A Study on the Transport Behaviour of Cobalt (Co) in Mangroves

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Abstract: *Mangroves are a unique habitat rich in biodiversity. They are known as the plant army of the land. Present study is an attempt to simulate the accumulation and transport behaviour of cobalt by mangroves in sewage sludge included soil. Plants found on such fields absorb heavy metals, which causes phyto-toxicity. This manuscript is based on the dynamic macroscopic numerical model for heavy metal movement. The model is applied for simulating cobalt transport by Common Derris (Derris trifoliate) and Sea Holly (Acanthus ilicifolius) using measured field information. The controlling non-linear differential equations are settled numerically utilizing MATLAB.*

Key Words: *Simulation, Cobalt, Derris Trifoliate, Acanthus Ilicifolius, Phyto-toxicity, MATLAB.*

Introduction

Mangroves are evergreen plants that grow in the tidal range of the sea and at the confluence of rivers and backwaters. Mangroves are the guards of the land and the coast. So conservation of the mangrove forests is essential for maintaining the natural equilibrium. Here in the study, it is planned to simulate the transport behaviour of cobalt metal in Common Derris (Derris trifoliate) and Sea Holly (Acanthus ilicifolius) following well-established dynamic macroscopic numerical model. Extensive interests in environmental issues have led to active research on the adoption and take up of heavy metals in the environment. [1, 2, 3].

Accumulation of heavy metals in plants depends on their chemical nature, plant species and soil type. Plants contain organic and inorganic ingredients. A lot of research work has already been processed on the biotic constituents of plants while very little attention has been paid on the role of minerals in the medicinal use of plants. Numerous plants are discovered to be wealthy

in at least one individual mineral and accordingly giving a potential connect to the remedial activity of the medication.

Here, a model has been developed for simulating water movement in "*unsaturated zones"* by integrating the "*one-dimensional transient unsaturated water flux equation (Richard's equation)"* with a root water withdrawal term (sink) and also use an equation which says the passage of heavy metal in the soil column and plant roots. Both the controlling *"non-linear partial differential equations"* are settled numerically by the "*implicit finite difference method* using *Picard's iterative technique"*.

Model Description

The present model is based on Richards's equation. It has been introduced by *"Richards (1931)*" who has suggested that, *"the Darcy's law originally devised for saturated flux in porous media is also applicable to unsaturated flux in porous media [5]"*. Here we have considered the "*unsaturated zone*"; it is the intermediate area between the land surface and the water bed.

Controlling Equation for Water Flux and its Take-up by Root

The generalized equation of water flux in isotropic media is [4],

$$c\,(l)\frac{\partial l}{\partial t} = \frac{\partial}{\partial \xi}\left[k(l)\left(\frac{\partial l}{\partial z} - 1\right)\right] - Z(\xi, t) \qquad 1$$

Here l is the pressure level, c(l) is the soil wetness proportion, k(l) is the pressure level waterpower conductivity and ξ is the soil depth taken to be progressive upwards. The 1-D function Z(ξ, t) is *"the sink term for water withdrawal"* and is expressed as *"the volume of water per unit volume of soil per unit time"*. The solution of above equation (Eqn. 1) requires "*soil wetness holding parameters and the waterpower conductivity"*. Since they are irregular functions of l, obvious expressions developed *by "van Genucthen [6] and van Genucthenet al. [7]"*, established by experimental data set, are taken here. *These expressions can be written respectively as*

$$\frac{\phi\,(l) - \phi(r)}{\phi_s - \phi_r} = \frac{1}{(1 + (\beta\, l)^n)^{\,m}} \qquad 2$$

$$k\,(l) = \frac{[1 - (\beta l)^{n-1}\{1 + (\beta\, l)^n\}^{-m}\,]^2}{[1 + (\beta\, l)^n]^{\frac{m}{2}}} \qquad 3$$

Here $\phi(l)$ is the water holding function, defining *"the water content as a function of the soil water pressure",* ϕ_s and ϕ_r are the saturation and remnant wetness content respectively β, n and m are the curve contour parameters and k_s is the saturated waterpower conductivity of the soil. Differentiating Eqn. (2) partially with respect to l gives *the expression for soil wetness proportion as*

$$c(l) = \frac{\partial \phi}{\partial l} = \frac{(1-n)\beta^n \, l^{n-1} \, (\phi_s - \phi_r)}{[1 + (\beta l)^n]^{m+1}} \qquad 4$$

"The root water withdrawal function is a sink term" in Eqn. (1). Many expressions for that sink term are available in the literature, *"the linear root water take-up model proposed by Prasad [8]"*, is used here as it is confirmed by several field conditions. *The equation is*

$$Z(\xi, \, t) = \frac{2 \, T_p(t)}{Z_{max}} \gamma \, (\, l)[1 \, - \, \frac{\zeta_r}{\zeta_{max}}] \qquad 5$$

Here T_p is the prospective transpiration rate, ζ_r is the root length at the given time, ζ_{max} is the extreme rooting depth and $\gamma(l)$ is the pressure head dependent reduction factor. The value of the *"sink term at any time gives the take-up rate at the top of the root"*. In the water take-up equation (Eqn. 1*), "the water withdrawal rate is proportional to the root depth* Z_r*, which is a function of time."*

Empirical equations have been framed by many researchers to forecast the root growth with time. Among various expressions, *"the one suggested by Borg and Grimes [9]"* is accepted since it has been developed after widespread *regression analysis using more than 100-field observations,*

$$\zeta_r = \frac{1}{2} \, \zeta_{max} \, [1 + [\, sin \, (\frac{303}{100} \frac{DAP}{DTP} - \frac{147}{100}) \,] \qquad 6$$

Here "DAP *and* DTM *are respectively the days after planting and days to maturity of the plant under consideration*", here in this equation root spreading with depth is not considered.

Controlling equation for heavy metal passage and its take-up by plant

The Controlling "1-D equation for heavy metal movement through soil" can be written as [10]

$$\frac{\partial}{\partial t}(\delta\,\lambda_s)+\frac{\partial}{\partial t}(\phi\,\lambda_w)=\frac{\partial}{\partial z}(\phi\,\psi\,\frac{\partial\lambda_w}{\partial z}-\chi\lambda_w)+\Omega_p \qquad 7$$

Here *"the bulk density"* of the soil is δ, mass of the heavy metal in the soil column is λ_s, *"volumetric wetnesscontent*" is ϕ, the concentration of heavy metal in water phase is λ_w and the hydrodynamic dispersion coefficient is ψ, which is a function of pore velocity υ. χ is the Darcy velocity and Ω_P is the heavy metal take-up by plant roots. The pore water velocity and hydrodynamic dispersion coefficient can be written respectively as,

$$\upsilon=\frac{\chi}{n} \qquad 8$$

$$\psi=\omega\,\upsilon+\tau \qquad 9$$

Here n is the *"porosity of the soil"*, ω is the *"elongated dispersity"* and τ is the *"molecular diffusion coefficient"*. *The Darcy velocity* χ *is given by*

$$\chi=k\,(l)\left(\frac{\partial l}{\partial z}-1\right) \qquad 10$$

Usually, many heavy metals in the soil will combine together. Since most of these heavy metals are divalent cations, they strive for adsorption sites, but it is very challenging to understand which heavy metals are more homogeneous than other heavy metals used for plant absorption, and the result is not globalized [10]. Therefore the passage behavior of a single heavy metal that is Cobalt is considered here. The heavy metal in soil solution is presumed to be *"governed by linear isothermal adsorption and is related to the soil heavy metal concentration [11].*

$$\lambda_w=\kappa_d\lambda_s \qquad 11$$

Here κ_d is the *"barrier coefficient*". The heavy metals take-up builds on soil and plant attributes. The analytical models are developed on the movement of the heavy metal ions in the plant roots by *"mass flux and diffusion"* along the congregation acclivities. The absorbed ions by roots expected to follow a *"Michaelis–Menton type relationship". The expression is modified for soil pH by taking into account a pH factor in the take-up term in the form as [11],*

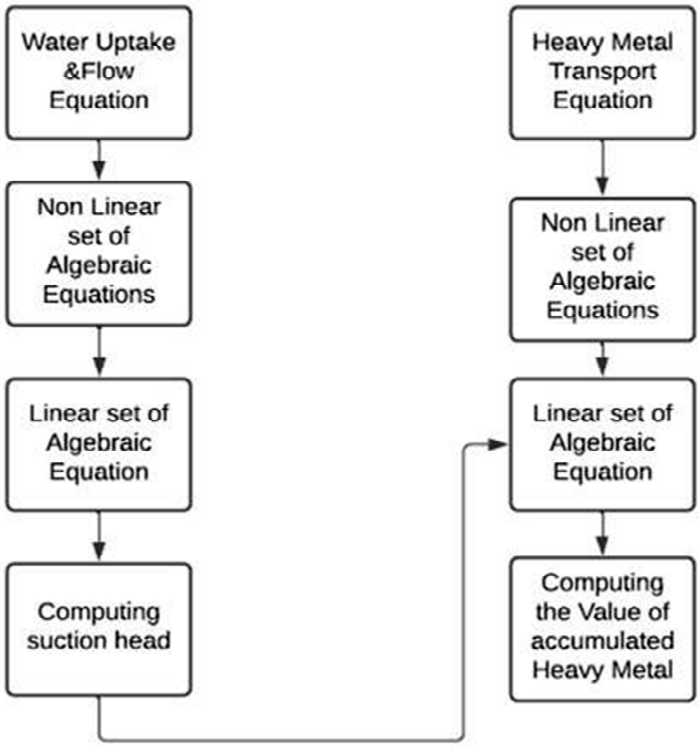
$$\Omega(p) = \Pi_{pH} \frac{\Psi_{max}\ \lambda_w}{\kappa_m\ +\ \lambda_w}$$

Here is Ψ_{max} the take-up rate at extreme concentration, κ_m is the *"Michaelis and Menton constant",* and Π_{pH} is pH value of the soil.

Results and Discussions

Equations 1-12 form the comprehensive set of controlling equations. We have to solve them to simulate/model the heavy metal take-up. Since the equations are *"non-linear partial differential equations"* analytical solutions are very difficult, hence numerical methods have been used to solve them. The various steps for the numerical solution are given below.

Figure 1: Steps for Solving the Controlling Equations



All the equations are solved using MATLAB (R2016a) and the code is written based on the above steps.

Initial and Boundary Conditions

The Controlling equation for flux is first solved using the initial and boundary conditions, which can be taken as*: "*

$$\frac{\partial}{\partial \xi}\left(\frac{\partial l}{\partial \xi}\right) = 0\,, \qquad at\ t = 0$$

$$l(0,t) = 0\ m, \qquad at\ floor\ \ level$$

$$l(L,t) = 0.30m\ at\ floor\ surface"$$

After solving the Controlling equation for flux, then we need to calibrate the collective water take-up by using the *"transpiration rate"*. Then the *"Controlling equation for heavy metal passage*" is solved by using the following conditions.

$$\lambda_w(\xi, 0) = 0\ \mu g\ /\ ml\ initillay\ at\ t = 0$$

$$\lambda_w(\xi, t) = 0\ \mu g/\ ml\ initillay\ at\ groundwater\ level$$

$$\lambda_w(L, t) = 5000\ \mu g\ per\ ml\ at\ ground\ surface"$$

The *"model parameters"* are given in *"Table 1"*, the "*plant parameters"* are given in *"Table 2"*, the *"soil parameters"* are given in *"Table 3"* and the *"simulation/take-up parameters"* are given in *"Table 4"*. *The model parameters* are taken from *"Rao et. al.* and *Verma et. al. [12, 13]*. *The soil and plant parameters* are taken from *A. Badarudeen et. al,* and *N.F.Y. Tamet. al. [14, 15]"*.

Table 1. Model Parameters

Parameter	Symbol	Value	Unit
Tallness of unsaturated zone	L	300	cm
Space period	Δz	10	cm
Time period	Δt	1	h
Empirical contour factor	n	1.5	cm^{-1}
Empirical contour factor	m	1	—
Empirical contour factor	β	0.000534	—
Pressure head dependent reduction factor	β(l)	1	

Table 2. Plant Parameters

Parameter	Symbol	MG1	MG2	Unit
Plant maturity period	DTM	30	45	days
Water demand	W	80	90	cm
Extreme rooting depth	ζ_{max}	100	200	cm
Total Cobalt collected in plant	λ_w	100	26	µg / kg
Cobalt buildup in the soil (dry weight basis)	λ_s	52	52	µg / kg

Table 3. Soil Parameters

Parameter	Symbol	Value	Unit
Saturated wetness value	ϕ_s	1.5	–
Remnant wetness value	ϕ_r	0.37	–
Saturated waterpower conductivity	k_s	2.5	cm / h
Bulk density of soil	δ	1.08	g /cm^3
Soil pH factor	pH	5.5	–
Dispersion coefficient	ω	0.008	cm
Diffusion coefficient	τ	0.002	cm^2 / s
Barrier coefficient	κ_d	1.4	–

Table 4. The Simulation/Take-up Parameters

Parameter	Symbol	Unit	MG1	MG2
Transpiration rate	$T_p(t)$	cm/ h	0.85	0.65
Extreme take-up rate	Ψ_{max}	g /ml/ h	0.00000418	0.000002
Michaelis Menton constant	κ_m	g / ml	0.0000395	0.00003

The various plots obtained from the simulation are shown below. The simulation/take-up parameters are found by the methods discussed here. To find the transpiration rate, the model is run for a number of times till the collective water take-up matches with the water demand given in *Table 2*. Also the values of Ψ_{max} and κ_m are found by running the model for a number of times till the computed collective metal take-up by the plant root matches with the restrained total Cobalt in the plant root given in *Table 2*. While simulating the model we could find the value of Ψ_{max} is more significant than K_m. So we first made κ_m as constant (while fixing it as a constant care is taken to fix its value always less than the value of λ_w).

Figure 2. Transport Behaviour of Cobalt in MG1

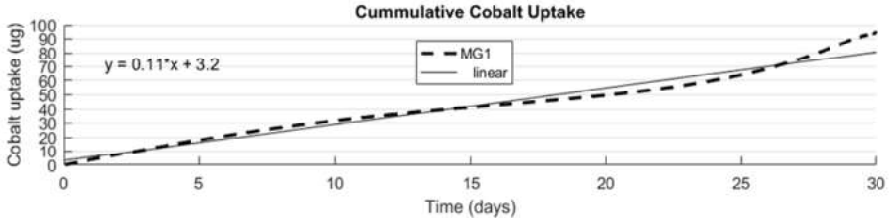
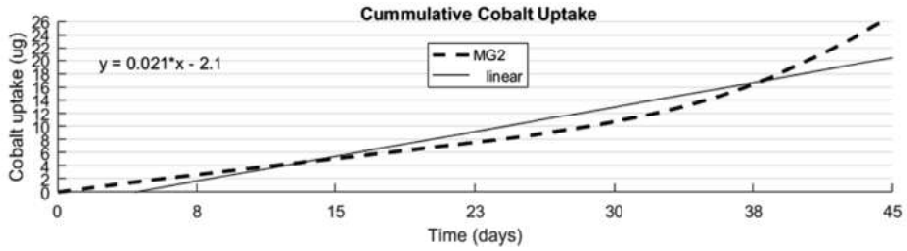


Figure 3. Transport Behaviour of Cobalt in MG2



Here MG1 and MG2 are Derris trifoliate and Acanthus ilicifolius respectively. The dashed curve represents the cumulative Cobalt uptake. The solid line is the suitable linear curve fitting graphs. In the soil sample the amount of Cobalt was 52. $\mu g/kg$. The amount of Cobalt in MG1 is 100 $\mu g/kg$ and in the case of MG2 is 26. The variations of transport behaviour of Cobalt

in MG1 and MG2 are clear from the plots. In MG1 traces of more amount of Cobalt is found and the corresponding transport behaviour of Cobalt is different from that of MG2.

Conclusion

The controlling equations (Equations 1 and 7) are unraveled to simulate the behavior of cobalt take-up in Common Derris (Derris trifoliate) and Sea Holly (Acanthus ilicifolius). This model is built on realistic filed conditions and can be used to forecast the behavior of cobalt take-up in different plants. The cobalt take-up plot helps to understand the heavy metal take-up rate of the concerned plant. Hence, this model is helpful to demonstrate and predict which plant is to be grown in a specific heavy metal contaminated site to extract that particular heavy metal and thus reducing the heavy metal contamination of the associated soil. The model is helpful to identify bio-indicators among various plants and thereby mitigation of heavy metal contamination of the environment. The model may also be helpful to predict the long term environmental pollution primarily due to heavy metal accumulation.

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Alternative Organizational Climate, Changing Scenarios in Catholic Hospitals

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Abstract: *Changing scenario of organizational climate in the catholic hospitals of Kerala and Karnataka were studied in the context of job satisfaction. The methodology used was qualitative in approach and narrative in design. The paper focused on the subjective experiences of selected nurses and ancillary staff. The objective of the part of the doctoral study was focused on the variables such as; 1) Communication flow, organizational structure and methodology of change in the administration, 2) Management policies in decision making, professional and personal growth 3) Personnel treatment in terms of organizational warmth and recognition and free from exploitation and stress and 4) Job Satisfaction, work group, leadership and communication. The result showed positive and favourable experience from the part of nursing and ancillary staff in both the states deriving an innovative model in the area of organizational climate that could be replicated in service-oriented health institutions.*

Key Words: *Organisational Climate, Job Satisfaction, Catholic Hospitals.*

1. Introduction

Organizational climate is a relatively enduring quality of the internal environment of an organization that (a) is experienced by its members, (b) influences their behaviour, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization (Tagiuri, R et al, 1968). Campbell, Dunnette, Lawler, and Weick focused on the properties of climate and offered a definition based upon a review of the factors that might contribute to climate in an organization: ... we might define climate as a set of attributes specific to a particular organization that may be induced from the way that organization deals with its members and its environment. For the individual

member within the organization, climate takes the form of a set of attributes and expectancies which describe the organization in terms of both static characteristics (such as degree of autonomy) and behaviour-outcome and outcome-outcome contingencies (Campbell et al., 1970).

These definitions have some common elements. Organizational climate is usually considered to be a molar concept in the same sense that personality is a molar concept. The climate of a particular organization, while certainly not unchanging, nevertheless has an air of permanence or at least some continuity over time. Phenomenologically, climate is external to the individual, yet cognitively the climate is internal to the extent that it is affected by individual perceptions. Climate is reality-based and thus is capable of being shared in the sense that observers or participants may agree upon the climate of an organization or group, although this consensus may be constrained by individual differences in perceptions. This "commonality of perceptions" is considered by some to differentiate climate from other organizational variables such as satisfaction. The climate of an organization potentially impacts the behaviour of people in the system.

Many researchers (certainly not all) consider that organizational climate is an indirect determinant of behaviour in an interactive sense rather than a direct determinant of behaviour in a main effect sense. Other researchers now appear to be uncomfortable with any suggestion of causality, although they might consider organizational climate as a predictor in the correlational sense.

Conceptualizations of organizational climate usually include aspects of shared history, expectations, unwritten rules, and social mores that affect the behaviour of everyone in an organization and the underlying beliefs that shape the actions of staff (Frederickson, 1966; Glisson, 2000). Organizational climate is theorized to influence treatment outcomes through its relationship with staff behaviour (Muldrow, Buckley and Schay, 2002). This relationship has been confirmed across a variety of settings.

This paper is based on the doctoral study done by the author upon the job satisfaction derived in the context of organizational climate in the Catholic Hospitals in the states of Kerala and Karnataka. It focuses on the change making in the very behaviour of the staff in such hospitals due to the conducive organizational climate in such hospitals.

2. Review of Literature

2.1. Organisational Climate

Organizational climate has been found to influence productivity levels and the level of predictability in employee behaviour (Kaczka and Kirk, 1968; Schneider and Hall, 1972). More recently, Glisson (1989; Glisson and Durick, 1988) has successfully applied the concept of organizational climate to the study of human service organizations. The identification of a link between organizational climate, job performance, and treatment outcomes for children served within the child welfare system (Glisson and Hemmelgarn, 1997; Yoo and Brooks, 2005) has particular relevance since the clients demonstrated improved psychosocial functioning, an outcome also sought for clients served by Community Mental Health Associations (Chambers, 1986; Levin and Petrila, 1996). Organizations and their climates are dynamic, evolving entities that naturally change over time. Such change is often incremental, and it may be unintentional and unplanned, or planned and intentional. The very fact of organizational change suggests that directed, intentional efforts at change have the potential to succeed in effecting substantive changes in organizational climate (Trice and Beyer, 1993). The idea of organizational change that is directed and substantive is well established in the management literature (Deal and Kennedy, 2000; Kotter, 1990; Schein, 1990; Trice and Beyer, 1993; Cameron and Quinn, 1999; Pratt and Foreman, 2000). Glisson and colleagues (Glisson and James, 2002; Glisson, Duke and Green, 2006) rightly point out that, although organizational research in mental health is at the beginning of the knowledge-building process, research on the diffusion of innovation, technology transfer, and organizational and community development has much to contribute to understanding organizational change in agencies providing mental health services. Community development literature as far back as Lerner (1958) has examined how the introduction of new information changes social norms and behaviours. Glisson (Glisson and James 2002; Glisson and Schoenwald, 2005) has found that organizational-level change can be instituted using methods similar to those used for community change, such as social planning by outside experts, participatory or grassroots engagement with individuals directly impacted by changes, and advocacy by both outside experts and community residents (i.e., agency staff and clients). These methods have been successfully applied

in other settings (Larrison, 2001; Larrison and Hadley-Ives, 2004). Given the apparent existence of ethnic disparities in mental health treatment (USDHHS, 2001) and the relationship between organizational climate and client outcomes (Glisson and Hemmelgarn, 1997; Yoo and Brooks, 2005), it is reasonable to question whether the climate in which services are provided plays a role in creating disparate outcomes (Beckett and Dungee-Anderson, 1998). Further, the ability to direct organizational change indicates that interventions aimed at the organizational level may have a significant impact on disparities at agencies where they exist.

Campbell et al. found four common factors in organizational climate. These dimensions include: (1) individual autonomy, (2) degree of structure imposed upon the position (managerial structure), (3) reward orientation (rewards, general satisfaction, and achievement orientation), and (4) consideration, warmth and support (managerial support and nurturance of subordinate). These authors felt that this list of factors was too small and much more investigation should be done to be complete.

Continuing in the same vein of perceptual importance and aggregate consensus, Pritchard and Karasick (1973) gave their conceptual synthesis from definitions in other studies. They gave a comprehensive definition of the organizational climate as "a relatively enduring quality of an organization's internal environment distinguishing it from other organizations; (a) which results from the behaviour and policies of members of organization, especially top management; (b) which is perceived by members of the organization; (c) which serves as a basis for interpreting the situation; and (d) acts as a source of pressure for directing activity". The leader's behaviour includes the aspects of: aloofness, production emphasis, thrust, and consideration (Duxbury et al.,1982). Aloofness is behaviour of the leader that "goes by the book", is formal and impersonal. Production emphasis is behaviour by the leader which is highly directive and is characterized by close supervision. Humanistic thrust is behaviour by the leader which motivates the subordinates, especially by the example one sets. Consideration is behaviour by the leader which includes warmth and the inclination to try to do a little something extra for subordinates. The subordinate's behaviour includes the aspects of disengagement, hindrance, esprit and intimacy (Duxbury et al., 1982). Disengagement is a subordinate's tendency of "going through the motions" or to be "not in

gear" with respect to the given task. Esprit or morale is the subordinate's sense of their social needs being satisfied and a sense of work accomplishment. Hindrance is a subordinate's feelings that the leader encumbers them with routine duties, committees or other "busy work". Intimacy is a subordinate's enjoyment of a satisfying social-needs relationships.

The Relationship of Organizational Climate to Nurses' Job Satisfaction- In their study of 16 magnet hospitals, Kramer and Schmalenberg (1988, 1991) focused on the eight attributes of excellence described by Peters and Waterman in their book, 'In Search of Excellence' (1982). Data were collected from 16 magnet hospitals in order to compare the characteristics of the work environment to the attributes of some of the nation's best run corporations. The results show that the nurses perceived real differences in the culture and the work environment of the magnet and nonmagnet hospitals as perceived by nurses. Duxbury et al. (1982) looked at relationships between dimensions of organizational climate and nurses' job satisfaction level. They gathered data from the NICU nurses in 18 Midwest hospitals (n=682). The OCDQ scale (Halpin and Croft 1962) was modified by Duxbury et al. into the revised NOCDQ-B form (the Nursing Organizational Climate Descriptive (Questionnaire) which include 6 of the 8 original dimensions. (Production Emphasis was dropped, and Consideration and Thrust were merged into a single scale.) Analysis of variance showed that each of the six NOCIXQ-B dimensions served to differentiate the NICLTs in the study. Significant relationships were found at the unit mean level between three of the six NOCDQ-B scales and nurse satisfaction, as measured by the Minnesota Satisfaction Questionnaire. The considerable (r=.7l) relationship between Esprit and Satisfaction was not unexpected, since both are measures of group morale, although from different perspectives. The relationship between Humanistic Thrust of a leader and nurse satisfaction is also an expected trend in the literature. The generalizability of the original OCDQ items of Halpin and Croft (1962) across various organizations may make this an instrument which, according to Duxbury et al. (1982), should be applied in future studies. Significant differences between high-satisfaction and low-satisfaction nurses on the six dimensions of job satisfaction at two South-eastern metropolitan hospitals (0=159) were identified by Tumulty, Jemigan and

Kohut (1994). In this study, nurse job satisfaction was measured by the Index of Wotic Satisfaction (IWS) developed by Stamps and Piedmont (1986), and an abridged version of the WES (Moos, 1986) measured aggregate assessments of the work environment. The relationship factors of the work environment contributed significantly to the job satisfaction of the nurses. No significant differences were found between the personal growth dimension of the work environment and job satisfaction. In general, staff nurses who perceived the work environment to be relatively positive also were more satisfied with their jobs than those who perceived the work environment less positively. Baylor plan nurses were the least satisfied in all cases. Nurses working in the maternal/child specialty area were significantly more satisfied than the medical/surgical or critical care nurses, and they perceived the environment more positively on the relationship dimension. A cohesive peer group may mediate other problems in the work environment, with a supportive manager may enhance the strengths of a unit. This stuff gave more specific evidence to the connection between work environment and job satisfaction for nurses.

Nakata and Saylor (1994) replicated studies done by Lucas (1988,1991) which investigated nurses' perceptions of current and desired management styles in hospital units as well as the relationship of management style to staff nurse job satisfaction. In this nonexperimental, cross-sectional survey (n=102) of one Catholic hospital in northern California, the perceived and desired management styles and job satisfaction were measured. The study was based on the theory of Likert's management styles, which consists of four types; exploitive-authoritative, benevolent-authoritative, consultative, and participative groups. Results were similar to those found by Lucas. Staff nurses perceived an overall benevolent-authoritative style of management on their units. Conversely, the staff nurses desired more of a participative management style, denoting a desire to be more involved in decision-making processes. The overall job satisfaction mean score was 4.7 on a scale of 1 to 7. The Pearson product-moment correlation statistic between the overall perceived management style and the overall job satisfaction of hospital staff nurses ($r=.48$, $p=.0001$) reinforced the need to investigate the implementation of management style that is closer to a participative group style of management. Findings of a pilot study by Gillies et al. (1990) suggested that deliberate modification of organizational

climate may increase nurses' job satisfaction and job tenure. A convenience sample of 34 registered nurses from four patient units in an urban teaching hospital was studied in this descriptive survey design. The Work Satisfaction (Questionnaire (Stamps, 1978) with its seven sub scores (pay, professional status, physician-nurse relationship, administration, autonomy, task requirements, and interaction) was used to calculate nurses' satisfaction Litwin and Stringer's (1968).

2.2 Social Support

Social support is an important factor promoting mental health both in the workplace (Digman and West, 1988) and in life outside of work (e.g., Rook, 1987). Social interaction at work (in terms of the relationships between co-workers as well as between employees and their supervisors) is becoming increasingly important to most organizations. Higher social support in a work setting is related to lower levels of psychiatric disturbance and absenteeism (Stansfield, Rael, Head, Shipley, and Marmot, 1997). Moreover, Landy (1992) notes that there is a substantial research base indicating that the quality of supervision can have a significant effect on employee well-being. Genuine social support from management and colleagues can engender feelings of trust and belongingness within the organization. Conversely, poor social support at work can potentially become a significant source of stress for employees and can, consequently, generate feelings of isolation and loneliness. Because of the importance of social support to well-being, it would be reasonable to expect that social support at work would potentially play a role in the prediction of loneliness at work.

Organizational Climate Description (Questionnaire, which contains nine subscores (structure, responsibility, reward, risk, warmth, support, standards, conflict, and identity), was used to evaluate the work environment. Four of the nine subscores which had the highest reported interitem correlation (identity .49, reward .42, support .37, and warmth .33) were selected to be specifically studied in this report. The majority of satisfied nurses described their organizational climate as being high in responsibility, warmth, support, and identity. The study demonstrated that nurses' job satisfaction was; mildly correlated with a climate of responsibility; moderately correlated with a climate of warmth; strongly correlated with a climate of support; and strongly correlated with a climate of identity. These

findings were similar to other studies (Huey and Hartley, 1988) that showed that support from administration is an important factor influencing nurses' job retention. This study could be replicated using a larger sample size and in various other types of hospitals.

The close observation of the review shows the relationship between staff behaviour and supportive behaviour of the management in setting better organizational climate leading to high job satisfaction.

3. Methodology and Research Design

This is a qualitative study, narrative in approach with brief content analysis done based on the interview scripts collected from the nurses and ancillary staff working in the catholic hospitals in Kerala and Karnataka.

Although the topic of organizational climate and job satisfaction is exhaustive, this paper takes up only a few variables such as;

3.1. Communication flow, organizational structure and methodology of change in the administration;

3.2. Management policies in decision making, professional and personal growth;

3.3. Personnel treatment in terms of organizational warmth and recognition and free from exploitation and stress;

3.4. Job Satisfaction, work group, leadership and communication.

The subjective opinions of nurses and ancillary staff are taken in content analysis and discussed to get an objective outcome of change making in the organizational climate that can lead to job satisfaction.

4. Analysis

4.1 Organizational Climate

4.1.1. Administration

4.1.1.1. The Communication flow and Information flow between management and staff in the hospital one is working is analysed in the beginning.

Stephy, the staff nurse in a catholic hospital in Kerala says, *'the communication flow and information flow between management and staff is effective and is essential for success in delivering safe and*

quality care. The management provides timely accurate and consistent information that satisfy the needs of staff and others'.

According to Leena an ancillary staff in a Catholic Hospital in Kerala, *'the management communication is good and open. Everyone is very supportive and helpful. We can give opinion and suggestions on certain matters concerning the work we do*'.

Then, Jalaja a nurse in a Catholic Hospital in Karnataka says, '*communication flow and information flow between management and staff is good. All staffs follow the orders and do the needful without any hurdles. The staffs are hardworking and committed in doing their job to their best*'.

Malu an ancillary staff in a catholic Hospital in Karnataka expressed her opinion that, '*I am very pleased with the atmosphere of the hospital and all my co-workers are really helpful. It makes me happy to work with them*'.

All of them had positive opinion about the communication and information flow in the catholic hospitals where they work. It made them feel good and work hard.

4.1.1.2. The Organization structure in the hospital - authoritarian, authoritative (partially hierarchical and democratic) or fully democratic and team approach - an explanation…

Stephy says, '*my work place is very democratic and it helps me to grow intellectually, and to express myself freely*'.

Leena has the opinion that, '*the employees work as a team and are very cooperative. The management motivates us and helps to do the work effectively*'.

Jalaja says, '*the organization structure in my hospital is team approach. We work in teams for support and encouragement of one another. The management is friendly and supportive of all our endeavours'.*

Malu has to say, '*the organisational structure of the hospital is authoritative. Being an institution under Catholic church it has a hierarchical structure and at the same time they try to introduce little bit of professionalism and so there is democratic approach and it is more in clinical side*'.

Most of them opined that the hospital administration is democratic with a team spirit. But Malu feels it is authoritative although democratic approach is adhered to professional field and only in clinical realm.

4.1.1.3. The management methodology for change and their feelings… Stephy has to say, '*in certain aspects I do find instances of change. Very often due to the suggestions of the medical team to compete with other hospitals management is ready to change its rigid policies*'.

Leena says, '*the management adopts newer policies to keep up with the changing circumstances. To support better administration, changes become a necessity. The management adapts to a new environment rather quickly understanding its need*'.

Malu also says that, '*The management have a methodology for change and is very adaptable to emerging technologies. They have very good policies that are in line with the new technologies*.

Jalaja says, '*yes, I feel the management has a methodology for change. They are ready to adapt to changing situations. Although they focus on charitable and service way of functioning, they need to face the challenges from the professional and commercial style of functioning seen around modern hospitals'*.

All of them agree that the hospitals are adopting a method of change due to changing scenario in the hospital particularly due to the competition in health care sector irrespective of the service attitude to match with professional interests in the service sector.

4.1.2. Management Policies

4.1.2.1. Consultation with the personnel staff in decision making by the higher management

Stephy says, '*in my hospital regular meetings and brainstorming are done. There is always a give and take policy. It helps in better co-operation of the staff and the staffs are in a better position to accept the suggestions and guidance of the management*'.

Leena is of the opinion that, '*at this hospital, everyone values originality and promotes teamwork. Each staff represents themselves although they work as a team. So, their opinions have value and are considered by the management for decision making*'.

Malu says, '*we are not consulted in decision making. Only the in-charge from each department is consulted for decision making for a particular department. Other staffs are consulted only when necessary*'.

Jalaja expressed her feelings that, '*it is satisfactory. Not always do we get a chance to make decisions. Most of the time, the management makes the decisions with little help from superintendent and sometimes assistant superintended or head nurse gets a chance to give their suggestions*'.

The staff from Kerala are of the opinion that they have a role in the decision making. But those who are from the Catholic hospitals in Karnataka expressed their feelings that only the department heads are consulted in decision making.

4.1.2.2. The satisfaction of employees with the management policies.

Leena says that, '*the management policies are good. It is easy to follow and flexible. But sometimes, it is strict as well to make the administration smooth and efficient. It helps the hospital to function in full capacity*'.

Stephy has the opinion that, '*I am 85% satisfied with management policies. It is flexible and adaptable to change. It is changed whenever required according to the needs of the hospital and the management'*.

Malu says, '*it's very good, I feel. The management policies are flexible to a certain extent and ready to introduce whatever is needed for the welfare of the staff, of course from the limitations they have*'.

Jalaja has to say, '*the policies are very good and easy to follow. They are made for betterment of the staff and fits in really well. The management pays attention to every small detail and uses them in the policies*'.

All of them agree with the policies of the hospital and are satisfied. They also observed that the policies were in tune with the welfare of the employees.

4.1.2.3. The opportunities provided for the personal and professional growth and development of the staff.

Stephy says, '*weekly programmes are held to discuss the growth of the hospital and the organization. It is the platform for training the employees for better prospects which can be implemented to the functioning of the hospital*'.

Leena has the opinion that, '*I have lots of opportunities to grow and develop. The management offers weekly seminars, workshops and staff training programs that helps me in work. I appreciate the efforts of management in the development of staff and employees of the hospital. It is very helpful to us*'.

Jalaja says, '*many opportunities are provided for the staff to improve their skills and enhance their performance. Training sessions, seminars, and workshops are held regularly to assist the staff and keep them informed and revisit basic foundations, which proves useful to increase productivity*'.

Malu has the opinion that, '*training programs are conducted for the staff. It focuses on the personal as well as professional growth of the staff. Ancillary staff also is given sufficient training on patient care, communication skills, and effective management of stress and strains*'.

4.1.3. Personnel Treatment

4.1.3.1. The organizational warmth and recognition in the hospital

Stephy says, '*the higher authorities are approachable and supportive and so is the management. The service of all staff is valued and given the importance required. Some prizes are also given for exceptional service in their work*'.

Leena has the opinion that, *'it is good. The management creates an ambient atmosphere in the campus focusing on positive relationship between the management and the staff.*

Jalaja says, '*I am well recognized in my hospital. There are sufficient warmth and cordial relationship between different personnel in the management. They recognize my service, efforts, and encourage very often and support at times of troubles and difficulties*'.

Malu has the feelings that, '*we have a committed team who helps each other. The contribution of every staff is recognized and appreciated. My team is warm and welcoming*'.

All of them equally agree about the warmth and recognition they receive from the hospital administration. They are satisfied with the way the approach of the hospital management.

4.1.3.2. The freedom from exploitation and job stress.

Stephy says, '*through effective communication, we avoid exploitation in our work arena. Fair payment is received by all employees of this hospital and not misused*'.

Leena has the opinion that, '*exploitation and job stress are nil in the hospital. A favourable work environment promotes effective performance among workers and encourages them to do their level best. They are also paid correctly according to the standards of the hospital*'.

Jalaja says, '*since we work as a team, no one feels stressed. The work is divided among the staff and every member is appreciated for their contribution. I don't have any stress. I am very happy to be part of the team*'.

Malu says, '*it is good. There are minor stressors but my colleagues help me to overcome the stress. My family members also support me a lot. I don't find any exploitation of my service in my organization. The remuneration is lower than in other private hospitals. But I don't think it is exploitation because the hospital is charity based and I think I am part of this service and it is my contribution to accept the lower end benefits*'.

All four of them feel that there is hardly any job stress. They expressed the fact that they are free from exploitation. As the Catholic hospitals are charity based, they consider the low payment as their contribution in the very charity done by the hospitals.

4.2. Job Satisfaction

4.2.1. Job satisfaction: The job satisfaction with regard to the positive behavioural fundamentals such as independence, task implication and feedback.

Stephy says, '*we are satisfied with the job. We are accountable for the patient's life during their stay at the hospital during the course of treatment. If something goes wrong the staffs are blamed not the doctors. We acknowledge that each member of the team is skilled in their profession and that by using our talents together, we can adequately assist the patients. The co-operative and supportive environment provides content in the collaboration. But if placed with the wrong team who has no team spirit, then it is difficult to work with*'.

Leena has the opinion that, *'I am satisfied with my job and do my work independently with guidance from management and assistance from my co-workers. Feedback can be given directly to management which they manage effectively*'.

Jalaja says, '*I have good job satisfaction about positive behavioural fundamentals such as independence, task implication, and feedback. They provide a situation of responsible freedom which gives us sufficient independence. The task implications and feedback are given at regular intervals*'.

Malu expressed her views that, '*yes. I have job satisfaction. The management supports my decisions and way of doing the work. The nuns always motivate the staff to do their best. They also solve the problems and issues we face. We also get a chance to give our opinions*'.

All of them have expressed similar opinion about job satisfaction with regard to the positive behavioural fundamentals such as independence, task implication and feedback. They get satisfactory response from the management and feel that they are adequately listened by the management.

4.2.2. Work group: The level of being active with the work groups and the nature of satisfaction they derive from the work groups.

Stephy says, '*I get confident, improve team spirit and work actively in groups. The management is supportive and encourage work groups to improve functioning of the hospital*'.

Leena tells, '*I am very co-operative with all work groups. All in my group are supportive and caring. I feel a sense of belonging here. The Management also motivates us to do our best work more often*'.

Jalaja says, '*I am happy to work together. The workload is divided, so working in a team reduces stress and makes the work less and manageable. It also encourages me and helps me to do my best. There is a good team spirit in the hospital and I like working as a team*'.

Malu has the opinion that, '*I am active and do very well in the workgroups. There is good team spirit and I enjoy a good amount of joy and satisfaction in working as a team*'.

All of them actively participate in the work groups and they get good support from the groups leading them to better levels of satisfaction.

4.2.3. Leadership styles: The type of leadership exercised by the Management-authoritarian or democratic and their response towards it.

Stephy says, '*we work as a team at all levels most often. There is no question of stress here and each staff is given a place in a team which they have to do responsible without fail*'.

Jalaja tells that, '*it is a combination of both authoritarian and democratic. It is helpful to raise our questions and response to Management. We can give suggestions which the management respond to*'.

Leena says, '*it is mostly authoritarian. But the Management does have a democratic spirit that very often they consult with the staff representatives informally before making any major decisions*'.

Malu tells, '*the place I work shows a democratic type of leadership where we can express our views to any situation that we face and this type of leadership helps us grow*'.

Although they agree that the leadership is mostly democratic in style, there is authoritative elements found in the Management attitude. However, the staff consider it positively.

4.2.4. Communication methods: The comfortable nature of the communication styles of hospital Management.

Stephy says, '*I am comfortable with the communication styles of our management. They are friendly and supportive of all our endeavours. They lay flexible, easy to follow rules which we follow without any hurdles*'.

Leena tells that, *'it is good; we can communicate everything to authority. They try to help if possible. The Management is capable to handle any situation regarding work or hospital anytime*'.

Malu has the opinion that, '*I am very comfortable with the communication style of the hospital. Every staff communicates with clarity and understanding*'.

Jalaja says, '*I am comfortable with the style of Management communication. Although it is hierarchical in nature, personal communication and care make me more committed to the service*'.

Regarding the communication style of the Management all of them were happy and comfortable. It creates a friendly work climate.

5. Discussion

In communication flow, organizational structure and methodology of change in the administration, the subjective experience of the staff was positive both for the nursing and ancillary staff. They feel a change in the attitude as well as the communication of the Management in the process of competition with the business focused institutions in health sector.

The Management policies in decision making, professional and personal growth was also favourable to the staff. It shows a changing scenario in the organizational climate leading to better job satisfaction for the staff.

The personnel treatment in terms of organizational warmth and recognition are highly accepted by the staff and they feel that they were free from exploitation and stress.

The job satisfaction, work group, leadership and communication were also considered positive by the staff.

The experience of the staff both from Kerala and Karnataka shows that they enjoy a favourable organizational climate in the Catholic hospitals where they work. They also felt that from authoritative to democratic approach a change was taking place that ultimately provide a conducive environment for the staff to continue to work in such Catholic hospitals.

6. Conclusion

Change is always painful. However, the end result may bring joy and satisfaction. The paper presented favourable environment for the nursing and ancillary staff in Catholic hospitals in Kerala and Karnataka. Irrespective of the financial constraints the staff prefer to continue to work in such hospitals due to the better warmth and cordial relationship they feel from the managerial staff. Hence the model could be further studied on how welfare of the employees in medical set up can contribute to the favourable organizational climate in a health institute and could be earmarked for the growth and development in the given segment.

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Factors Affecting Housing Loan Decisions of Rural People in Kerala: A Study of Vellarikkundu Taluk in Kasaragod

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Abstract: *Housing Finance plays a vital role as an engine of equitable economic growth through the reduction of poverty and prevents slum proliferation in economy. The demand for housing has increased rapidly day by day. Percentage of families owing house in India is 87 percent. The introduction of banking finance for housing purposes is a big boost to the customers and the economy. It is also linked with other industries like cement, steel, blue metal, and so on. The housing finance decisions of people in rural areas are influenced by a number of factors. They also were facing different problems while getting such loans. Interest rate of the loan varies from institution to institution, the period of repayment of loan ranges between 5 to 20 years and some enjoy tax benefit.*

Key Words: *Housing Loan, Rural People, Interest Rate, Source of Fund, Tax Benefit.*

1. Introduction

Good housing is a pre-requisite for human development and welfare. It provides shelter, security, amenities and privacy to the human beings for decent living. Without good housing, people cannot realize their full potential and carry on the life they want to lead. Good housing reflects the general welfare of the community, whereas bad housing leads to serious consequences such as diseases, immorality, and juvenile delinquency. Deprivation of a decent housing, in fact, becomes a threat to social harmony and economic

prosperity (Sivaramakrishnan L and Swaaminathan TM, 2014). Housing is also an investment activity and provides impetus to economic growth. It has both forward and backward linkages. Because of its forward and backward linkages, even a small initiative in housing will propel multiplier effect in the economy through the generation of employment and demand (Madhav Rao, et. al, 2015). Recognizing the critical importance of human settlement in developing countries, the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights, have recognized the right to housing as a human right. Since then, there has been a growing concern to address various forms of housing deprivation particularly in developing countries, where with the growing population pressure, meeting the housing needs of all families is a real challenge. In India average percentage of families having houses is 86.6 percentonly (table 1).

The demand for housing has increased rapidly due to population growth, migration from rural areas to urban areas, the decay of the existing housing stock and breakdown of traditional joint families. The information technology revolution and rapid growth of knowledge based industries in recent years have also further contributed to the already growing acute shortage of housing in India particularly in urban areas (Rose Peter S, 2016). Since housing requires huge investment, a critical constraint for the development of housing is lack of finance. With the entry of commercial banks into housing finance, the housing sector has witnessed real boom during the last decade. The growing demand for housing finance has contributed for rapid growth of banks' lending to housing sector. Housing finance has received a boost since the establishment of National Housing Bank by the Reserve Bank of India in 1988. On the demand side, housing being a basic need of the growing population, the strategic role of the house building industry and the bulging demand for housing finance cannot be under-estimated. A large section of the population in rural and semi-urban areas is still beyond the reach of the banks. Banks also are concentrating in urban and metropolitan centers, where the demand for housing finance is strongly supported by the builders. On the supply side, public sector banks are the major source of housing finance having share of 63 percent. The share of private sector banks-both of the older and younger generations is 26 percent. Foreign banks, though quite active in extending housing finance, their share is about 9 percent only. Gramin banks have a negligible share at less than 2 percent.

Table 1. List of states ranked in order of percentage of families owning a house in India.

Rank	States	Families owing Houses (%)
1	Bihar	96.8
2	Jammu and Kashmir	96.7
3	Uttar Pradesh	94.7
4	Manipur	93.6
5	Rajasthan	93.2
6	Tripura	91.9
7	Madhya Pradesh	90.9
8	Kerala	90.7
9	Odisha	90.4
10	Chhattisgarh	90.2
11	Jharkhand	89.3
12	West Bengal	89.3
13	Punjab	88.9
14	Haryana	88.4
15	Assam	88.4
16	Himachal Pradesh	87.2
17	Gujarat	83.9
18	Uttarakhand	82.9
19	Meghalaya	82.0
20	Maharashtra	81.1
21	Goa	78.9
22	Andrapradesh (including Telungana)	78.5
23	Tamil Nadu	74.6
24	Karnataka	74.3
25	Nagaland	73.8
26	Arunachal pradesh	68.3
27	Mizoram	65.8
28	Sikkim	64.5

Source : Census Report, GOI

2. Review of Literature

Housing finance all over the world are undergoing tremendous changes and have acquired great significance in the present day context of liberalization, globalization and modernization of the society. Ananda Bose, C.V (2006) emphasized the need for propagating cost-effective and environment friendly building technology. Sivaramakrishnan L and Swaaminathan TM (2014) analyzed the magnitude of housing problem and procedural simplification of housing loans. Rose Peter S (2016) observed the views that there is a vast scope for housing promotion in India. Madhav Rao, et. al (2015) observed the housing shortage in the country and highlighted the role of HFIs in national housing.

3. Materials and Methods

Housing is one of the essential needs of mankind. The demand for shelter grows in line with the increase in population and the standard of living and the need of financing the purchasing of a house is quite relevant.
The present study thus mainly focused on:

i. To find out the main factors affecting housing finance decision of rural people
ii. To find out the problems of housing finance of rural people
iii. To find out the tax benefit available by rural people through housing financeand the major source of funds to refinance housing loan.

Both primary and secondary data were used. Primary data were collected from a sample of 30 rural people of Vellarikkund Taluk of Kasaragod in Kerala. Secondary data were collected from journals, and related websites.

4. Results, Analysis and Discussion

4.1. **Institutions in Housing Finance:** Of the various institutions, 50 percent are nationalized banks, followed by Cooperative banks, 40 percent and other financial institutions 10 percent (table 2).

Table 2. Institution Involved in Housing Finance

Institution	Percentage
Nationalized banks	50
Co-operative banks	40
Others	10
Total	100

Source: Primary Data

4.2. Factors Affecting Housing Finance: Rate of interest of housing loan is one of the influencing factors that decide the house financing decision of an individual. Interest rate of housing loan ranged from 8 to 12 percent. Table 3 depicts, various factors affecting rural people while selecting housing finance. Long period for repayment of housing loan is the main attracting factor (28 percent), followed by easy accessibility (20 percent), friendly terms and conditions (18 percent); speed of loan and low interest rate (10 percent).

Table 3. Factors Affecting Housing Finance

Factors	1st rank	Points = 6	2nd rank	Points = 5	3rd rank	Points = 4	4th rank	Points = 3	5th rank	Points = 2	6th rank	Points = 1	Total	Rank	%
Low interest rate	0	0	1	5	3	12	4	12	9	18	13	13	60	6	10
Long period	27	162	3	15	0	0	0	0	0	0	0	0	177	1	28
Friendly terms	0	0	7	35	13	52	8	24	2	4	0	0	155	2	18
Easy accessibility	3	18	12	60	8	32	4	12	3	6	0	0	128	3	20
Speed of loan	0	0	2	10	2	8	4	12	9	18	13	13	61	5	10
No hidden charges	0	0	5	25	4	16	10	30	7	14	4	4	89	4	14

Source: Primary data

4.3. Interest Rate of Housing Loan: Interest rate of housing loan ranged from 8 to 12 percent (table 4).

Table 4. Interest Rate of Housing Loan

Rate of interest (in percent)	Percentage
Below 8	23
8-10	57
11 – 12	20
Above 12	0
Total	100

Source: Primary Data

4.4. Repayment Period: Period allowed for the repayment of loan is another deciding factor. Repayment period for 50 percent of the respondents is 15 years (table 5).

Table 5. Repayment Period of Loan

Repayment period (in years)	Percentage
5	20
10	7
15	50
25 and above	23
Total	100

Source: Primary Data

4.5. Source of Fund for Repayment of Housing Loan: For repayment of housing finance 40 percent of rural people depend on self employment. Table 6 shows that other source of fund used for repayment of housing loan is employment and income from abroad; 20 percent each.

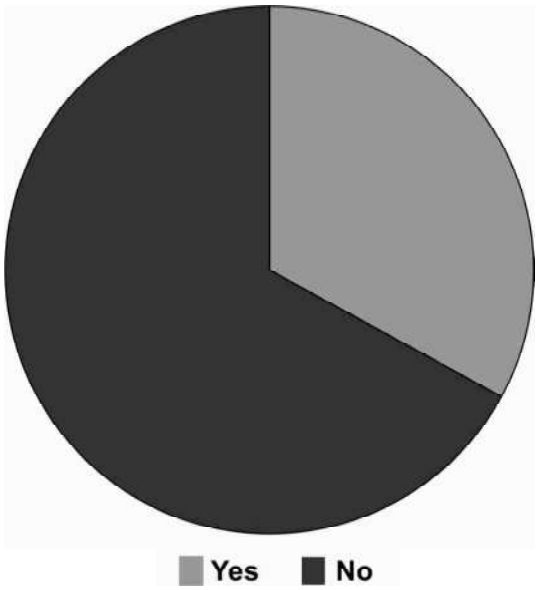
Table 6. Source of Fund for Repayment of Housing Loan

Source of fund for repayment	Frequency	Percentage
Self employment	12	40
Employment	6	20
Profession	5	17
Income from abroad	6	20
Others	1	3
Total	30	100

Source: Primary Data

4.6. Tax Benefit to the Borrower: One of the main benefits of Housing loan finance is the income tax deduction enjoyed by the borrower. In rural area employment and salary is limited and only few (33 percent) of them enjoy tax benefit (figure 1).

Figure 1: Tax Benefit Received by the Borrowers



Source: Primary Data

4.7. Problems of Housing Finance: Getting Housing loan from financial institutions involve various procedural aspects and documents. The major problem for raising housing finance by the rural people is demand for number of documents (33 percent). Another major problem is lengthy procedure (24 percent) followed by Penal interest (17 percent), demanding collateral security (16 percent) and High EMI (10 percent).

Table 7. Problems of Housing Finance

Problems	1st rank	Points	2nd rank	Points	3rd rank	Points	4th rank	Points	5th rank	Points	Total	Rank	%
Lengthy procedure	0	0	20	80	7	21	3	6	0	0	107	2	24
High EMI	0	0	0	0	6	18	4	8	20	20	46	5	10
Number of document	30	150	0	0	0	0	0	0	0	0	150	1	33
Collateral securities	0	0	4	16	8	24	12	24	6	6	70	4	16
Penal interest in default	0	0	6	24	9	27	11	22	4	4	77	3	17

Source: Primary Data

5. Conclusion

The housing finance system in rural area is still in its nascent stage. It has to cross many hurdles before it can become an effective instrument for solving the housing crisis presently faced by rural people. In order to overcome the inadequacies and deficiencies of the existing housing finance system in rural area, an improved housing finance schemes should be introduced. As effective affordable housing finance system would call for innovative strategies including flexible lending, norms and minimal transaction costs which could be achieved by providing institutional finance through a network of specialized home loan institution at the grass-root level especially in rural area.

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Innotransformative Trajectory of the Pandemic Covid-19

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Abstract: *The data on Coronavirus were changing on daily basis, and it was difficult to provide current statistics for the affected, recovered and casualties. However, based on some initial studies, a few characteristics were emerging for this virus. This paper is based on the review of published papers in journals and news papers about multifaced effects of the pandemic. The review shows that there is an innovative transformation in the form of the trajectory of the pandemic in different spears of human life. Starting from the event in China its spread in 97% of the nations created economic, social, psychological, environmental, ethical and work life issues. The result of the studies upon the pandemic is exhaustive and only selected spears were analysed to arrive at the conclusion of its transformative results and characteristics.*

Key Words: *Pandemic, Innotransformation, Trajectory, Multifaceted Effects.*

Introduction

The novel Coronavirus (COVID-19) is a humanitarian emergency, which started in Wuhan in China in early December 2019, brought into the notice of the authorities in late December, early January 2020, and, after investigation, was declared as an emergency in the third week of January 2020. The WHO declared this as Public Health Emergency of International Concern (PHEIC) on 31th of January 2020, and finally a pandemic on 11th March 2020. As on 4th February 2021 there were 10,51,31,248 coronavirus cases, 22,84,215 deaths and 7,68,53,341 recovered cases (www.worldometers.info).

This paper is based on the review of scientific papers published related to selected topics about Covid-19 pandemic. Most of the data are based on the abstracts published as well as the chosen data within the full text of the articles that showed how multifaceted results like the trajectory of the pandemic evolved in the entire course of the illness and its spread across the nations.

Infodemic and Emerging Issues

"We're not just fighting an epidemic; we're fighting an infodemic", said WHO Director–General Tedros Adhanom Ghebreyesus at the Munich Security Conference on 15 February 2020. WHO Information Network for Epidemics (EPI-WIN) was launched as a new information platform after WHO declared COVID-19 as a Public Health Emergency of International Concern (PHEIC). The goal was to share customized information with specific target groups as per the study of Zaroncostas, J. (2020). Finally, on 11th March, WHO declared it as a pandemic. "We know that every outbreak will be accompanied by a kind of tsunami of information, but also within this information you always have misinformation, rumours, etc. We know that even in the Middle Ages there was this phenomenon. But the difference now with social media is that this phenomenon is amplified, it goes faster and further, like the viruses that travel with people and go faster and further. So, it is a new challenge, and the challenge is the timing, because you need to be faster if you want to fill the void... What is at stake during an outbreak is making sure people will do the right thing to control the disease or to mitigate its impact. So, it is not only information to make sure people are informed; it is also making sure people are informed to act appropriately", said Sylvie Briand, Director of Infectious Hazards Management at WHO's Health Emergencies Program and architect of WHO's strategy to counter the infodemic risk. This poses the real challenge of mitigating the risk occurring from Coronavirus. One of the key issues of the "invisible disaster" is obtaining correct information.

It was reported that the case-fatality-rate (CFR) for Coronavirus was 2.3%, initially; however, the age group of 70 to 79 had an 8% CFR, and CFR was 14.6% for those more than 80 years old (WHO, 2019). This meant that the virus had a stronger impact on the aged population. The other characteristic of the virus was its speed in spreading. When Dr. Zhong Nan Shan made a public announcement of this virus in CCTV on the 20th of January, the virus had already spread in different provinces in China, as well as outside China. Every day, some new countries are added to the list, which had already reached 219 countries and territories (worldometer). It took only 30 days to spread from one city to the entire country of China. The early cases might have been spread from the Wuhan seafood market, while later cases were spread from person to person, the speed of which surprised the health

workers in Wuhan city and Hubei province. The epidemic curve found in (Wu, Zet al., 2020), showed that the second to the third week of January was the most crucial time, when the spread was very high. There were some similarities and differences among COVID-19, Severe Acute Respiratory Syndrome: 2002–2003 (SARS) and Middle East Respiratory Syndrome: 2012-ongoing (MARS). SARS also had a zoonotic transmission in markets in Guangdong Province, China. It was said that COVID-19 was likely to have been transmitted from bats via palm civets. Similarly, MERS was also traced to zoonotic transmission of a novel coronavirus (likely from bats via dromedary camels) in Saudi Arabia. All three viruses had similar syndromes like fever and cough, which frequently lead to lower respiratory tract disease. However, SARS had a higher CFR of 9.6%, while MARS was even higher at a rate of 34.4%. Despite much higher CFRs for SARS and MERS, COVID-19 had led to more total deaths due to the large number of cases.

The pandemic outbreak was initially found in Wuhan China lead us to the importance studied upon the perspectives of China in the early part of the pandemic. The review from the study of T. Xu et al., (2020) is highlighted as follows.

China Perspectives

1. Improve the Public Health Emergency Management System

   China needs to continue to carry out top level design for building institutions and mechanisms, improve the monitoring system for public health emergencies, and achieve networked and accurate management. China should improve the emergency response mechanism for major outbreaks, establish a centralized, unified and efficient leadership and command system, and improve our ability to respond to major public health emergencies (Wang Q, 2020). China should strengthen cross-provincial, cross-regional and departmental communication, and collaboration mechanisms.

2. Optimize the Public Health Service System

   China should strengthen the development of a contingency plan system for public health emergencies, formulate contingency plans by category, and specify and standardize the specific contents of such plans. China should focus on improving the ability of medical institutions and public

health administrative departments at all levels to respond to and manage public health emergencies. China should increase investment in medical and health resources, strengthen the public health workforce and personnel training, and improve the personnel structure. China should establish an evaluation and incentive system for medical personnel and improve their remuneration.

3. Strengthen the Rule of Law in Public Health

   China should repair the wildlife protection act. The wild animals carrying the virus are included in the fasting list, the areas of endangered wild animals are strictly protected, and the punishments for those who eat and sell wild animals are clearly defined (The Standing Committee of the National People's Congress, 2020). China should strengthen publicity of the laws on the prevention and treatment of infectious diseases enacted in China and comprehensively improves our ability to prevent and control infectious diseases in accordance with the law.

4. Raise Public Health Awareness

   China should intensify efforts to publicize the prevention and treatment of infectious diseases, and conduct popular science education to the general public through the preparation of publicity manuals, popular science books, new online media and other forms. In the community, experts and doctors of infectious diseases will be invited to give training lectures on popular science, so that the public can learn basic knowledge and ideas of epidemic prevention and have basic skills to deal with sudden infectious diseases.

5. Facilitate International Exchanges and Cooperation

   China should learn from the advanced public health emergency management system across the world, such as World Health Organization, including emergency management organization system, operation mode, early warning and monitoring, scientific research and experiment, and civic education. China should actively participate in international academic exchanges on epidemic prevention and control, work closely with counterparts around the world to share research results, and fight against infectious disease.

Psychological Impact

There were studies that highlighted the psychological impact of the COVID-19 pandemic on frontline workers. The pandemic had led to features of generalized anxiety and poor sleep quality that was significantly associated with factors such as the female gender and availability of Personal Protection

Equipments. The findings underscore the need to identify Health Care Workers (HCWs) at risk at an early stage and enable comprehensive, tiered, as well as situation-tailored mitigation measures, enhancing the HCWs' psychological resilience and alleviating their vulnerability in the present pandemic conditions. Limitations of working hours, special training to manage patients with COVID-19, availability of adequate quality PPE, along with timely and appropriate mental health support through multidisciplinary teams were vital elements of such mitigation measures. These efforts were essential because of the impact of anxiety on not only HCWs' personal wellbeing but also on health care delivery overall, which might be affected by the HCWs' potentially impaired decision-making ability, judgement, and attention (Bhawna Gupta et al, 2020).

Yet other studies provided evidence that COVID-19 had severe impact on psychological stressors, fear and anxiety, and poor sleep outcomes (Huang Y et al., 2020, Choi EPH et al., 2020, Ahorsu DK et al., 2020, Jahrami H et al., 2020). High anxiety levels during the pandemic had been strongly associated with functional impairments, alcohol or drug coping, negative religious coping, extreme hopelessness, and passive suicidal ideation (Lee SA, 2020). Similarly, problematic sleep was associated with adverse consequences on the patient's psychological, social, and cognitive functioning, which leads to deterioration of the overall quality of life (Szentkirályi A et al., 2009). Health care workers (HCWs, including doctors, nurses, dentists, and paramedics) are regarded as the saviours of human life; nevertheless, they remain wounded by the psychological consequences of COVID-19. Frontline workers in particular, who are directly involved in management of patients with COVID-19, are at a greater risk than others (Spoorthy MS et al., 2020, Shanafelt T et al., 2020, Esakandari H et al., 2020). Initial estimates suggest that frontline HCWs account for 10%-20% of all COVID-19 diagnoses (Nguyen LH et al., 2020). In India, with a population of approximately 1.3 billion (worldometer-population) and a doctor-population ratio of 1:1800 (Deo MG, 2013), the already inadequate public health care system has crumbled during the COVID-19 pandemic, further pushing frontline HCWs to the edge. Moreover, HCWs are vulnerable to physical and psychological fatigue and poor sleep outcomes due to increased workload, physical exhaustion with irregular work schedules, frequent work shifts (Zhang C et al., 2020), and the occasional need to make ethically challenging decisions, including rationing of care (Chan-Yeung M, 2004, Lai J et al., 2020, Kline

C et al., 2013). They were also constantly challenged by isolation and lived with an omnipresent fear of contracting the infection themselves or transmitting it to their families. This fear seemed to be a major factor causing a psychological impact among HCWs, apart from separation from families, shortage of personal protective equipment (PPE), lack of essential intensive care units, as well as universally and rapidly changing guidelines on disease transmission and treatment that further add to their stress. Multiple cognitive behavioural theoretical models have suggested that the following factors contribute to the severity of healthanxiety: memory and attention process, misinterpretation of health-related stimuli, and maladaptive beliefs and behaviours (Taylor S, 2019). Research on HCWs has revealed that approximately 50% of physicians have reported poor sleep quality during the pandemic, which may be attributed to the contagious nature of COVID-19 (Qiu D et al., 2020) and the emergency nature of their work (Zhang C et al., 2020).

An online survey conducted by University of Arkansas for Medical Sciences to assess and ensure "wellbeing" of their physicians found that the primary worry of all HCWs was the safety of their families during the COVID-19 pandemic, which was regarded as a major anxiety stress factor (Berg S,2020).

The study by Shu Wang et al., (2020) found that 11.0–13.3% of participants had anxiety, depression, or insomnia symptoms and that 1.9–2.7% had severe psychological distress or sleep problems during the outbreak of COVID-19.

Researchers have conducted multiple investigations of the consequences of the disruptive routine changes experienced by most individuals due to the COVID-19 pandemic. Some common impacts include disturbed eating behaviours such as increased comfort food consumption (Scarmozzino, F., et al., 2020), eating in response to stress and boredom, a snacking after dinner (Zachary, Z et al., 2020), decreased physical activity (PA) (Ammar, A. et al., 2020), and either significant increases (Neill, E et al., 2020) or reductions (Ammar, A. et al., 2020), in alcohol consumption. An important consequence of this pandemic has been the global psychological distress; multiple researchers have found increased prevalence of pandemic-related psychiatric morbidity and psychological distress (Smith, L et al., 2020, Gómez-Salgado, J., et al, 2020). The higher prevalence of anxiety and stress-related disorders may be purely pandemic related, such as fears that oneself or a loved one will contract the virus, and generalized uncertainty about the

future (Troyer, E.A. et al., 2020), but the direct biological effects of the virus itself on the central nervous system (CNS) are unknown. A meta-analysis from previous coronavirus infections revealed that common symptoms during the acute phase of the infection were depressed mood, anxiety, confusion, and impaired memory. If SARS-CoV-2 follows a similar course to that of previous coronaviruses, patients should recover from psychiatric symptoms without experiencing mental illness (Rogers, J.P. et al., 2020). The act of quarantining itself adds a facet to mental health deterioration (Smith, L et al., 2020). For example, anxiety and depression prevalence almost doubled in participants who had to quarantine or whose friends and family had to quarantine compared with participants who did not (Lei, L. et al., 2020).

Comorbid Health Issues

Lucia et al (2021) explained that the diverse clinical manifestations of COVID-19 were emerging as a hallmark of the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infection. While the initial target of SARS-CoV-2 is the respiratory tract, it is becoming increasingly clear that there is a complex interaction between the virus and the immune system ranging from mild to controlling responses to exuberant and dysfunctional multi-tissue directed autoimmune responses. The immune system plays a dual role in COVID-19, being implicated in both the anti-viral response and in the acute progression of the disease, with a dysregulated response represented by the marked cytokine release syndrome, macrophage activation, and systemic hyperinflammation. It has been speculated that these immunological changes may induce the loss of tolerance and/or trigger chronic inflammation. In particular, molecular mimicry, bystander activation and epitope spreading are well-established proposed mechanisms to explain this correlation with the likely contribution of HLA alleles. We performed a systematic literature review to evaluate the COVID-19-related autoimmune/rheumatic disorders reported between January and September 2020. In particular, we investigated the cases of incident haematological autoimmune manifestations, connective tissue diseases, antiphospholipid syndrome/antibodies, vasculitis, Kawasaki-like syndromes, acute arthritis, autoimmune-like skin lesions, and neurologic autoimmune conditions such as Guillain–Barr´e syndrome. We screened 6263 articles and report herein the findings of 382 select reports which allow us to conclude that there are 2 faces of the immune response against

SARS-CoV-2, that include a benign virus controlling immune response and a many faceted ranges of dysregulated multi-tissue and organ directed autoimmune responses that provides a major challenge in the management of this viral disease. The number of cases for each disease varied significantly while there were no reported cases of adult onset Still disease, systemic sclerosis, or inflammatory myositis.

Sung A Bae et al (2020) stated that in the previous studies evaluated cardiovascular risk factors thatconsidered age as a potential confounder. Sung's study was aimed to investigate the impact of cardiovascular disease (CVD) and its risk factors on fatal outcomes according to age in patients with COVID-19. A systematic literature review and meta-analysis was performed on data collected from Pub Med and Embase databases up to 11 June 2020. All observational studies (case series or cohort studies) that assessed in-hospital patients were included, except those involving the paediatric population. Prevalence rates of comorbid diseases and clinical outcomes were stratified by mean patient age in each study. The primary outcome measure was a composite fatal outcome of severe COVID-19 or death. Results included 51 studies with a total of 48 317 patients with confirmed COVID-19 infection. Overall, the relative risk of developing severe COVID-19 or death was significantly higher in patients with risk factors for CVD (hypertension: OR 2.50, 95% CI 2.15 to 2.90; diabetes: 2.25, 95% CI 1.89 to 2.69) and CVD (3.11, 95% 2.55 to 3.79). Younger patients had a lower prevalence of hypertension, diabetes and CVD compared with older patients; however, the relative risk of fatal outcomes was higher among the former. The results of the meta-analysis suggest that CVD and its risk factors (hypertension and diabetes) were closely related to fatal outcomes in COVID-19 for patients across all ages. Although young patients had lower prevalence rates of cardiovascular comorbidities than elderly patients, relative risk of fatal outcome in young patients with hypertension, diabetes and CVD was higher than in elderly patients.

Digital Technology and Telemedicine during Pandemic

According to Davide Golinelli (2020), the COVID-19 pandemic is favouring digital transitions in many industries and in society as a whole. Health care organizations have responded to the first phase of the pandemic by rapidly adopting digital solutions and advanced technology tools. The aim of this review is to describe the digital solutions that have been reported in the early

scientific literature to mitigate the impact of COVID-19 on individuals and health systems. We conducted a systematic review of early COVID-19–related literature (from January 1 to April 30, 2020) by searching MEDLINE and med Rxiv with appropriate terms to find relevant literature on the use of digital technologies in response to the pandemic. The search identified 269 articles, of which 124 fulltext articles were assessed and included in the review after screening. Most of the selected articles addressed the use of digital technologies for diagnosis, surveillance, and prevention.

Karanvir Kaushal et al., (2020) had elucidated the role of artificial intelligence (AI) in therapeutics for coronavirus disease 2019 (COVID19). Five databases were searched (December 2019–May 2020). Out of 31 studies included, 16 studies applied AI for drug repurposing, whereas 10 studies utilized AI for novel drug discovery. Only four studies used AI technology for vaccine development, whereas one study generated stable antibodies against SARS-CoV-2 (:severe acute respiratory syndrome coronavirus). Approx. 50% of studies exclusively targeted 3CLpro (3-chymotrypsinlike protease) of SARSCoV-2, and only two studies targeted ACE (angiotensin-converting enzyme)/TMPSS2 (transmembrane protease serine 2) for inhibiting host viral interactions. Around 16% of the identified drugs are in different phases of clinical evaluation against COVID-19. AI has emerged as a promising solution of COVID-19 therapeutics.

Gates B. Colbert et al., 2020, studied that, telehealth has become a central piece in patient healthcare delivery during COVID-19 pandemic era. Telehealth allows health care services to reach patients in their homes, keeping other patients safe through social distancing and maintaining self-quarantine. Within this administration of health, TH allows health care providers to focus more resources to pandemic usage and at the same time continue caring for the health of non-COVID-19 patients.

The Vulnerable and the Marginalised

Rajib Acharya et al., (2020), reported that despite the Indian Government's efforts to contain the disease in the affected districts, cases have been reported in 627 (98%) of 640 districts. A number of districts in nine large states—Bihar, Madhya Pradesh, Telangana, Jharkhand, Uttar Pradesh, Maharashtra, West Bengal, Odisha, and Gujarat—located in every region of the country except the northeast, were found to have high overall vulnerability (index value more than 0·75).

According to Srilakshmi Bellamkonda (2020), COVID-19 has further marginalised people with disabilities. The Department of Empowerment of Persons with Disabilities (DEPWD) recognises that PWDs are more vulnerable to the virus because of their physical, sensory, and cognitive limitations. These limitations come in the way of their capacity to access, interpret, and use the information and services being made available to deal with COVID-19, and can lead to further marginalisation.

Unprotected workers, including the self-employed casual and migrant workers, are likely to be hit by the virus as they do not have access to paid or sick leave mechanisms, and are less protected by conventional social protection mechanisms and other forms of income smoothing. Migrant workers are particularly vulnerable to the impact of the COVID-19 crisis, which will constrain both their ability to access their places of work and or return to their families in their natives.

In India 90% of work force is in unorganized sector. The sector is characterized by low wages and inadequate social security and most susceptible to exogenous economic vicissitudes. The COVID 19 outbreak and standstill of economic activities will have distressing impact on poor marginalized.

The lockdown has already disproportionately hurt marginalized communities due to loss of livelihood and lack of food, shelter, health, and other basic needs. The government does have a responsibility to protect the health and wellbeing of the population, but some of these steps have left tens of thousands of out-of-work migrant workers stranded, with rail and bus services shut down. The blanket closing of state borders had caused disruption in the supply of essential goods, leading to inflation and fear of shortages. Thousands of homeless people are in need of protection. Police actions to punish those violating orders have reportedly resulted in abuses against people in need.

As per the report of Human Rights Watch, Indian migrant workers during the COVID-19 pandemic have faced multiple hardships. With factories and workplaces shut down due to the lockdown imposed in the country, millions of migrant workers had to deal with the loss of income, food shortages and uncertainty about their future (Slater et al, 2020, Singh et al, 2020). Following this, many of them and their families went hungry (Abi-Habib et al., 2020). Thousands of them then began walking back home, with no means of transport due to the lockdown leading them to infirmities and death.

According to Rashid et al., (2020), among the various categories of migrant labourers in India, one category is of the seasonal workers employed in agriculture and related activities. Data shows that the agricultural labourers, who take upon rural to rural inter district and interstate seasonal migration, predominantly belong to the Scheduled Caste and Scheduled Tribe categories, making them one of the most deprived strata of the rural hierarchy. With their mobility restricted this very section faces one of the greatest brunt of the pandemic lockdown. In order to fully gauge the harshness of the blow that has befallen on these agricultural labouring classes, the pandemic has to be situated within the context of the pre COVID-19 economic conditions. Women labourers fared even worse receiving four fifths of the wages that were paid out to men in the harvest and postharvest agricultural operations (The Economic Times, 2020).

Manisha et al., (2020), studied that the global pandemic and the lockdown had brought to light the dire ethical repercussions of neglecting structural influences while designing and implementing policies. Now more than before, the experiences of vulnerable communities are increasingly finding prominence. However, the intersections of structures of power are yet to be considered significant enough to respond effectively. The insights we have gained make it imperative to use a gender and intersectionality lens to understand and mitigate the deprivations that have stemmed from Covid-19 and the lockdown.

Social Problems, Livelihood and Living

The New Leam, 2020, reported that the spread of COVID-19 is posing a serious threat before the tribal community and has made the tribal population more vulnerable than ever before. Low immunity and weak healthcare structures are making them increasingly vulnerable to the virus. We need to note that the greater chunk of minor forest produce is collected between the months of April and June every year. However, this year these months have coincided with the nationwide lockdown, the report underlies how the lockdown has resulted in extensive difficulties for the tribes as far collecting the forest produce is concerned and therefore effecting their livelihoods for the entire year. The report also brings to light another important aspect related to the problem of the tribes and it is related to increased diversion of forest land for other purposes and putting severe restrictions on the movement of tribes. This tenurial insecurity is looming like a big threat for the tribes. The other challenges that the tribes are facing are afforestation, diversion of ancestral

forest land, displacement and loss of livelihoods. Another matter of great concern is the fact that the union environmental ministry has used this time to clear many forest diversion proposals and has issued new guidelines relating to forest and environmental clearance norms for mining by new lessees when people have been confined due to the lockdown and cannot come out even if they have to protest. Many lost their job. There was huge plight of the migrant workers to their natives on account of the lockdown when all work stood still.

Socio-Economic Impacts

While the nationwide lockdown has resulted in financial losses and has affected all segments of society, the dominant effect on health, healthcare and nutrition could possibly pose major setbacks to previously gained successes of National health programs. Apart from firm economic measures, all National Health Programs should be restrengthened to avert possible surge of communicable (apart from COVID 19) and non-communicable diseases. These efforts should be focussed on population belonging to low socio-economic stratum.

Real Gross Domestic Product (GDP) growth had been estimated by the Reserve Bank of India (RBI) at 6.2% in 2019-20 (RBI, 2020). The International Monetary Fund however, lowered India's growth forecast by 1.3% points to 4.8% for 2019-20 and stated that India's growth had slowed sharply (Mishra A R, 2020). It is selfevident, therefore, that an economy already affected by slow growth in the previous fiscal year would be severely affected by the lockdown as a result of the pandemic. The Small and Medium Enterprises market ratings project that the nationwide lockdown is expected to incur losses of over $4.5 billion (₹ 35,000 crores) every day during the lockdown (The Hindu businessline, 2020). The healthcare sector, the fourthlargest employer in the country, and specifically the private sector which provides nearly 80% of out-patient care and about 60% of in-patient care (MoHFW, 2015) is currently facing 90% losses due to decreases in out-patient attendance, elective surgeries and international patients (Sharma NC, 2020). During the current pandemic, the economic downturn has greatly affected people from the lower socio-economic stratum (SES). The distressing media visuals of migrant labourers going to their native places from the cities on foot during the lockdown has been critically debated. Remittance of

money to the home country, which many migrant Indian workers popularly do, is another way of poverty reduction, economic development and increase in GDP. About $139 billion (₹ 1042500 crores) was remitted to low and middle income (LMICs) countries of South Asia from countries of work (e.g. Gulf countries) in the year 2019 (Guermond V., et al., 2020). The disruption caused by COVID 19 has had a significant impact on these remittance flows. Importantly, remittances are projected to fall by about 23% in India in 2020, to $64 billion (₹ 4,80,000 crores) in striking contrast to a growth of 5.5% and receipts of $83 billion (₹ 6,20,000 crores) seen in 2019 (Press Trust of India W., 2020). The World Economic Forum states that in the current pandemic situation, migrants stuck abroad trying to cope with the exigencies will compromise to the adverse circumstances, by taking up low wage jobs, live in poor working conditions, restrict spending and thus, risk exposure to infections like the coronavirus (Guermond V., et al., 2020). The scenario among the internal migrant workers (intra and inter-state) in India is equally grim. These workers constituting the informal sector, total to a staggering 139 million and are about 93% of the workforce (Mishra HH., 2020). About 50% of migrant workers stated that they had rations for less than a day when interviewed (Saini S. , 2020). Further, the study by Stranded Workers Action Network showed that 89% of the stranded workers had not been paid wages by their employers during the first 21 days of lockdown and that 74% had less than half their daily wages to live on (Edwin T. , 2020). The economic impact of this pandemic is likely to be more severe for India in the following manner; (a) increase in poverty i.e., pushing more people below poverty line (Anser MK et al., 2020), (b) worsening of socio-economic inequalities (Mahendra Dev S., 2020, Saini S., 2020), thus affecting health and nutrition indices, and (c) compromise in health-related precautions (use of masks, social distancing, seeking medical advice in case of cough and fever etc.). All these would have major long-term associations with health indicators.

Education and Digital Technology

SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis of Some Educational Impacts of the Coronavirus Pandemic.

Strengths (Advantages)	**Opportunities**
a. Accelerates the adoption of virtual instruction b. Fosters expertise in virtual andragogy c. Promotes virtual work d. Accelerates hybrid models for student and trainee onboarding e. Fosters reassessment of the need for administrative physical space in academic medical centres f. Instances of enhanced teamwork, participation, and communication compared with prior face-to-face work g. Can enhance participation in virtual meetings, either because travel time to physical meetings is curtailed or because some who are normally reluctant to participate in live meetings may find the "chat box" a more comfortable option	a. Energizes strategies to optimize virtual work and virtual teaching and learning (eg, develop "playbooks") b. Chance to improve virtual student/trainee onboarding c. Tighten the interface between undergraduate medical education and graduate medical education (eg, by focusing on areas of common impact like virtual interviewing, holistic assessment, and diversity and inclusion) d. Leading through crisis e. Discover and strengthen personal attributes of compassion, resilience, and posttraumatic growth
Weaknesses (Disadvantages)	**Threats (Ongoing Challenges)**
Conditions at home may be distracting for some a. Loss of spontaneous interactions (ie, no "water cooler" dialogs) b. Loss of opportunity for important in-person ceremonies/ celebrations (eg, graduations for medical student and trainees) c. Risk of erosion of camaraderie d. Increased need to supply equipment for work from home (eg, laptops, headsets, monitors) e. Loss of hands-on training for procedures (eg, cadaver dissection, procedural training) that are difficult to replicate virtually f. Loss of hands-on training for direct patient interaction (eg, objective structured clinical examinations) g. Faculty discomfort with virtual teaching h. Challenges to student/trainee onboarding and orientation i. "Zoom" (virtual meeting) fatigue	Accelerated loss to the workforce of those averse to or challenged in adapting to virtual work a. For clinicians and trainees, loss of networking and learning due to the inability to attend/present at conferences b. For trainees, concerns over risk of not graduating or being certified because of lack of clinical hours/experience c. Concerns by students and trainees about moving to new places (during transitions from medical school to residency or residency to fellowship) without prior opportunities to visit d. Concerns by trainees that financial losses by health care institutions might cause posttraining job offers to be rescinded e. Budgetary shortfalls that have been widely experienced by hospitals following the pandemic could curtail funding for education at a time when educational innovation is needed.

Source: James K. Stoller (2020)

Work Life Transits

The COVID-19 pandemic has forced families to try to maintain work-family balance with few supports. With schools and daycare facilities closed, parents are solely responsible for childcare and perhaps even home-schooling. Yet, many parents are also working their paid jobs from home, while others have heightened financial concerns due to losing their job, and yet others involved in healthcare may be living away from their families to reduce exposing them to the virus. Whatever the circumstance, work-family balance has become increasingly challenging. There has been much discussion on how the pandemic will likely exacerbate gender inequalities, with women being forced to do even more domestic labour given the circumstances (Ruppanner et al., 2020).

Drawing upon the employee isolation literature, Akanksha Jaiswal C etal., (2020) aimed to examine the impact of work from home on employees during the lockdown. This investigation would help us learn about the nature and quality of work in the context of the current crisis. Towards this, we conducted in-depth interviews with 24 middle and senior level managers across manufacturing and technology enabled service sectors in India and analysed the data using MAXQDA software. Employees reported an increase in working hours, major changes in their roles, reduced levels of productivity, and increased levels of stress. Besides these findings, we discovered sparks of creativity among employees during this isolation period. These creative steps were either towards nurturing oneself for career growth or towards solving long pending organizational issues. Interestingly, the creativity was self initiated. Our findings have key implications for organizations and their leaders who need to revisit work-from-home policies for the future workforce. We highlight our theoretical contributions and outline the scope for future research.

This study makes two important contributions to the literature. Despite the numerous challenges in its implementation, the work-from-home model during the COVID-19 pandemic has been a revelation for employees and organizations. Mapping to the situational theory, work-from-home was an immediate response to the pandemic. However, going forward, organizations will have to adapt themselves to the drastically changing ecosystem. Thus, our findings shed light on the organizational adaptation theory (Felstead et al., 2002) concerning the work-from-home model in the post-lockdown and

pandemic-recovery situation. Organizations will have to reflect upon their current processes and redesign functioning to readjust and conform to the changes happening in the societal context. The adaptation process would include taking cues from the general and economic conditions, the changing nature of employees' work, their readiness to return to work, and the psychological impact of the crisis on their attitude and well-being.

Health care workers on the front line who are directly involved in the diagnosis, treatment and care of patients with COVID-19 are at risk of developing psychological distress and other mental health symptoms (Sharma T., 2020).

Even those who were previously sceptical about achieving efficiency in distributed teams are now embracing it as a new way of working. Up grading and making use of digital platforms to stay connected. The more self-awareness needs about work style, find ways to work smarter, not harder. Perhaps it is time that the expression "work-life balance'' is laid to rest, and, in its place, we use the term 'work-life integration'. People who make this transition may well find that their resilience is strengthened because the mindset is about accepting and incorporating multiple demands upon our time and talents, between work, health, responsibility and family (Aruna et al., 2020).

Eco Trajectory

According to the study of Harekrishna Bar (2020), in the lockdown period, the levels of nitrogen dioxide (NO_2) and carbon emission remarkably decrease in atmosphere due to restricted consumption of fossil fuel by industries, thermal power stations and air transportations. The concentration of NO_2 dropped by 45–54% in the atmosphere of most populated cities in Europe. The intensities of particulate matters PM2.5 and PM10 decreased by 43% and 31% respectively, at lower atmosphere indicating improvement in air qualities in different parts of world caused by less traffic and construction activities. New deserted bank has developed due to less river activities in this period. Noise pollution remarkably dropped below 60 db even in crowded cities. Thus, the atmospheric environment has resumed some extent in all respect by means of such global-wide lockdown aiming to control COVID-19 pandemic. The behavioural changes of wild animals, birds, butterfly, pets and street animals that reflected on ecosystem of their relative region indicate

the non-interference of human activities on lives of natural creatures during lockdown period. There is certain correlation between atmospheric change with the behavioural changes of natural creature during lockdown period.

According to Tanjena et al., 2020, the global outbreak of coronavirus disease 2019 (COVID-19) is affecting every part of human lives, including the physical world. The measures taken to control the spread of the virus and the slowdown of economic activities have significant effects on the environment. This study indicates that, the pandemic situation significantly improves air quality in different cities across the world, reduces Green House Gases emission, lessens water pollution and noise, and reduces the pressure on the tourist destinations, which may assist with the restoration of the ecological system. In addition, there are also some negative consequences of COVID-19, such as increase of medical waste, haphazard use and disposal of disinfectants, mask, and gloves; and burden of untreated wastes continuously endangering the environment.

COVID-19 is causing severe damage to economies and societies, it has augmented the environment as pollution has reduced significantly (Chakraborty and Maity, 2020). Due to COVID-19, governments have imposed restrictions on the movement of people, vehicles, and suspended industrial activities (Zambrano-Monserrate et al., 2020). The consequences of such lockdowns have been remarkable, as pollution levels have dropped significantly; for instance, greenhouse gas emissions, nitrogen dioxide, black carbon and water pollution have decreased drastically (Chakraborty and Maity, 2020; Saadat et al., 2020; Tobías et al., 2020; Wang and Su, 2020; Zambrano-Monserrate et al., 2020).

Ethical Probs in Vaccination

Beth P et al., 2020 explained that the continued global spread of the coronavirus disease 2019 (COVID-19) pandemic highlighted the pressing need for safe and effective COVID-19 vaccines.Vaccine development efforts of unprecedented scale and speed are being pursued. Since June 2020, the Advisory Committee on Immunization Practices (ACIP) has held 4 public meetings to lay the ground work for public health recommendations for COVID-19 vaccines. In September 2020, the ACIP endorsed 4 interim ethical principles, central to the development and implementation of recommendations for COVID-19 vaccine use, including in the setting of a constrained supply — maximizing benefits and minimizing harms; equity;

justice; and fairness. Transparency, a fifth key principle, was considered foundational to ethical decision-making. Transparency is essential to foster public trust and ensures that allocation decisions are clear and open for review and public engagement.

Masking and Personality

The word person comes from the Greek word, 'Persona', meaning 'mask'. Hence personality is something hidden by mask. Widespread use of face coverings is a key public health strategy to prevent the spread of COVID-19. However, few studies have examined why Americans use or do not use face coverings, and little is known about the most effective messaging strategies. This study explored perceptions of face coverings, including motivations and barriers for use, and examined reactions to messaging promoting the use of face coverings. Six virtual focus groups were conducted with 34 North Carolina residents in July 2020. Participants reported high compliance with face covering recommendations but often did not wear them around family, friends, and colleagues. The most prevalent motivation for the use of face coverings was to protect or respect other people, including high-risk populations and individuals. Other motivators were self-protection, responsibility, desire for control, requirements, and expert advice. Barriers included physical and social discomfort, confusion or misinformation, low perceived susceptibility to COVID-19, and perceptions of identity and autonomy. Even among individuals who frequently wear face coverings, there are opportunities to improve compliance. Messaging should highlight how face coverings protect the wearer and others around them, normalize the use of face coverings in social settings, and emphasize requirements. Positive messages that focus on unity, personal experiences and the rationale for face coverings are recommended (Victoria S, 2020). Thus, mask use is a reflection upon the personality positively and negatively.

Conclusion

The information available from published scientific papers on the pandemic Covid-19 reflected through this paper shows that there was multifaceted effect of the pandemic across the Globe. Although it was a health problem it affected human life in all spheres, animal and plant life as well. It had its positive and negative results in society, economy, political and work life. It had created transformation in the day today lives of everyone even if one had not contracted the corona virus. The loss of life, property, job, and

business created a vacuum in the human history adding a resetting in the natural order of ecocentrism in human life. The results of the mega disaster would be further devastating and creating a paradigm shift in the very futuristic aspirations of everyone across the world. Hence everyone has a responsibility to repair the damage caused to individual, familial and national lives and to rebuild the society to get back to normalcy at the earliest through innotransformative means and methods. It is a challenge and at the same time a sense of satisfaction.

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Pros and Cons of Government Support in Creation of Women Entrepreneurship in Medium and Large Scale Industries in South India

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Abstract: *Today, women in India are scaling equal to that of men in different fields of business, which enabled government to concentrate on creation and development of women entrepreneurship in India. Government of India has launched different financial and other schemes in which some are meant specially for women like Stand-Up India scheme which provides loan only to women and SC/ST entrepreneurs. As on 31.01.2020, 70% of the total loan borrowers of Pradhan Mantri MUDRA are Women. As on 17.02.2020, more than 81% account holders under Stand Up India Scheme are women and Rs. 9106.13 crore has been disbursed for women account holders. We can find women's taking initiatives in different fields but majority of the women entrepreneurs are limiting themselves to small sector. Even though this is help them to become self-employed but focusing on medium and large scale entrepreneurship can help to boost the economic growth. Therefore, the present study tries to find out reasons behind women's taking entrepreneurship in small sectors in large number instead of medium and large scale entrepreneurship. Primary data using telephonic interview, have been extracted from women entrepreneurs who have taken government support in creating their entrepreneurial initiative. Convenience sampling method has been used to select samples.*

Entrepreneurial qualities and skills are essential for industrial development as well as eradication of poverty by means of creating self employment and employment to others. The Central and the State governments are trying their best for promotion of entrepreneurship among the economically backward castes, particularly scheduled castes and scheduled tribes through policy measures and institutional network. Keeping in view the need and importance of the entrepreneurship development among under privileged communities in the present

era of globalisation, the present study is undertaken to probe into the entrepreneurial process, problems and challenges faced by the SC/ST entrepreneurs and to make some possible suggestions.

Key Words: *Women Entrepreneurship, Government Financial Schemes, Pros and Cons.*

1. Introduction

An entrepreneur is a business person who not only conceives and organizes ventures but also frequently takes risks in doing so. India is a developing nation which requires many different strategies to grow in a competitive world. Entrepreneurship development is a key strategy which helps nation to develop and compete globally. Presently, we have women entrepreneurs who are taking entrepreneurship initiative with the support of government financial and other schemes. As we know finance is the life blood of business, and financial support to women can become foundation in creating entrepreneurship mind-set. Government financial schemes like MUDRA, Stand-Up India, Pradhan Mantri Employment Guarantee Yojana are implemented to help every individual to create entrepreneurial intension, and women are also attracted towards these schemes and started establishing new ventures in various sectors using these financial benefits.

1.1 Small Scale Business

Small scale Industries or small business are the type of industries that produces goods and services on a small scale. These industries play an important role in the economic development of a country. The owner invests once on machinery, industries, and plants, or take in a lease or hire purchase. These industries do not invest more than one crore. Few examples of small-scale industries are paper, toothpick, pen, bakeries, candles, local chocolate, etc., industries and are mostly settled in an urban area as a separate unit (Large Scale Industries – Definition, Advantages and Examples, n.d.).

1.2 Large Scale Industries

Large scale industries include various types of industries in its purview. Large scale industries comprise multiple heavy and light industries. The heavy industry like steel, textile and automobile manufacturing industry falls under the category of large scale industries (Large Scale Industries – Definition, Advantages and Examples, n.d.).

2. Objectives of the Study

i. To understand the need for creation of women entrepreneurship in India.

ii. To understand the necessity of women entrepreneurs in medium and large scale industries.

iii. To study the benefits and limitation of government support in creation of women entrepreneurship in medium and large scale industries.

3. Scope of the Study

The scope of the study is extended to understand the reasons behind women who are not involving themselves in medium and large scale entrepreneurship even after the government is extending their support throughout entrepreneurial activities. The study can be taken to understand the importance of women role in medium and large scale industries.

4. Limitations of the Study

Study tries to identifies the necessity of women in medium and large scale industries and it ignores role of women in small scale industries. Convenient Sampling is used to select respondents which may limit to generalise the study.

5. Significance of the Study

Women entrepreneurs are emerging in different business activities, which are creating employability and improving standard of living of the family of each women entrepreneurs. But majority of the women entrepreneurs are limiting their initiative to only small scale industries. Promoting these women entrepreneurship in medium and large sector has multiple benefits to the society, may be in the form of large employment or industrial development. Therefore, study related to identifying the reasons behind majority of the women stepping back to take up entrepreneurship in large scale sector has benefits not only to knowledge seekers but also for the government and society.

6. Research Methodology

As the study needs to be taken care from different perspective to get better result, the research is made taking into consideration of factors like ‘pros and cons of government support in creating entrepreneurial mind-set among

women entrepreneurs in large scale sectors' 'Reasons behind women's stepping back to take up entrepreneurial initiative in large scale sectors'. Convenient sampling method is used to select 100 women entrepreneurs in small scale sectors who have taken government support to establish entrepreneurship in South India. Telephonic interview method is used to collect responses to the structured interview questions. All South Indian states namely Karnataka, Tamil Nadu, Kerala and Andhra Pradesh/Telangana state have been taken for the study.

6.1 Identification of the Research Gap

The subject under research "Pros and Cons of Government Support in Creation of Women Entrepreneurship in Large Scale Industries" includes different concepts like "Women Entrepreneurship", Women in Medium and Large scale industries", "Government support to women in creation of women entrepreneurship". Previous studies discussed the role of women entrepreneurship in small scale sectors, role and responsibilities taken by women entrepreneurs in creation of employment opportunities, women entrepreneurship and its contribution to increase standard of living of the family (Xavier et al., 2012), (Sharma, 2020), (Kar, 2014). The present study identifies need for creation and development of women entrepreneurship in medium and large scale sectors with the support of government support.

6.2 Review of Literature

In the study Xavier et al., (2012) explored that women entrepreneurs made a change from salaried employment to ownership of small and medium businesses. The study highlighted that the five least possessed entrepreneurial skills were computer knowledge, enhance competitiveness in the market, risk taking, good strategic management and planning practices, controlling productive resources and good marketing strategies. The study demonstrated that corporate women entrepreneurs did not enter the business world due to family commitments but rather due to personal achievement, independency and autonomy which seems to parallel the pull factors theory.

In the study Sharma, (2020) explored that women who already had their family business felt that the business is in their blood only. Many of them also feel that instead of sitting idle and doing nothing, they took up the entrepreneurial path because they wanted to do something full of creativity and imagination. He concluded that the women in India have to play a very vital role in the socio-economic development of the nation.

(Das, 1999) The study also suggests that there is a rationale for focusing on 'created' or 'pulled' entrepreneurs, as they seem to perform better and seem to view their success as resulting from the business skills they possess. Women who were forced into entrepreneurship also did better than 'chance' entrepreneurs. It may, hence, be inferred that financial motivations can lead to success in entrepreneurial activities.

6.3 Women Entrepreneurship in India

Women entrepreneurs are those who have initiated businesses and have been actively involved in managing it; own at least 50% of the firm, and have been in operation for one year or longer (Moore, D.P. and Buttner, 1997). Stand Up India Scheme was launched on 5 April 2016 to promote entrepreneurship at grass root level for economic empowerment and job creation. This scheme seeks to leverage the institutional credit structure to reach out to the underserved sector of people such as Scheduled Caste, Scheduled Tribe and Women Entrepreneurs so as to enable them to participate in the economic growth of nation. Pradhan Mantri MUDRA Yojana (PMMY) was launched on April 8, 2015 for providing loans up to 10 lakhs to the non-corporate, non-farm small/micro enterprises. These loans are given by Commercial Banks, RRBs, Small Finance Banks, MFIs and NBFCs.

Table 1. Women in Stand-Up India Scheme

Number of account opened	Total sanctioned amount (in crores)	Total disbursed amount (in crores)	Total percentage of account holders
73,155	16,712.72 crore	9106.13	81%

Table 2. Women in MUDRA Scheme

Total sanctioned amount (in crores)	Total disbursed amount (in crores)	Total percentage of account holders
22.53	15.75	70%

6.4 Need for Women Entrepreneurship Development in Medium and Large Scale Sectors in South India.

Women in South Indian states namely Karnataka, Tamil Nadu, Andhra Pradesha/Telangana and Kerala is emerging with entrepreneurship through utilising government financial schemes like Stand-Up India and MUDRA. Development of women Entrepreneurship in India is an essential requirement of government to reduce unemployment and make women self-employed. This move can be further improvised by supporting women to take-up entrepreneurship in medium and large scale sector. As we can witness small scale sectors in south India fails to provide societal benefits and it enriches only women in the society. Medium and Large scale sectors can reduce the burden of government in developing economy. Therefore, women need to be motivated enough to expand their small scale entrepreneurship to higher level so that entire society can be benefited. We can find women in large scale sectors also but which is in small number and majority are from strong family background and not taken much support from government schemes. Those women who take government support in establishing the entrepreneurship limit themselves to very less risky entrepreneurship due to different reasons. Some reasons may be from limitations of government schemes and huge documentation needed to get the loan so on. Once the women find way to shift from present small scale business to large scale, then we can find a rapid economic development in very less time period. This must be made possible by removing barriers which are restricting women entrepreneurs. The study tries to identify those barriers and discuss proper methodologies to overcome those barriers.

7. Results and Discussion

The structured interview data collected from 100 women entrepreneur in small scale sectors in South India using telephone interview method are presented below. Similar responses are presented under particular themes.

Total Respondents: **100**

Table 3: Themes and Codes of Responses

Respondent's State	Total Respondents	Number of times responses related to particular theme is received from each state	Themes of Responses						
			Financial Difficulties	Lack of Support from family	Lack of government support	Comfortableness in small scale industries	Lack of Interest	Risk Involved	Total responses and percentage
Karnataka	25		21	18	16	18	16	21	110
Tamil Nadu	25		21	13	08	14	15	18	89
Kerala	25		19	08	17	15	21	19	99
West Bengal/ Telangana	25		18	15	14	21	15	14	97
Total	**100**		**79**	**54**	**55**	**68**	**67**	**72**	**395**
		Percentages	**20%**	**13.67%**	**13.92%**	**17.22%**	**16.96**	**17.22%**	**16.96%**

Source: Author's own

Note: 1) Numbers in the above table denotes, number of times similar responses received from the respondents under each theme.

2) Percentage is calculated using the formula:

$$\frac{\text{Total responses under each theme X } 100}{\text{Total Responses}}$$

As we can see from the above table that, out of total 395 responses from 100 respondents, majority, that is 20% of the responses received states that women are finding it difficult to identify and get the finance from the proper source. 18.23% of responses stated that women are not ready to take much risk and they want to live with small scale business which do not possess high risk and 17.22% of responses stated that women are comfortable in small scale industrial entrepreneurship instead of taking huge burden with medium and large scale entrepreneurship. Other responses also highlight problems such as lack of support from the family, lack of interest in taking big businesses and lack of government training facilities and motivation. From the data we got from the study we can identify majority of the women coming forward to take entrepreneurship to become self-employed and live with minimal standard of life. As government is providing many training facilities, financial and other supports which need to be developed in such a way that it should reach every women entrepreneur. Proper awareness should be created in developing the entrepreneurship instead of only creating entrepreneurship mind-set.

8. Conclusion

Women are scaling equal to that of men in every business activity and this needs to be identified and developed in such a way that women entrepreneurship can grow in shorter time. Study shows women are coming forward to take-up entrepreneurship but are worried about different factors to take high risk and start or develop an entrepreneurship from small scale to medium and large scale sectors. As the days move, we can see majority of the women becoming self-employed instead of working as employee. This development is creating benefits in many ways and government should take this into consideration and help them to develop their entrepreneurship.

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