS)- 4, 2015 -16). The questionnaire/schedule was completed using information on family size, education, income/expenditure, household assets/ liabilities, information on general health and hygienic practices and awareness, etc. The information were collected from household heads and were crosschecked from several other sources. Household size has been classified arbitrarily into in three groups such as Small (4 members), Medium (5- 7 members), Big (> 7 members). The literacy rate of the village Turunji is 60.17% (67.18 % in males and 53.24% in females) with gender literacy gap of 13.94%. In 2011 census, the literacy rate in Nabarangpur District was 48.20%. It was 59.45% for males and 37.22% for females. There is a gender literacy gap of 22.23% in the district as against the corresponding figure of 18.04% in Odisha & 16.3% in the country. Income wise, the population of village Turunji of Nabarangpur district has been classified into Low economic subgroup (income less than Rs. 10,000), Middle economic subgroup (income Rs.10,000 to Rs. 50,000) and High economic subgroup (income of Rs.50,000 or more) on the basis of per capita income per year using the cut-off point 50,000.00 as suggested by the local people themselves. All statistical analysis were undertaken using the SPSS Statistical Package version 20 for Windows (SPSS, 2011, Chicago). Descriptive statistics such as Mean and Standard Deviation (SD) for each variable was estimated for the selected anthropometric variables.*

## Result and Discussion In Table 1, Anthropometric characteristics of adult individuals (>20 years) presented.

Table 1: Distribution of anthropometric variables across the study participants.

Variables	Amanatya (n=28)		Bhotra (n=100)		Saora (n=72)		Total (n=200)	
	Male (n=12)	Female (n=16)	Male (n=52)	Female (n=48)	Male (n=36)	Female (n=36)	Male (n=100)	Female (n=100)
Height (cm) (SD)	160.33 ( $\pm$ 9.07)	156.00 ( $\pm$ 4.69)	163.54 ( $\pm$ 5.57)	149.75 ( $\pm$ 5.75)	166.33 ( $\pm$ 4.35)	153.00 ( $\pm$ 5.12)	164.16 ( $\pm$ 5.70)	151.92 ( $\pm$ 5.67)

Weight (kg) (SD)	54.67 (±9.71)	46.00 (±1.41)	54.92 (±6.04)	44.50 (±5.45)	51.22 (±6.61)	43.67 (±2.91)	53.56 (±6.62)	44.44 (±4.16)
BMI	21.33 (±1.5)	18.75 (±0.95)	20.46 (±1.85)	19.67 (±1.55)	18.56 (±2.0)	18.89 (±1.45)	19.88 (±2.08)	19.24 (±1.45)
Min waist (cm) (SD)	70.33 (±9.60)	74.25 (±2.63)	73.31 (±6.21)	74.17 (±6.56)	72.33 (±5.59)	68.89 (±5.15)	72.60 (±6.19)	72.28 (6.01)
Max hip (cm) (SD)	87.33 (±6.02)	89.00 (±2.58)	86.31 (±4.44)	85.67 (±6.88)	85.33 (±3.90)	84.00 (±3.42)	86.08 (±4.29)	85.60 (±5.41)
WHR (SD)	0.80 (±0.05)	0.83 (±0.28)	0.85 (±0.60)	0.85 (±0.45)	0.85 (±0.38)	0.82 (±0.38)	0.84 (±0.53)	0.84 (±0.44)
Conicity Index(SD)	1.20 (±0.08)	1.25 (±0.02)	1.18 (±0.08)	1.20 (±0.08)	1.18 (±0.08)	1.18 (±0.08)	1.19 (±0.08)	1.20 (±0.08)
Head Circumference(SD)	53.67 (±1.53)	53.50 (±1.29)	53.77 (±1.58)	53.60 (±2.02)	52.44 (±1.23)	52.89 (±0.92)	53.28 (±1.54)	53.24 (±1.56)
MUAC(SD)	27.67 (±2.51)	25.50 (±1.29)	24.62 (±1.66)	23.17 (±1.40)	24.00 (±2.55)	22.44 (±1.13)	24.76 (±2.31)	23.28 (±1.62)

Table 1 indicates that the mean heights of the overall population (both males and females) are  $164.16 \pm 5.70$  cm and  $151.92 \pm 5.67$  cm respectively. Among the three tribal groups under study the Saora males are tallest ( $166.33 \pm 4.35$  cm) followed by the Bhotras ( $163.54 \pm 5.57$ ) cm and the Amanatya ( $160.33 \pm 9.07$  cm). Among the females, the Amanatyas are the tallest ( $156.00 \pm 4.69$  cm) and the Bhotras are the shortest ( $149.75 \pm 5.75$ ) cm. The mean weights of the overall population are  $53.56 \pm 6.62$  kg and  $44.44 \pm 4.16$  kg respectively. The mean weight of males of the three tribal communities Amanatya ( $54.67 \pm 9.71$ ) kg, Bhotra ( $54.92 \pm 6.04$ kg) and Saora ( $51.22 \pm 6.61$ kg) which

is greater than the females of the three tribal communities Amanatya ( $46.00 \pm 1.41$ kg), Bhotra ( $44.50 \pm 5.45$ kg) and Saora ( $43.67 \pm 2.91$ kg) respectively. This indicates that the females are shorter and lighter than the males. The mean BMI of the total population are 19.88 for males and 19.24 for females. The Bhotras have males have a better BMI value (21.33) as compared to the Amanatya (20.46) and the Soaras (18.56). The Amanatya females have a better nutritional profile in terms of BMI as compared to the other two tribal groups. The nutritional profile of the Bhotras is better than the Amanatyas and the Saoras.

Table 2: Nutritional status of the population based on BMI

Tribe	Sample size	CED (BMI <18.5)	Normal (BMI 18.5-25)	Overweight (BMI >25)
Amanatya	Male : 12	0	12 (100%)	0
	Female: 16	8 (50.0%)	8 (50.0%)	0
Bhotra	Male: 52	4 (7.69%)	48 (92.39%)	0
	Female: 48	8 (16.6%)	40 (83.4%)	0
Saora	Male: 36	16 (44.44%)	20 (55.56 %)	0
	Female: 36	12 (33.33%)	24 (66.67%)	0
	Male : 100	20(20.0%)	80(80.0%)	0
Total	Female:100	28 (28.0%)	72(72.0%)	0
	Total: 200	48 (24.0%)	152 (76.0%)	0

The rate of undernutrition among the three tribal groups are compared in Table 2. The rate of under nutrition is very high in Saora population and among the Amanatya females. The rate of undernutrition is comparatively low as compared to Bhotras and Saoras. The highest frequency of undernutrition is found among the Amanatya females i.e, 50.0% followed by Saoras ( male = 44.44% ; female =33.33%) and Bhotras ( males =7.69%; females= 16.6%). Total population shows that 24% of overall population (including both male and female) fall under CED level. None of the individuals are found

overweight or obese in the studied population.

The study shows a high prevalence of CED among Amanatyas and Saoras. The Bhotras have a low percentage of CED but this can not be neglected. While comparing our study with other studies among various tribes of Eastern India we find a coherence that in most studies females have a lower BMI value than the males. But in Oraon, Santal (Mukhopadhyay, 2010), Savar (Bisai and Bose, 2012) and Saora (present study) the females have higher BMI value than that of the males.

Table 3 gives an overview to the mean BMI values of some tribes of Eastern India.

Sl No	Community	Body Mass Index		Reference
		Male	Female	
1	Bathudi	18.4	17.9	Bose and Chakravarti, 2005
2	Oraon (Odisha)	18.8	19.3	Beck and Mishra, 2010
3	Oraon (West Bengal)	18.8	19.7	Mittal and Srivastava,2006
4	Juang	19.4	18.3	Goswami, 2013
5	Bhumij (Odisha)	18.9	18.5	Goswami, 2012
6	Bhumij (West Bengal)	18.7	18.4	Ghosh, 2007
7	Mankidia	19.3	18.6	Goswami, 2011
8	Munda	18.7	17.7	Ghosh and Bharati, 2006
9	Santal	20.0	19.3	Bose et al., 2006
10	Santal	18.5	18.7	DattaBanik et al., 2007
11	Santal	20.5	19.5	Mukhopadhyay, 2010
12	Santal	19.5	18.1	Das and Bose, 2010
13	KoraMudi	18.7	18.3	Bose et al., 2006
14	Dhimal	19.5	19.1	DattaBanik et al., 2007
15	Lodha	19.5	19.3	Mondal, 2007
16	Hill Kheria	19.2	17.9	Das and Bose, 2014
17	Birhor	20.5	20.0	Das et al., 2013
18	Savar	18.9	19.3	Bisai and Bose, 2012
19	Amanatya	21.33	18.75	Present study , 2017
20	Bhotra	20.46	19.67	Present study , 2017
21	Saora	18.56	18.89	Present study , 2017

Under nutrition remains a major issue among the tribes of India. Several recent studies (Bose and Chakravarti, 2005, Ghosh and Bharati, 2006, Mittal and Srivastava, 2006, Bose et al., 2006, DattaBanik et al., 2007, Mondal, 2007, Mukhopadhyay, 2010,

Goswami, 2012, Bisai and Bose, 2012, Das and Bose, 2014,) have highlighted the nutritional status of various tribes of Eastern India such as Oraon, Bhumij, Bathudi, Juangs, Lodha, Dhimal, Santal, Mankidia, Savara, KoraMudis etc.

Table 4 shows the prevalence of CED or undernutrition among the tribes of Eastern India.

Tribe	Sample size	Mean BMI	CED (BMI<18.5) (%)	Study Area	Reference
Oraon	Male – 200	18.8 (2.0)	47.0	Jalpaiguri	Mittal and Srivastava, 2006
	Female – 150	19.7 (2.4)	31.7		
Lodha	Male – 157	19.5 (2.7)	45.2	PaschimMedinipur	Mondal, 2007
	Female - 199	19.3 (2.6)	40.7		
Dhimal	Male: 159	19.5(2.5)	27.0	Darjeeling	DattaBanik et al., 2007
	Female:146	19.1(2.6)	46.4		
Santal	Male:400	18.5(2.1)	55.0	Bankura	DattaBanik et al., 2007
	Female:400	18.7 (2.3)	52.5		
Bhumij	Male: 244	18.9 (2.6)	48.4	Balasore	Goswami, 2012
	Female:223	18.5 (2.0)	58.3		
Mankidia	Male:124	19.3 (2.2)	48.4	Mayurbhanj	Goswami, 2011
	Female:136	18.6 (2.8)	59.5		
Juang	Male:414	19.4 (2.7)	51.9	Keonjhar	Goswami, 2013
	Female:423	18.3 (2.9)	62.9		
Bathudi	Male:226	18.4 (1.9)	52.7	Keonjhar	Bose and Chakravarti, 2005
	Female:183	17.9 (2.5)	64.5		
Savara	Male:	19.3 (2.1)	38.0	Keonjhar	Bose et al., 2006
	Female:	18.9 (2.7)	49.0		
KoraMudi	Male:	18.7 (1.8)	48.0	Bankura	Bose et al., 2006
	Female:	18.3 (2.1)	56.4		
Amanatya	Male : 12	21.3 (1.5)	0	Nabarangapur	Present study, 2017
	Female: 16	18.6 (0.9)	50.0		
Bhotra	Male: 52	20.5 (1.8)	7.69	Nabarangapur	Present study, 2017
	Female: 48	19.7 (1.5)	16.6		
Saora	Male: 36	18.6 (2.0)	44.44	Nabarangapur	Present study, 2017
	Female: 36	18.9 (1.4)	33.33		

Table 4: Prevalence of CED among the tribes of Eastern India.

These studies reveal that there is a very high prevalence of CED among the tribes of Eastern India. Studies show that the percentage of CED is higher in females as compared to males whereas in Oraon, Lodha, Santal, and Saora (present study)

the prevalence of CED is higher in case of males. The present study shows a high percentage of CED among the Saoras and Amanatyas. The Bhotras have a lower CED level but this cannot be neglected. This implies that the tribes of Eastern India are under

serious nutritional stress. This might be due to their poor socio-economic conditions, lack of education, food habits and lack of awareness about health and healthcare facilities. The government should play a pro-active role in increasing the socio-economic conditions and hence reducing the rate of undernutrition among the tribal groups of eastern India.

### Conclusion

The present study among the three ethnic groups of Turunji village of Nabarangpur reveals that the prevalence of undernutrition is very much common irrespective of. Females are the worst sufferers as compared to their male counterparts. When the results of the present studies were compared with other studies among the tribes of Eastern India, it shows a similar trend in terms of undernutrition. However, this distinct inter-tribal difference is due to the variation in their poor socio-economic condition, poor literacy rate, food habits, lack of awareness and health care facilities. Therefore, better education and employment opportunities will enhance their overall development. Keeping this in mind, formulation and implementation of culture and gender specific nutritional intervention programs for upliftment of these tribal groups is imperative. Since undernutrition has several underlying causes, future investigations should aim at identifying the likely causes of high prevalence of undernutrition among these tribes.

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