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Dr. K VENKATA NAGENDRA
Dr. MALIGELA USSENAIAH

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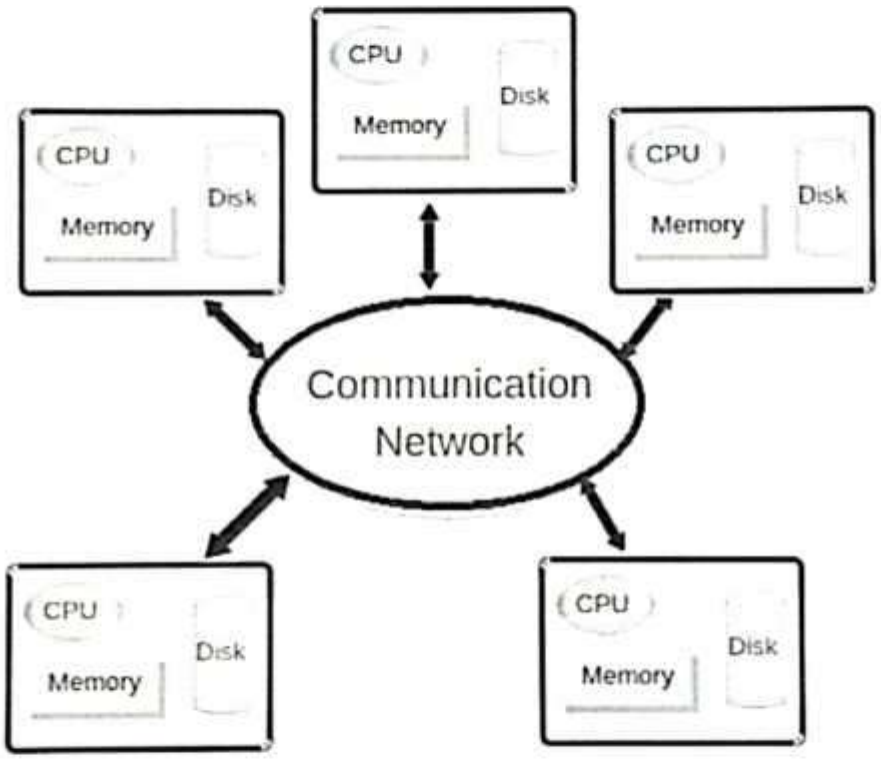

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Contents

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INTRODUCTION TO BIG DATA

For B.Tech 3rd Semester CSE
(As per the Latest Syllabus of JNTUA)

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New Delhi

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HEALTH & WELLBEING OF WOMEN AND CHILDREN

Prof. Anuradha .K
Prof. I.V. Lalitha Kumari

Content

15

Health And Wellbeing of Women Caregivers' Of Elderly: Impact of Caregiving Burden

K. Suneetha

Abstract

Women caregivers of elderly are silent angels. They may not outwardly complain or whine about their responsibilities to care for elderly. Caregiver burden is the term used to describe the physical, emotional and financial toll of providing care. There are several symptoms that can indicate caregiver burden and stress including: depression, anxiety, difficulty concentrating ,irritability, exhaustion, easy annoyances, sleep disturbances, health problems, substance abuse etc.

To know the impact of caregiving burden on women caregivers' health and wellbeing a study was conducted in Nellore district with a sample of 250 caregivers of elderly by adopting Burden Scale for Family Caregivers (BSFC) , Satisfaction with life by Diener scale and the Perception of Social Support Inventory. The study revealed that the health status of the caregivers, level of satisfaction in life and social support received has significant influence on burden of elderly caregiver. Further there is a significant impact of intervention on reducing the caregivers burden. Similarly individuals who are with low social support exhibited higher level of burden at pre and post intervention levels. Thus the individuals with good social support are found to be better equipped to face caregiver burden and its consequences.

Introduction

Caregiver burnout takes place when caregiver stress and burden is chronic and has escalated to the point of physical and mental exhaustion. It involves many of the symptoms of caregiver burden and stress: depression and anxiety, difficulty concentrating, irritability, exhaustion, easy annoyances, sleep disturbances, health problems, substance abuse etc..on a deeper and more intense level. One of the ways that the body responds to stress is by releasing the steroid hormone cortisol. This hormone suppresses the igestive, reproductive and immune systems leading to heightened risk of getting sick. This can also lead to depression, anxiety and heart disease as well. Heightened caregiving burden and stress has been linked to decreased longevity and early death.

The consequences of a high caregiver burden include an increased risk of the need to place the family member in a long-term care facility as well as increased use of formal in-home services. The societal and economic benefits of reducing the amount of caregiver burden are evident. In addition, higher levels of burden may correlate with increased morbidity and mortality in caregivers. Multiple studies have shown that the incidence of depression in caregivers is high, ranging from 18 to 47 percent and caregivers who are depressed experience higher degrees of burden. Recent surveys estimate there are 44 million caregivers over the age of 18 years (approximately one in every five adults).The economic value of their unpaid work has been estimated at $257 billion in 2000 dollars. Most caregivers are women who handle time-consuming and difficult tasks like personal care. Caregivers spend a substantial amount of time interacting with their care recipients while providing care in a wide range of activities. On average, informal caregivers devote 4.3 years to this work (Donelan ,2002) Four out of 10 caregivers spend 5 or more years providing support and 2 out of 10 have spent a decade or more of their lives caring for their family member. This is a day-in, day-out responsibility. More than half of family caregivers provide 8 hours of care or more every week, and one in five provides more than 40 hours per week.

Most of the research on the health of caregivers has focused on psychological well-being. Depression is the most heavily researched area in caregiver health. Grossfeld et.al. (2010) study revealed that anxiety was present in 17.5 percent of caregivers compared to 10.9 percent of subjects in a matched control group. An increased incidence of anxiety correlates with research that has documented a higher amount of psychotropic drug use among caregivers. When compared with persons who are not in a aregiving role, caregivers perceive their own health status to be lower. More than just perception, the immune function of caregivers may be reduced. Kurasawa et.al. (2012) research has shown that viral illnesses last longer in caregivers than in control subjects. In addition, three measures of cellular immunity have been shown to be lower in caregivers than in control subjects.

A landmark study Perkins et.al (2013) of caregiver health revealed that elderly spousalcaregivers who experienced caregiver strain had a mortality risk that is 63 percent higher than that of control subjects. The implications of this study make early identification of caregiver burden and appropriate intervention even more critical. Caregivers have been described as "hidden patients." Family physicians should identify their patients who are caregivers through a detailed family and social history. Caregivers should be assessed for their level of perceived burden and for the presence of affective disorders such as depression and anxiety. In addition, family physicians should assist caregivers with coping strategies, counsel them about ways to handle behavioral management issues that arise during the course of dementia. The degree of caregiver burden should be assessed systematically. Family caregivers of elderly persons with physical ailments and/or dementing illnesses often experience high levels of stress which can lead to a lowered sense of well-being , feelings of being burdened , depression , compromised physical health and even premature mortality. Although some caregivers derive benefits from caregiving many are nonetheless in need of psycho-social and instrumental support. Early studies on the effects of interventions relied on the clinical impressions of group leaders or satisfaction surveys of small, select samples of caregivers.

Mental health issues are a significant area of concern. Because depression is the most common health problem in caregivers, it should be screened for routinely. Family and individual counseling may be considered for patients with affective disorders or a high level of caregiver burden. Social support and resources should be explored if the patient's answers to screening questions suggest a need for outside help. The clinician should ask specifically about the number of visits each week by family members and friends. The patient may also be asked, "Have your family or friends offered to help?" or "Have you accepted the offer?". If the caregiver does not receive respite regularly, physicians should give them permission to ask for help and assist them in finding sources for assistance. Formal and informal respite care has been helpful to delay institutionalization, respite care has a varied impact on caregiver burden.

Sally Savage and Susan Bailey (2004) discussed that impact on caregivers' mental health include the relationship between the caregiver and care recipient, the nature of the care recipient's disability and the stage of the caregiving process, socio-economic factors, social support and coping strategies. This information provides a context within which to examine the type of interventions appropriate to assist caregivers in various situations. Empowering individuals by helping them make the most of available sources of social support, providing assistance with coping strategies and enhancing feelings of mastery or self-efficacy may be particularly worthwhile for some caregivers, but are not currently part of mainstream services.

Rasha Aziz Attia Salama and Faiza Ahmed Abou El-Soud (2012) study revealed that caregivers who had little informal social support, inadequate financial resources and more caregiving hours were more likely to experience intense caregiving burden. Burden was also positively associated to the functional disabilities of care recipients and the degree of caregiver burnout. The results of this study indicated that the female spouse was the most common caregiver within the sample, which indicates that cultural norms in Egypt still affect caregiving burden.

Distinct from gender differences in the delivery of care are gender differences regarding the impact of family caregiving. Studies show that women experience greater caregiver strain than do men, regardless of the level of disability of the care recipient .Daughters and wives in particular experience greater strain than the other relative caregivers (Neal et.al , 1997). Approximately 40percent of caregivers provide assistance to a parent and 5percent care for a spouse. The remaining 55percent of caregivers care for grandparents, parents-in-law, other relatives, neighbors or friends (NAC/AARP, 1997).

Mehta (2005) article highlights the nature of and relationship between caregivers' stress and gender, patients' activities of daily living (ADL) and instrumental ADL dependency and caregivers' attitudes. Findings revealed that female caregivers tended to be more stressed than male caregivers, samples of 61 family caregivers of homebound patients. 94percent felt constantly under stress and 88 percent had restless, disturbed nights also showed a significant inverse relationship between the level of stress experienced by caregivers and the ADL and instrumental ADL dependency of patients.

According to Nortey et.al (2017) their article on Economic burden of family caregiving for elderly population in southern Ghana revealed that about 78percent of the family caregivers in the study reported a high level of caregiving burden (as measured with the ZBI) with females reporting a relatively higher level than males. Further, about 87percent of the family caregivers reported a high level of financial stress as a result of caregiving for their elderly relative. The study shows that support/caregiving for elderly population imposes economic burden on families, potentially influencing the economic position of families with attendant implications for equity and future family support for such vulnerable population.

Hence this study (part of ICSSR-SRC, Hyderabad funded research study) Health and Wellbeing of Women Caregivers' of Elderly : Impact of Caregiving Burden was planned with few objectives such as.

- to understand the socio-demographic and economic profile of caregiver of the elderly;
- to assess the health status of caregiver of the elderly ;
- to study the caregivers level of burden or stress due to caregiving to the elderly relative
- to study the life satisfaction and social support received by the caregiver of the elderly.
- to study the impact of social work intervention on the women caregivers of elderly with regarding to the level of burden experienced due to caregiving.

Hypotheses

- The health status of the women caregiver of elderly is influenced by their level of burden or stress due to caregiving to elderly relative.
- The social work intervention received by the caregiver has impact on their level of burden due to caregiving of the elderly relative .

Sampling Design

The universe of the present study consists of the family caregivers to the elderly residing in Naidupeta, Guduru, Nellore, Kavali and Atmakur divisions of Nellore district .250 caregivers to elderly were selected from 10 areas (i.e.5 urban and 5 rural) by the method of simple random sample.

Tools of Data Collection

The assessment of caregiver burden is done by using Burden Scale for Family Caregivers (Elmar et.al,2003) , Satisfaction with life by Diener et.al scale (1985) and the Perception of Social Support Inventory which was constructed and standardized by Ramamurthi and Jamuna (1991) were adopted for the study.

Burden Scale for Family Caregivers (Elmar et.al,2003)

The assessment of caregiver burden enables to judge the situation of the caregiver. The correct measurement of subjective burden is necessary to draw conclusions about the effectiveness of family interventions. The care situation is an important, highly

specific stressor which should be treated with specific interventions. Burden Scale for Family Caregivers (BSFC) The BSFC exists in a detailed version with 28 items, and in a short, more efficient version (BFSC-s) with ten items. Compared to other burden scales, the BSFC has two benefits. There is a long and a short version, both validated in separate studies. The caregivers have to rate these items on a four-point scale from "strongly agree" to "strongly disagree". An evaluation is possible both on item level and on score level. A differentiated detection of the critical aspects of home care is possible with the analysis on item level. The score measures the total burden. This is an important factor to judge the caregiver's situation.

Satisfaction with life (Ed Diener et al 1985)

It is a short and easy version on seven point scale with five statements. Higher the score indicates high satisfaction in life.

Perception of Social Support Inventory (Ramamurthi and Jamuna (1991) for the elderly. This scale was constructed and standardized to assess the family, community and government support of elderly. This scale consists of 16 statements on five point scale 'always to never'. Lower the score indicates better social support.

Method of Data Collection

The researcher approached the elderly family caregivers personally and their consent was obtained. Interviews were conducted at the residence of respondents or sometimes in the neighbourhood. Thus, convenience of the respondents was taken into consideration to conduct interviews. Besides interview, observation method was also used while collecting the data pertaining to family caregiver burden and stress.

Analysis of Data

The data which was collected was analysed by using certain statistical techniques with the help of SPSS 16.0.

Results:

The socio-demographic characteristics of the present study sample revealed that 44 percent of the respondents i.e. caregivers are middle aged adults i.e. in the age group of 35- 55 years and 56.8 percent were not having any formal education. Regarding occupation of the respondents 42 percent of the caregivers are engaged as wage workers and 49 percent are having income of less than Rs 3,500 per month and 96.4 percent opined that their income is not sufficient to meet their needs. A majority of the respondents i.e. 92.4 percent belong to Hindu community and a significant number i.e. 42percent belong to Backward caste. A majority of the caregivers of elderly i.e. 87 percent were married and living with their spouses .and are living in joint family.

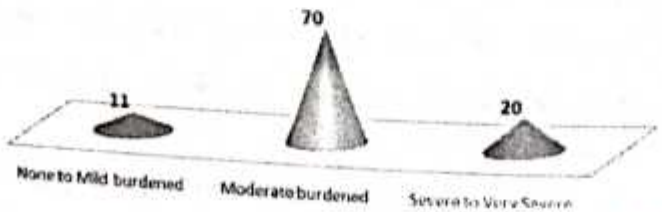
Regarding living arrangements , it is found that a majority of the respondents i.e. 78.4 percent have concrete roof house, 47.2 percent of the caregivers were 'not at all satisfied' with the available living arrangements at home and availability of recreation facilities for 60.8 percent of the respondents is television. Further 38.4 percent of the respondents rarely participated in organized social activities and 40.8 percent have 'moderate' health status and 40.4 percent have 'poor health' when compared to last five years and 33.2 percent of respondents have mild health problems and 35.6 percent have major health problems.

It was clear from results that a majority of the respondents i.e. 64 percent didn't feel fresh and rested in the morning and the same percent of respondents (60 percent) agreed that their life satisfaction has suffered because of the caregiving responsibility and often they are physically exhausted (68percent). Further 79 percent don't want to run away from the situation and 69 percent opined that they have enough time for their own needs and interests. 51 percent were able to talk with others about care and 75 percent were not feeling that the care receiving elderly is using them but 20 percent felt that the elderly are using them . A significant number of respondents i.e. 66 percent of the respondents doesn't switch off away from caring situation and the same percent said that

the care they give is acknowledged by others .47 percent expressed that sometimes they don't really feel like as before and 52 percent agreed that being a caregiver of elderly their financial situation has decreased and 69 percent expressed that they were being forced into this caregiving situation.

The caregiver may be affected sometimes due to stress burdened by caregiving and other responsibilities. The results revealed that 58 percent stated that their health is affected due to caregiving and 42 percent does not feel capable of feeling really joyful. Nearly three fourths of the repondents i.e. 72 percent bother about outsiders are aware of the sick persons situation and a majority of the respondents 72 percent felt that the caring tasks takes a lot of their strengths and the same percent felt that they are not having good relationship with the person they are caring for.Further the results revealed that 53 percent of respondents felt torn between the demands of their environment and 69 percent expressed that they have problems with other family members due to the caregiving responsibility. 57 percent of repondents felt that they should take a break from caring responsibility and the same percent didn't feel sad because of the fate of the person they are caring for and they can (63 percent) take care of other daily obligations to their saisfaction. It is clear from the results that nearly three fourths i.e 70 percent of the respondents are moderately burdened due to caregiving to their elderly relative and that nearly half the respondents i.e. 46 percent expressed that they were dissatisfied with their life followed by 30.8 percent slightly dissatisfied. Further more than four fifths i.e. 81.6 percent of the respondents received moderate social support from family members in their caregiving responsibilities followed by 16 percent received low social support.

Fig 2 Respondents Distribution According to their Burden Level



Levels of Caregiving Burden according to their Health status, satisfaction on living arrangements ,life satisfaction , social support etc

S. No		N	Mean	Std. Deviation	F	P
1	**Health Status**					
	Excellent	11	1.546	0.68755		
	Good	26	1.962	0.59872		
	Moderate	102	1.99	0.4771	7.659	.000*
	Poor	101	2.267	0.52709		
	Very poor	10	2.3	0.48305		
2	**Living Arrangement**					
	Very highly satisfied	3	1.333	0.57735		
	Highly satisfied	3	2.333	0.57735		
	Satisfied	32	1.844	0.67725		
	Moderately satisfied	94	2.075	0.49164		
	Not at all satisfied	118	2.186	0.52214	4.34	.002*
3	**Life Satisfaction**					
	Satisfied	7	1.2857	0.48795		
	Slightly satisfied	18	1.7778	0.54832		
	Neutral	4	1.75	0.5		
	Slightly dissatisfied	77	1.961	0.37842	10.157	.000*
	Dissatisfied	115	2.2957	0.51254		
	Extremely dissatisfied	29	2.069	0.70361		
4	**Social Support**					
	Low social support	40	2.075	0.47434		
	Moderate social support	204	2.1225	0.54337		
	High social support	6	1.1667	0.40825	9.482	.000*

*Significant at 0.01% level, ** Significant at 0.05% level, @ not significant

Health is a very important factor in the well-being of the individual . The health status affect the individual body functioning and also their performance. Regarding the contribution of various socio-demographic variables for caregiver burden and life satisfaction and social support availability for caregivers was tested with the help of ANOVA and t-test . The caregiver burden mean scores distribution according to the respondents health status, life satisfaction and social support is presented in table no.1, It is identified from the study that low mean score for caregiver burden observed (1.5455) in the case of respondents with excellent health .The mean scores for caregiver burden differ significantly with regard to the caregiver health status ($t = 7.659, P < 0.01$) . The caregiver life satisfaction is determined by their caregiver burden

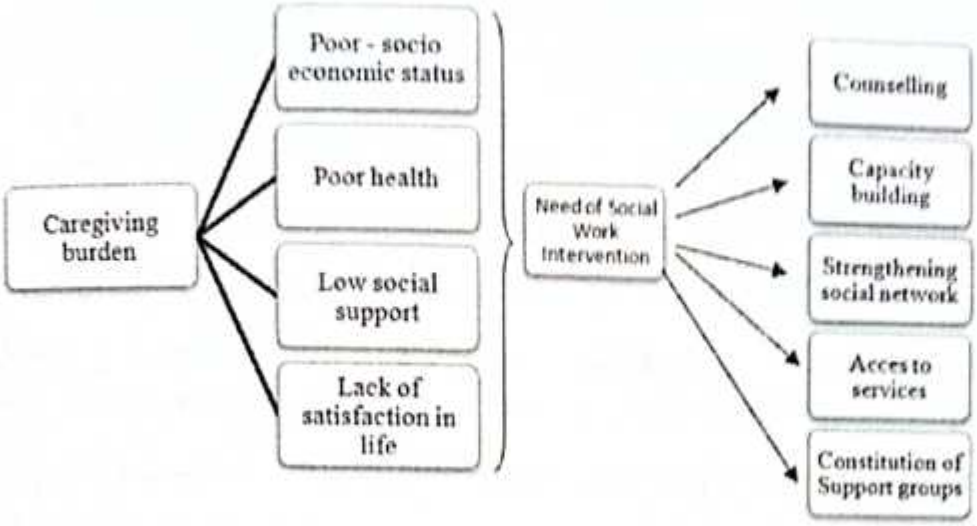
. Further low mean score (1.2857) for caregiver burden was noticed among those who have satisfied in life than who extremely dissatisfied.

The mean scores for caregiver burden differ significantly with regard to the caregiver life satisfaction level ($t = 10.157, P < 0.01$). The results also observed that low mean score for caregiver burden observed (1.1667) in the case of respondents with high social support than respondents with low social support . The mean scores for caregiver burden differ significantly with regard to the caregiver's level of social support received ($t = 9.482, P < 0.01$). The results revealed the caregiver burden mean scores significantly differ with regard to respondents' health status, life satisfaction and social support received at 0.01 percent level.

Social Work Intervention

One of the objectives of intervention is to help the family caregiver of the elderly to cope effectively to overcome from the strain of burden they are facing due to caregiving. Since caregiving is a task subjective in nature the intervention has been customized to local and family context at individual level. The content of the intervention module chiefly consists of individual counselling, guidance regarding elderly issues, management awareness about perception, stretching exercises, how to develop spirituality especially meditation etc, group counselling, family counselling, need of social support, recognition of caregiver needs and arrangement respite care (Relief from caregiving responsibility) and how to enhance satisfaction in life etc.. These were included in the author's self developed manual (Suneetha and Shyam babu ,2016).

Conceptual Framework for Intervention :



The study revealed that poor socio-economic status of the caregivers, poor health, low social support and lack of satisfaction entail to caregiving burden. As the caregivers with poor economic status are forced to attend their earning activities, if any emergencies aroused to elderly care receiver they have to attend the task by foregoing that days labour which is very inconvenient for them. Further the poor health status of caregiver itself led them to perceive the caregiving task as burdensome. Further non-availability of social support in any form hinder their respite care facilities and cause dissatisfaction in life.

The results of the study identified that there is a need of social work intervention to un-burden the caregiver burden and stress. The intervention module comprises of 5 areas. 1.Counselling 2.Capacity Building 3.Social Network 4.Access to services. 5. Constitution of Support groups.(NFCSP,2000). Interventions were provided to identify the causes for caregiver burden , stress and measures how to cope or unburden the stress and enhance satisfaction in life etc. The above mentioned areas had been covered through individual counseling, group counselling, family counselling, awareness programmes and focused group discussions. The duration of intervention was one month and the interventions were provided to caregivers based of the need and issues. In certain issues on one to one basis and for other general issues were covered through group counselling.

The intervention process consists of brief introduction on the concept of caregiving burden & stress and its impact on health. Individual counselling consists of guidance regarding management of elderly caregiving tasks which includes importance of nutritious diet (timing/quality/quantity) importance of relaxation training, need of spirituality and meditation, significance of self health care, how to enhance satisfaction in life etc to arrange quality caregiving for their elderly. The group counselling comprises mainly identifying the need of social support for caregivers in their caregiving tasks, respite care arrangements, sharing caregiving responsibilities by family members and importance of constitution of support groups. They were included in intervention on situation demand. Intervention was given to the caregivers for two consecutive days, then they were asked to practice the same for a period of 4 weeks and then the impact was assessed by using burden scale for family caregivers.

The post intervention assessment discovered that the low mean scores for caregiver burden is 1.8120 and there is a significant difference between pre and post intervention scores of caregiver burden ($t= 7.890$, $P < 0.001$). Hence this could be concluded that the suitable interventions which are tailored according to the needs of caregivers will have an impact to minimize the caregiver burden and stress in a significant manner. The study conclude that the health status of the caregiver, level of satisfaction in life and social support received has significant influence on burden on elderly caregiver. Further there is an significant impact of intervention on reducing the caregivers burden. Similarly individuals who are with low social support exhibited higher level of burden at pre and post intervention levels. Thus the individuals with good social support are found to be better equipped to face caregiver burden and its consequences.

Conclusion

The study provided an opportunity to understand the incidence of caregiver burden or stress among caregivers of elderly and its impact on health and wellbeing of women caregivers in the context of family, which is the need of the hour .Further identified the scope of social work interventions to minimize caregiver burden to enhance health and wellbeing of women caregivers.

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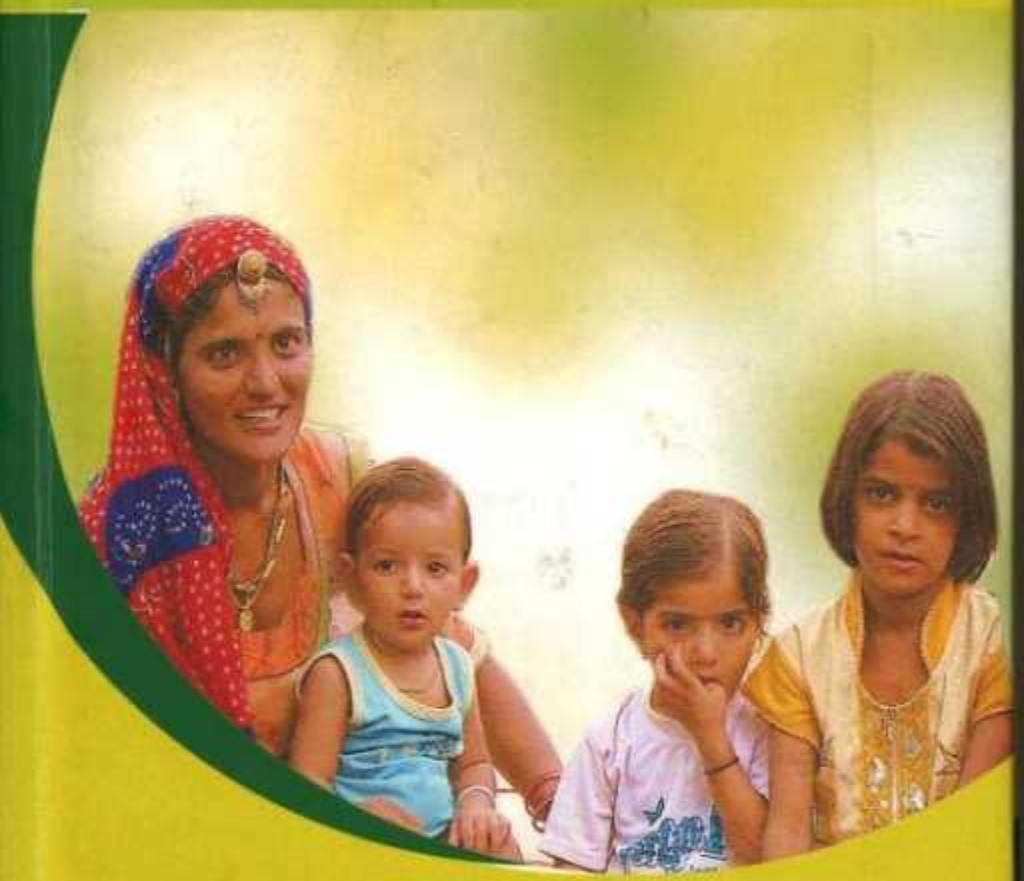
HEALTH & WELLBEING OF WOMEN AND CHILDREN



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Content

4

Health and Behavioural Problems of Children With Austism Spectrum Disorders: Coping Mechanisms of Parents

R. Madhumathi

Abstract

This study took a descriptive approach, collected information from 40 children with Autism Spectrum Disorders(ASD) in the age group of 6 to 18 years, in Nellore and Chittoor districts of Andhra Pradesh. Structured interviews were conducted to elicit information from parents (majority mothers) and assess the children with ASD by using ISSA and intake form. The results describe health and behavioural problems of children with ASD and also discuss the coping mechanism of parents of children with ASD and recommended strategies to parents of children with ASD to cope with the situation. This is an empirical paper extracted from ICSSR (Indian Council of Social Science Research), New Delhi Funded major research project entitled "Efficacy of Social Work Interventions for children with ASD and their families".

Introduction

Autism is a fast-growing neuro developmental disorder. The reports of the centre for Disease Control (CDC), USA, (2018) stated that 1 in 59 children have autism in the USA, (26th April 2018) and in India the prevalence rate ranges from 0.15 to 1.02% in various studies, depending on the screening method used and the areas surveyed (Rudra A.etal, 2017, Raina Sk et.al,2017) The children who suffer from autism have core deficits in communication, social interaction, restricted, repetitive and

stereotyped patterns of behaviours or interests. Autism in a child affects every member of the family in different ways. If the special child is in a joint family or in extended family normal siblings as well as grandparents are also affected.

Along with the core deficits as mentioned above, children with autism have health problems which lead to a lot of stress and burden among caregivers. They have comorbidities that include epilepsy, gastrointestinal distress, sleep disturbances, eating and feeding challenges, attention deficit and hyperactive disorder (ADHD), anxiety, depression, schizophrenia and bipolar disorders.

Review of Literature

Literature traces out that, many individuals who have autism spectrum disorders (ASD) experience elevated levels of health problems. (Filipek, 2005; Volkmar & Wiesner, 2004). Anecdotal and clinical literature has reported the association between physical health and behaviour problems in ASD (e.g., Goldson & Bauman, 2007; Volkmar & Wiesner, 2004) while some observe that the unique features of autism (i.e. impairments in communication and social interaction) can make it difficult for individuals to cope with their physical health problems and associated pain, often leading to behaviour outbursts. (Carr & Owen-DeSchryver, 2007; Groden, Cautela, Prince, & Berryman, 1994).

Research also documents that the prevalence of sleep disturbances ranges from 53% to 78% for children who have ASD compared with 26% to 32% for typically developing children. (Beth A.Malow.2012). The key components of insomnia (sleeplessness) in children with autism are repeated incidences/ episodes of difficulty initiating and /or maintaining sleep, including premature awakenings, leading to insufficient or poor-quality sleep. These episodes result in functional impairment for the child or other family members. In ASD insomnia is multifactorial. It includes not only behavioural issues but also medical, neurologic and psychiatric co-morbidities; it is also an adverse effect of the medication used to treat symptoms of autism and these co-morbidities. The children who have sleep problems may also have problematic daytime behaviours. Many parents are not able to understand the evidence of sleep disorders in children often go undetected and untreated. (MeltzerL.J, 2010; Owens JA, 2001). Many parents also have poor knowledge about sleep development and sleep problems. (Schreck KA, 2011).

Parents consult doctors with concerns regarding aggression, impulsivity, inattention/hyperactivity, or other behavioural issues that may be secondary to a sleep disorder. Medical practitioners often do not ask about sleep concerns or parents do not seek assistance. Raising a child with ASD puts tremendous strain on the parents and caregivers due to increased responsibility and social stigma. The stress of caring for a child with autism can affect the psychological and emotional wellbeing of parents and generate interpersonal conflict (Divan G et.al, 2012).

Factors that contribute to elevated stress in parents of children with autism also include the child's behavioural problems, lack of access to appropriate services, financial constraints and societal attitudes towards disability. (Desai MU et.al, 2012; Divan G et.al, 2012). Disability is sometimes thought of as a manifestation of past karmas of the child and or the family, and there are a lot of stigmas attached. When the financial situation is very poor, the upbringing of even normal children is a problem for many, in such a situation, caring for a child with special needs is all the more problematic.

In light of the above, a part of an ICSSR funded major research project has been extracted to study the health and behavioural problems in a selected sample which helps to visualize the intensity of the problems in children with ASD and suggest the parents how to cope with the situation.

Methodology:

Aim: To study the health and behavioural problems of children with ASD and suggest strategies to parents to cope with the situation.

Objectives:

1. To study the socio-demographic details and clinical picture of children with ASD under study.
2. To Study the details of health and behavioural problems of children with ASD
3. To identify the scope for strategies to parents of Children with ASD to cope with the situation

Study Area: Community settings of Nellore and Chittoor districts.

Research design: A descriptive research design was utilised to obtain data to meet the aims and objectives of the study.

Sample:

By using simple random sampling technique, 40 children with Autism Spectrum Disorders were selected from community settings of Nellore and Chittoor districts of Andhra Pradesh to constitute the sample.

Tools for Data Collection:

To realise the objectives of the study, following tools were used for the study 1. Intake form

2. Indian Scale for Assessment of Children with Autism (ISSA)

Description of Tools:

1. Intake form: This form was used to seek information relating to demographic and clinical details like age, gender, functional level of child with ASD, education level of the child, age at diagnosis, associated problems of the child, birth order, history of illness in the family, prenatal , natal and early childhood history of the child with ASD, current problems of child with ASD, ehavioural problems in child, stressors of the family, likes and dislikes of the child, history of previous interventions, medical problems of child with ASD, school history, Diagnosis, Selecting goals and objectives for Individualized Education Programme (IEP) .The intake form was prepared based on the standard case history taking proformas used in standard National institutions in India for children with disabilities.

2. Indian Scale for Assessment of Children with Autism (ISSA) was used to assess the level of autism in children with autism spectrum disorders. This scale was developed by the National Institute for Mentally Handicapped, 2009.

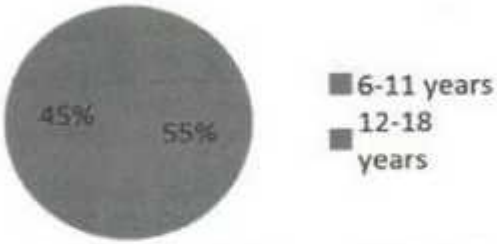
ISSA is a 40 item scale divided into six domains-Social Relationship and Reciprocity (9 questions); Emotional Responsiveness (5 questions), Speech-Language and Communication (9 questions), Behaviour Patterns (7 questions), Sensory aspects (6 questions) and Cognitive Component (4 questions). The scores for the each item of ISSA range from 1-5, depending on the intensity, frequency and duration of a particular behaviour with the following anchors: Score 1 = Rarely (Up to

20%), Score 2 = sometimes (21-40%), Score 3 = Frequently 41-60%), Score 4= Mostly (61-80%), and score 5 = Always (81-100%). Scoring is based on information from parents and observation of the child following guidelines from the Manual of the ISSA. In the Speech-Language and communication domain the child should be rated 5 if he/she never developed speech or communication. Total ISSA scores range from 40-200. The lowest score represents no symptoms or symptoms which were present only rarely, and the maximum score indicates the most severe presentation of Autism. The following categories are recommended: Mild Autism: 70-107. Moderate Autism: 108-153, Severe Autism = 153 and above. (NIMH, 2009, SJ&E).

Results & Discussion:

The present data was taken from the ICSSR major research project with the aim to study the health and behavioural problems of children with ASD in the study. The sample constitutes 40 children with ASD who were randomly selected from the community settings of Nellore and Chittoor districts. Indian Scale for Assessment of Children with Autism (ISSA) was used to find out the degree of autism in children. Structured interviews were conducted with parents (majority mothers) to elicit information about health and associated problems. Children with ASD were observed directly and their behavioural problems were noted down

Age wise distribution of the children with Autism

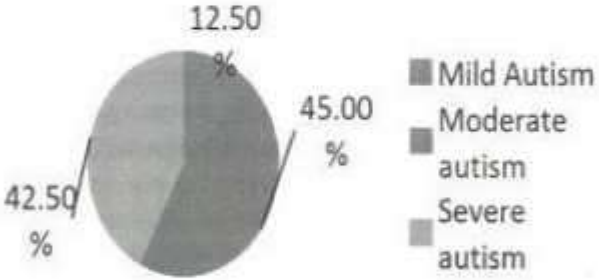


Children with ASD are distributed more (55%) in the age group of 6-11 years than the age group of 12-18 years(45%). It supports ing of prevalence rate in Autism as the estimated prevalence of ASD increased from 2011 to 2018 following changes in developmental disabilities (CDC,2018.

Fig-2 Genderwise distribution of children with ASD

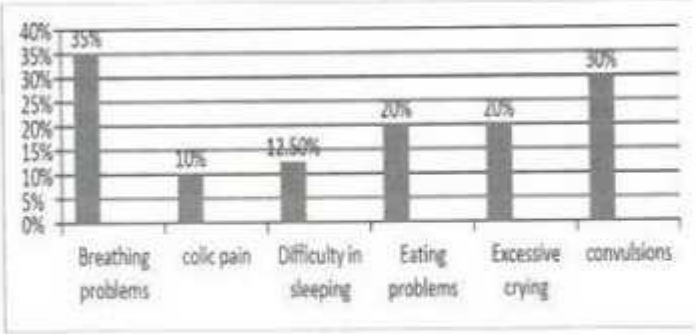
More occurrence of autism is observed in males (80%), than females (20%). Similar findings have been reported in other studies (David et al,2002, Broomely et al,2004, Benjak et al,2009; Tiraya et., al.,2015).

Level of Autism in children with ASD



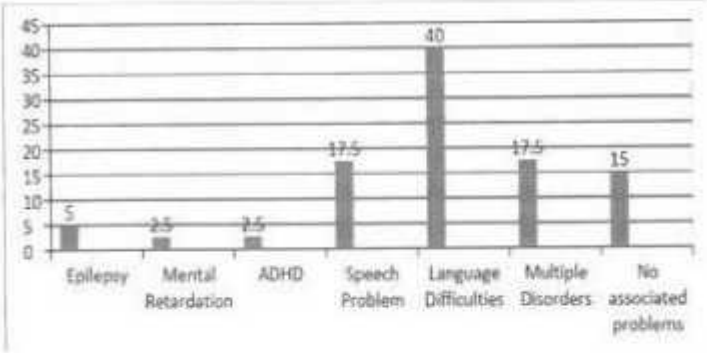
Majority of children with ASD were classified into moderate autism (45%) followed by 42.5 % who belong to the severe level of autism. This finding coincides with other studies Nikmat et al,2008, that out of 52 subjects, 29(55.8%) subjects perceived that their child's symptoms were within the severe level of ASD and in the study of Tiraya et al(2015), that majority of children with ASD were classified into the moderate and high functioning group

Health Problems among children with ASD in early childhood



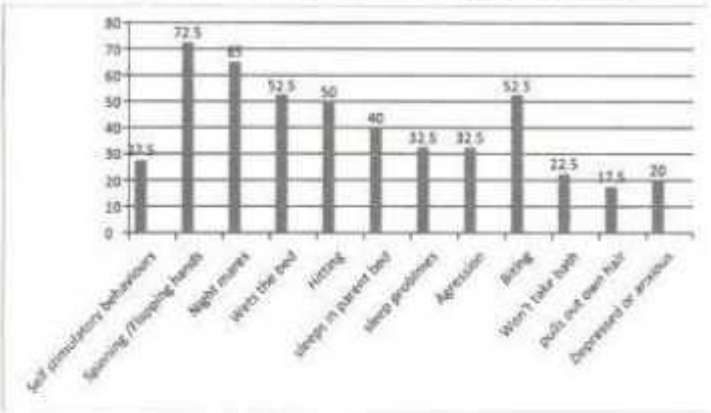
Majority of children with ASD have breathing problems (35%), and convulsions (30%) during early childhood period. Similar results were observed in the studies of Koegel et al, 1992, Matson et.al, 2007.

Associated problems in Children with ASD



In regards to the associated problems, 40% of children have language difficulties i.e., the speech ranges from a single word to 40 words (In this study) and 17.5% is non-verbal, no speech at all and 17.5% of children have multiple disorders. Similar results were observed in the studies of Koegel et al, 1992 (Linguistic Impairments).

Behavioural Problems of children with ASD



As evident from figures 1-6, it can be observed that a large number (55%) of children are in the age group of 6-11 years. The majority of children with ASD are males (80%), and most of them have moderate (45%) and severe autism (42.5%) levels. The health issues prevalent during the early childhood of children with ASD are mainly breathing problems (35%) followed by convulsions (30%). Children also have associated problems viz; language difficulties (40%) i.e., the speech ranges from single word to 40 words (In this study), 17.5% are non-verbal, no speech at all, and 5% of children have epilepsy (under medication), 2.5% children have Attention Deficit Hyperactive Disorder, and the same percentage of children have mental retardation (2.5%), 17.5% of children have multiple disorders.

With respect to behavioural problems, a major number of children with ASD exhibited various types of problem behaviours. Among them, self stimulatory behaviours (spinning /flapping hands) occupies nearly three quarters of problems(72.5%), followed by Nightmares (65%), bed wetting (52.5%), biting (52.5%), hitting(50%), sleeping with parents (40%), sleep problems (32.5%), aggression (32.5%) , rocking behaviour (27.5%), refusing bath(22.5%), Depressed or anxious(20%), pulls own hair(17.5%). etc.Behavioural problems in children with ASD leads, a lot of stress and burden among caregivers of children with ASD. Similar results were observed in the studies of Matsonet.al (2007).

Coping Mechanism in parents of children with ASD:

To cope with these challenges, parents strap up a range of mechanisms including acceptance the child with ASD, resistance to accepting the fact, social withdrawal, reorganizing life and relationships, empowerment, seeking social support, changing expectations and turning to spiritual and religious beliefs (Divan G et.al, 2012). The socio-cultural diversity in India greatly influences the parental coping mechanisms. In the joint family setup, especially grandparents are the first line of support. The joint family system helps parents in caring for the child with special needs and managing other schedules. In nuclear families, or in families with lack of a support system, one parent (usually the mother) often compromises on professional goals to care for the child. Over time, some of these parents may reintegrate into parent support groups (Parent Associations) or resume working outside the home later as the child grows up. Some parents seem to seek comfort from the thought that autism in the child was due to past karma, and so the child was destined to be born with it. Many parents turn towards religious beliefs and lead life spiritually. Parents, who are unable to cope with the stress of dealing with a child with ASD, often have marital and family conflicts, and are prone to anxiety and depression. Parents who manage to cope up adequately devise strategies for creating a secure loving environment for their child and families despite the various adverse situations, financial constraints and limited services.

Recommended strategies to parents of Children with ASD to cope with the situation:

1. The need for therapeutic intervention (ADL training, speech therapy, occupational therapy, Sensory integration therapy etc.,) should be determined; especially Individualized Educational Programme (IEP) to each child according to his age, needs, level of functioning, symptoms, and behavioural problems requires to be tailored accordingly .

2. Therapeutic interventions should begin with parent education in the use of behavioural approaches as a first-line approach. Psycho-educational Interventions also need to be taken up.

3. Appropriate medical intervention for the health problems of children with ASD should be provided

4. There should be follow-up after any intervention to evaluate the effectiveness and tolerance of the therapy. Follow-up may be conducted by telephone or in person. Timely follow-up allows for fine-tuning of treatment interventions, support of parents and provision of referrals if needed.

5. In addition to short-term follow-up (eg: 1-2 months), at long-term follow-up (1 year visit) the steps from the beginning of the IEP should be repeated.

6. Awareness needs to be created about various conditions of children with ASD, associated problems, behavioural problems, health problems importance of interventions, community support etc., which reduce stigma among parents and leads to welcoming societies.

7. There is need to formulate parent support groups, which help parents to overcome the situation with reciprocal exchange of feelings, emotions, and thoughts to train their children with ASD and also to raise their voice in developing training facilities, formulating policies and programmes with the support of NGO's, and government bodies and tap the available resources to train their children.

8. Strong policy initiatives may help persons with ASD attain their maximum potential and dignity as well as reduce the gap between them and the normal population. Right to Persons with Disabilities Act-2016 has included ASD under the category of disabilities. Parents must be aware of the latest acts and policies relating to their Special children and should know the procedure for certification. So that, the children with ASD can avail special benefits like inclusive education, scholarships, free travel in state transport buses, railway concessions, loans for self-employment and assistance for higher education. (RPwD Act, 2016).

Conclusions

Education programme should be established for family members who provide care for parents with ASD children, to support those who face burden by presenting knowledge about ASD and treatments, teaching, problem solving, communication

skills and providing coping skills. Press and media can play a major role in terms of providing caregivers with adequate information to deal with children with ASD to cope with the situation.

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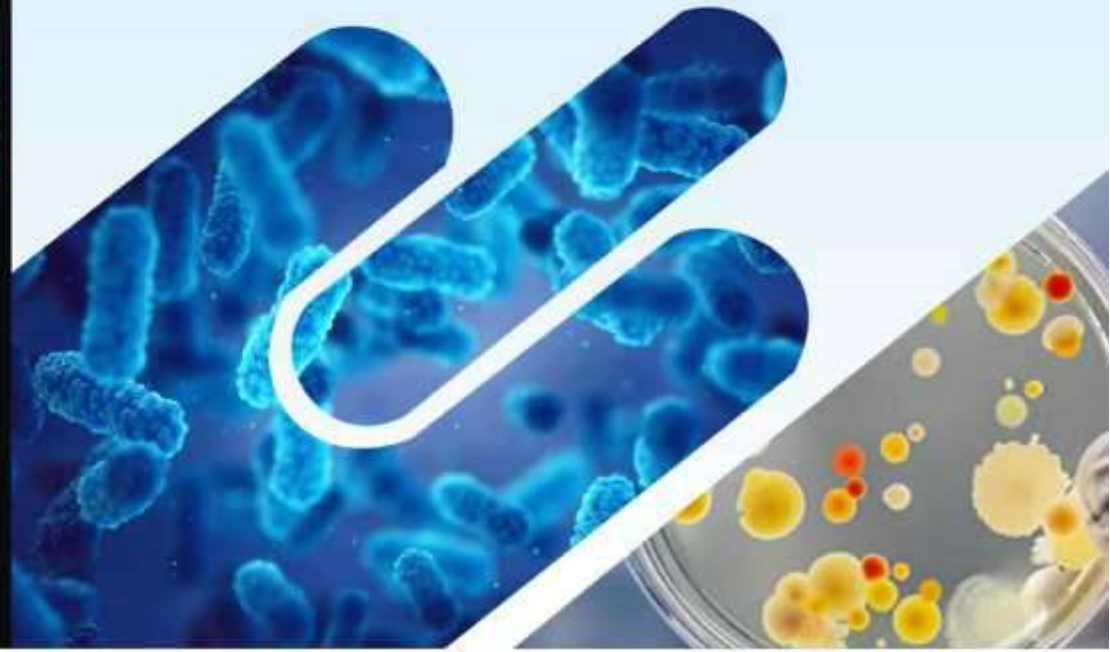
INTRODUCTION OF MICROBIOLOGY

INTRODUCTION OF MICROBIOLOGY

Dr. Vijya Chalamcherla



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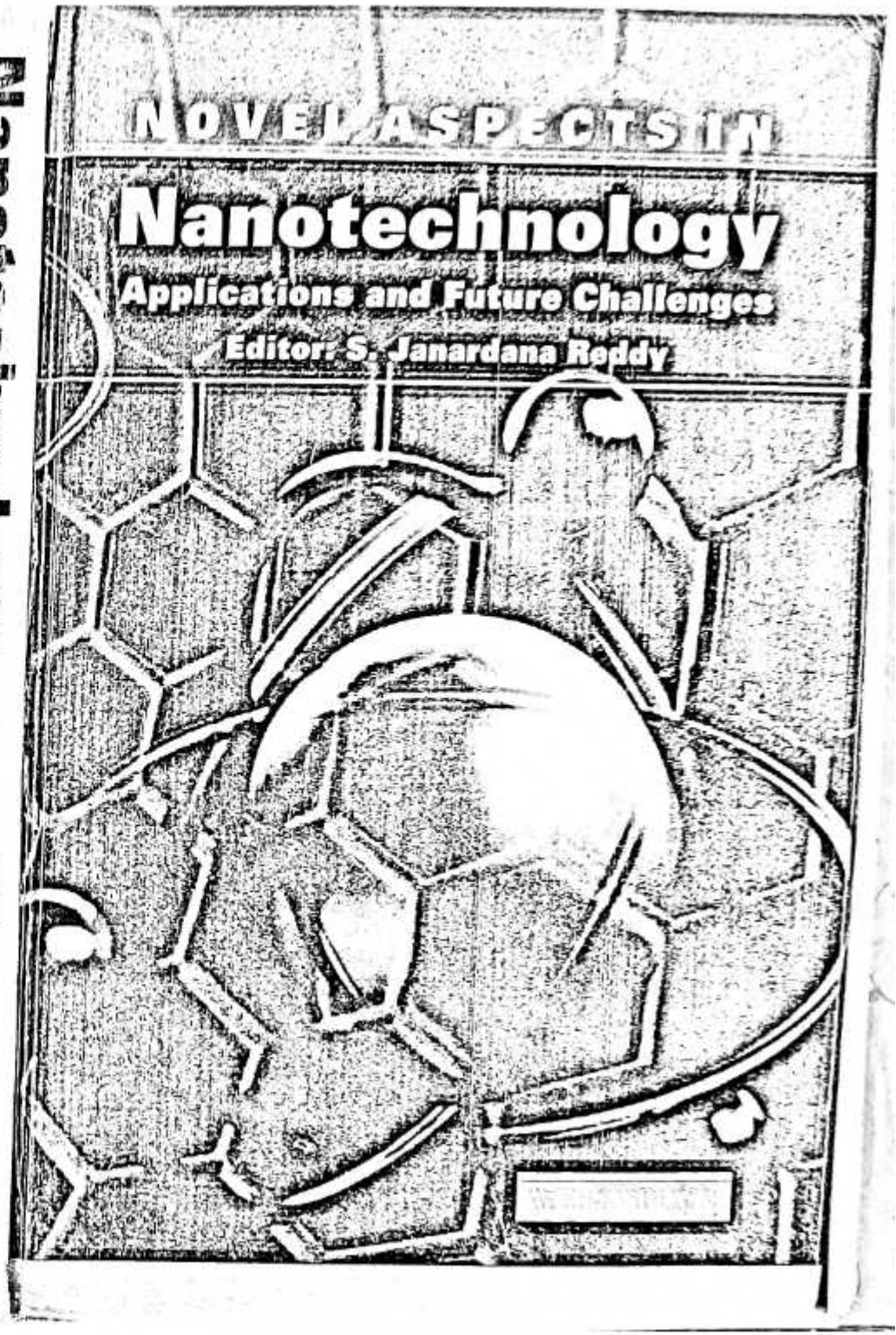

3

Chitosan Nano Particles: An Overview of Preparation and Applications

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ABSTRACT

Chitosan is a natural biopolymer derived primarily from crustacean waste and received plenty of interest because of its biodegradability, biocompatibility, bioactivity, and polycationicity. Chitosan nanoparticles gained more attention in biomedical engineering, waste water treatment and development of new therapeutic drug release systems with improved bioavailability, increased specificity and sensitivity, low toxicity, better stability and simple preparation methods. Different methods of synthesis of chitosan nanoparticles and their potential applications were discussed in this review.

Key Words: Bioresources, Chitin, Chitosan, Nanoparticle synthesis, Shrimp waste utilization.

INTRODUCTION

India's largest cultured shrimp production is in the state of Andhra Pradesh, followed by West Bengal, Tamilnadu, Puducherry, Gujarat, and Odisha. Andhra Pradesh accounts for close to 65 percent of the total shrimp production in India. Shrimp waste is considered to be one of the major bio-pollutants which are generally discarded in coastal regions through local markets and shrimp processing industries. Generally, 50 percent to 70 percent of sea food raw material goes as waste (Grenha, 2012). The shell fish processing industry is generating about 8.5 million tonnes of waste every year, with shrimp processing accounting for more than one lakh tonnes of industrial waste. Nowadays, it is being eyed as a newer Bio-resource and few of the bio-products commercially marketed are oil, bioactive peptides, collagen, chitosan and gelatine (Ngamviriyavong *et al.*, 2010).

Waste from shrimp and prawn is generally used as poultry feed and for a few other applications. By taking up production of Chitin and Chitosan, the major problem of containing pollution due to shrimp waste could also be solved. Chitosan is a natural polysaccharide and is considered the largest biomaterial after cellulose in terms of utilization and distribution (Mincea *et al.*, 2012). Chitosan is produced from shell waste sequentially by deproteinisation, demineralisation, decolourization and deacetylation processes (Vinusha *et al.*, 2017). Chitosan has attracted attention because of its biological properties and effective uses in the medical field, food industries, and agricultural sector.

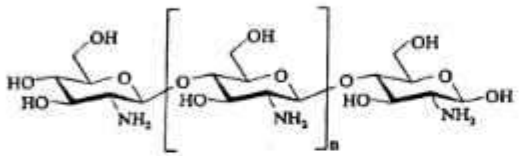

FIG. 1: Molecular structure of Chitosan (Wang *et al.*, 2011)

Chitosan has been used as a nanoparticle material owing to its versatile biodegradability, biocompatibility, and natural origin (Muhammed Rafeeq *et al.*, 2010) Chitosan is advantageous for use in nanoparticle systems due to its ability to control the release of active agents, nontoxic nature, ability to avoid use of organic solvents, readily available free amine groups for cross linking, and good electropotential (Niwa *et al.*, 1993). The development of micro- and nanoparticles of chitosan and its derivatives paved a path for applying these biomolecules in a more effective and economical manner, and expanding their applications in more diverse fields than those expected.

Similar to all the other types of nanoparticles developed from different materials, chitosan nanoparticles also possess their own physical, chemical, and morphological characteristics that finally determine their applications. The methods of preparation of chitosan nanoparticles are significantly responsible for their bioactivities and behavioural characteristics in different systems and applications.

The main methods of preparation of chitosan nanoparticles include emulsion cross-linking, emulsion-droplet coalescence, coacervation/ precipitation, ionotropic gelation, reverse micelles, template polymerization, and molecular self-assembly. All these methods have their own advantages as well as drawbacks, in relation to the properties of the nanoparticles. However, careful preparation of chitosan nanoparticles could provide a higher affinity for negatively charged biological membranes and site-specific targeting *in vivo*, enabling their application as encapsulating materials of drugs, enzymes, and DNA, used in controlled release systems and as coatings of wound dressings to accelerate healing (Wang *et al.*, 2011).

Chitosan nanoparticles-based films are used in the food industry to control microorganisms in food and to enhance shelf life while strengthening the mechanical properties and stability of the food-packing materials. Although the chitosan nanoparticles appear to be safe in some of their applications, knowledge on the risks imposed in the food and pharmaceutical applications needs to be strengthened further (Wang *et al.*, 2008).

PREPARATION METHODS OF CHITOSAN NANO PARTICLES

Ionotropic Gelation Process

Chitosan nanoparticles can be prepared by ionotropic gelation of chitosan with Tripolyphosphate (TPP). This method involves the formation of chitosan nanoparticles by the electrostatic interaction between the amine group of chitosan and negatively charged group of polyanions. Chitosan is dissolved in aqueous acidic solution to obtain the cation of chitosan. This solution is then added drop wise under constant stirring to polyanionic TPP solution. Chitosan undergoes ionic gelation and precipitates due to the complexion between oppositely charged species to form spherical particles (Shu *et al*, 2001).

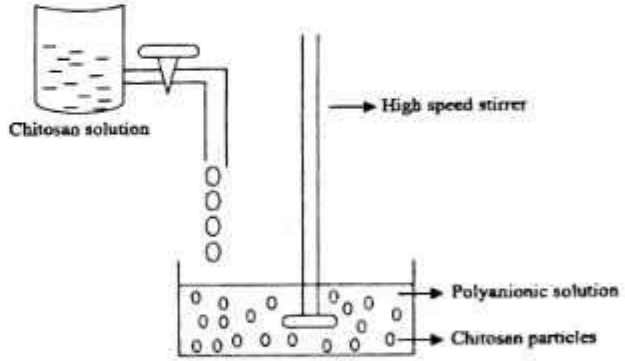

FIG. 2: Chitosan nanoparticles preparation by ionic gelation method (Wang *et al*, 2016)

Microemulsion Method

This method involves the formation of chitosan nano particles in the aqueous core of reverse micellar droplets and subsequently cross-linked through glutaraldehyde. In this method, N-hexane is dissolved with a surfactant and then chitosan dissolved in acetic solution followed by the addition of glutaraldehyde drop wise to surfactant/ hexane mixture under constant stirring at room temperature. In the presence of surfactant, Chitosan nanoparticles were

formed. The system is allowed to stir overnight to complete the crosslinking process. The solvent (acetic acid) is then removed by evaporation under low pressure (Sailaja *et al.*, 2011).

Emulsification Solvent Diffusion Method

This method is based on the partial miscibility of an organic solvent with water. This Oil-in-water (o/w) emulsion is obtained upon addition of an organic phase (Methylene chloride) into chitosan solution containing a stabilising agent (Poloxamer and Lecithin) under constant stirring followed by high pressure homogenisation. Methylene chloride is subsequently removed under reduced pressure at room temperature.

The emulsion is then diluted with a large amount of water to overcome organic solvent miscibility in water. Polymer precipitation occurs as a result of the diffusion of organic solvent into water, leading to the formation of nanoparticles. This method is suitable for encapsulating hydrophobic drugs like cyclosporin-hydrophobic drug and high encapsulation efficiencies (El-Shaboury *et al.*, 2002).

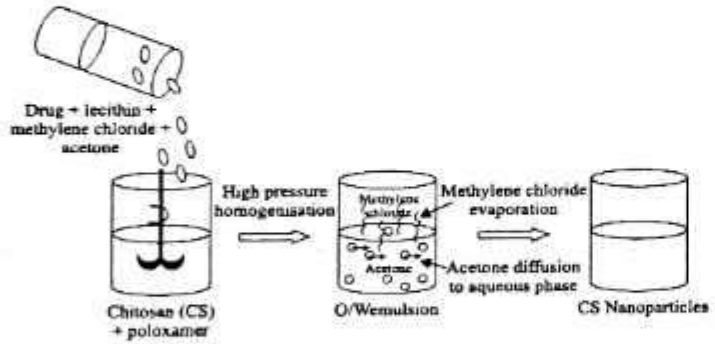

FIG. 3: Chitosan nanoparticles preparation by Emulsion solvent diffusion method (Mendoza *et al.*, 2016)

Emulsion Droplet Coalescence Method

The novel emulsion-droplet coalescence method is a derivation of emulsification and cross linking method and was developed by Tokumitsu *et al.*, (1999). Chitosan is dissolved in the aqueous solution of gadolinium along with drug is produced in liquid paraffin oil and then, another stable emulsion containing chitosan aqueous solution of NaOH is produced in the same manner. The mixture is stirred with a high speed homogeniser; droplets

of each emulsion would collide at random and coalesce, thereby precipitating chitosan droplets to give small size particles. Afterwards, a further set of washing and centrifugation steps is applied using toluene, ethanol and water. This method exploits the fact that, when two emulsions with equal outer phase are mixed together, droplets of each collide randomly and coalesce, resulting in final droplets with uniform content. The nanoparticles are formed within the emulsion-droplets (Ichikawa *et al.*, 2006).

Reverse Micellisation

Chitosan nanoparticles from reverse micelles was first reported by Mitra *et al.*, (2001). Reverse micelles are thermodynamically stable liquid mixtures of water, oil and surfactant (Pileni, 2006). In this method of reverse micellisation, a W/O microemulsion is prepared using a lipophilic surfactant that is dissolved in an appropriate organic solvent, like *n*-hexane. To this, aqueous solutions of chitosan and drug are added with constant vortexing to avoid any turbidity. The aqueous phase is regulated in such a way as to keep the entire mixture in an optically transparent microemulsion phase. Additional amount of water may be added to obtain nanoparticles of larger size. To this transparent solution, a cross-linking agent is added with constant stirring, and cross-linking is achieved by stirring overnight for the production of chitosan nanoparticles (Agnihotri *et al.*, 2004).

Desolvation

The method of desolvation is one of the precipitation method also frequently referred to as simple coacervation or phase separation in which flocculant (commonly sodium sulfate) is added to a water solution of chitosan and solubility of chitosan is decreased by the combination of water and sodium sulfate, leading to the precipitation of nanoparticles due to hydrogen bonding between molecules (Kissel *et al.*, 2006). The use of desolvating agents to produce chitosan particles was reported for the first time for the preparation of micron-sized carriers (Berthold *et al.*, 1996).

APPLICATIONS OF CHITOSAN NANOPARTICLES

Antimicrobial Agent

Chitosan nanoparticles have been reported to inhibit both Gram-negative and Gram-positive bacteria as well as fungi and yeasts. Antimicrobial activity of chitosan nanoparticles may be due to interference in the metabolism by binding to the surface of the bacteria or by blocking of transcription of DNA and RNA by binding to the DNA after penetration into cell. Chitosan nanoparticles showed antimicrobial action against pathogenic organisms and significantly inhibited *E. faecalis*, *E. aerogen* and *S. aureus*. They also inhibited *E. coli* which

nano particle has drawn particular attention as effective biosorbent due to its low cost compared to activated carbon and its high contents of amino and hydroxyl functional groups showing high adsorption potential for various aquatic pollutants. This natural biomass represents an attractive alternative to other biomaterials because of its physico-chemical characteristics, chemical stability, high reactivity, excellent chelation behaviour with heavy metals and high selectivity toward pollutants (Barba *et al.*, 2001).

Other Applications

Chitosan nanoparticles can be used as a potential adjuvant for vaccines such as influenza, hepatitis B and piglet paratyphoid vaccine. Chitosan nanoparticles can be used for preservative purposes while packaging foods and in dentistry to eliminate carries. It can also be used as an additive in antimicrobial textiles for producing clothes for healthcare and other professionals. The nanoparticles have also been proven to show skin regenerative properties when materials were tested on skin cell fibroblasts and keratinocytes in the laboratory, paving the way to anti-aging skin care products (Wang *et al.*, 2011).

CONCLUSIONS

Chitosan nanoparticles have attracted increasing attention because of their good biocompatibility, degradability, and nontoxicity. Different methods have been developed to produce chitosan nanoparticles. Chitosan based nanoparticles have been shown to offer striking advantages in many areas like drug delivery, waste water treatment and also in food technology.

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Biorecycling of Plastics: Recent advances

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ABSTRACT

Variety of plastics that were being used by mankind became one of the major snags today. Plastics have already entered into our food chain in the form of micro and nano plastics. Researchers are exploring the methods for biodegradation of plastics in all possible directions. This paper reports the recent approaches that are being tried such as biodegradation by microbes, using plastic eating worms such as Indian meal moth and wax moth which found to contain bacteria that degrades Poly Ethylene Terephthalate (PET) plastic material by producing PETase enzyme. Bringing mutations to PETase enzyme enhanced the ability of its plastic degradation. Genetic engineering of cutinase a similar kind of plastic eating enzyme, produced glycosylated cutinase which degrades PET more efficiently than its wild type. However, enzyme technology is costly method and scaling up to large scale takes much more time, but it is more promising towards the rapid biodegradation of plastics. Companies like Carbios are taking such technologies to much extent and affirm that their technology convert around 200 kg of PET waste into momomers in 24 hours. Plastic biorecycling technologies are mere hope towards the effective utilization of the plastic wastes that have many challenges.

Key words: *Plastics, bio-degradable, non-biodegradable, biorecycling, microorganisms, worms, enzymes.*

Introduction:

Plastics are polymers consisting of a variety of synthesized organic and inorganic compounds. They are made considerably from petro-chemical resources that were extracted from coal, oil and natural gas. Many polymer materials such as polyethylene (PE), polycaprolactone (PCL), polyurethane (PUR), polyhydroxybutyrate (PHB), polyhydroxyalkanoate (PHA), polyvinyl chloride (PVC), polyethylene terephthalate (PET), polybutylene succinate (PBS), polylactic acid or polylactide (PLA), polypropylene (PP), and polystyrene (PS) are commonly used for various purposes (Comanita et al., 2016; Hahladakis et al., 2018). Most of the fossil-based plastics have been accumulated in the environment in large quantities due to improper waste management and uncontrolled littering and, thus, posed a serious threat to our planet. The long-term accumulation of plastic polymers in the soil led to a decrease in soil fertility in addition to many other ecological and health problems (Barnes et al., 2018). As per global estimation, about 57 million tons of plastic waste is generated annually. In addition, the amount of plastic polymers in the oceans has exceeded six times compared to plankton, due to which aquatic birds and fishes are in danger (Sardon and Dove, 2018). Plastics and their additives are also causing serious problems related to human health. There are two groups of plastics on the basis of biodegradability, i.e., non-biodegradable plastics and biodegradable plastics (Brigham, 2018).

Non-biodegradable plastics:

Non-biodegradable plastics include both fossil-based and bio-based polymers. Most of the conventionally used non-biodegradable plastics are fossil-based synthetic polymers, which are obtained from the derivatives of hydrocarbon and petroleum (petrochemicals) (Bastioli et al., 2018). Their molecular weight is high due to the extensive repetition of small monomer units. These plastics are highly stable and do not readily enter into the degradation cycles of the biosphere. Most of the commodity polymers employed nowadays are either non-biodegradable or their degradation rate is too slow to be disintegrated completely. Non-biodegradable plastics include many of the routinely used plastics like PVC, PP, PS, PET, PUR, and PE (Lambert and Wagner, 2017).

Biodegradable plastics:

Both bio-based and fossil-based polymers can be included in biodegradable plastics depending upon the degree of biodegradability and microbial assimilation (Comanita et al., 2016). Biodegradation of plastics involves enzymatic and non-enzymatic hydrolysis. During degradation, microorganisms secrete exoenzymes that disintegrate polymer complexes into smaller molecules like dimers and monomers (Mostafa et al., 2018).

Microbes and their mechanisms for plastic biodegradation:

Microbes (mostly bacteria and fungi) often produce extracellular enzymes which helps in degrading various types of bio and fossil-based plastics. Biodegradation reactions involve both aerobic and anaerobic mechanisms. Bacteria and fungi act to degrade these polymers into CO_2 and H_2O through various metabolic and enzymatic mechanisms. The nature and catalytic activity of enzymes vary depending upon the microbial species and even within the strains. Due to this specificity, different enzymes are known to degrade various polymer types. *Bacillus spp. and Brevibacillus spp.* produce proteases involved in degradation of various polymers (Yang et al., 2014, 2015 ; Yoshida et al., 2016; Bhuyan et al, 2018). Fungi that biologically degrade the lignin frequently contain laccases to catalyze aromatic and non-aromatic compounds through an oxidation process (Devi et al., 2016). These microbial

enzymes also influence the biodegradation rate of polymers in an efficient and environmentally sustainable manner (Wilkes et al., 2017).

Both biodegradable and non-biodegradable polymers such as PHA, PLA, PET, PHB, PVC, PCL, and PBS are reported to be attached to various microbes and their enzymes. The primary mechanism involved in plastic biodegradation is sticking of microbes with polymers followed by surface colonization and degrades through hydrolysis by producing enzymes. Enzyme-based hydrolysis of plastics involves two steps: at first, the enzymes attaches to the polymer substrate followed by hydrolytic division (Paco et al., 2018). The degradation products of polymers are oligomers, dimers, and monomers. Under aerobic conditions, oxygen is used as an electron acceptor by the bacteria followed by the synthesis of tiny organic compounds, and thus, CO_2 and water are produced as end products (Leitgeb et al., 2017). Under anaerobic conditions, polymers are crushed down by microorganisms. A study demonstrated that the microbial combination composed of *Pantoea spp. and Enterobacter spp.* has a potential to degrade the Low Density Poly Ethylene (LDPE) (Sharma et al, 2018).

Tan et al., (2015) reported a strain of *P. putida NBUS12*, as an efficient styrene-degrading bacterium. Another bacterial strain, *Achromobacter xylosoxidans*, was found to affect the structure of high-density polyethylene (Kowalczyk et al. 2016). Similarly, a novel thermophilic bacterium, *Anoxybacillus rupiensis* Ir3 (JQ912241), was isolated from hydrocarbon-polluted soil in Iraq and demonstrated good capacity to utilize aromatic compounds as carbon sources followed by their degradation (Ahmed et al., 2018). So, extensive research efforts are made around the globe to develop processes for degradation of fossil-based and bio-based polymers in order to find out their new environment-friendly applications and waste control plans.

Plastic eating worms:

Yang et al.,(2014) reported that Indian meal moth larvae and bacteria within those larvae degrade polyethylene. Isotope-labeling studies were carried out to determine that a gut bacterium from mealworms consumes polystyrene. The organisms convert about half the polystyrene carbon they ingest to CO_2 rather than to styrene monomers. (Weinschenk et al., 2017). Bombelli et al., (2017) reported that wax worm (*Galleria mellonella*) caterpillars could break down polyethylene. It is estimated that approximately a hundred of these worms can eat 92 mg of polythene in just half a day. They prepared a paste from mashed-up caterpillars to a sample of polyethylene film, which generated new peaks during a scan with an infrared spectrophotometer. They also reported the breakdown product as ethylene glycol, estimated to be generated by a caterpillar enzyme or an enzyme in its gut microbes. Later it was found that two types of bacteria are living inside the worm, *Enterobacter asburiae* and *Bacillus* sp. YP1 (Liu et al., 2018).

Plastic eating enzymes

Tanasupawa et al (2016), found a bacterium *Ideonella sakaiensis* that uses two enzymes to degrade and assimilate PET: PETase converts PET to mono (2-hydroxyethyl) terephthalic acid (MHET), and MHETase breaks down MHET into terephthalic acid and ethylene glycol (Chaudhary et al., 2018). Another study reported a mutated PETase is more powerful and showed 20% more efficiency than the wild type (Austin, 2018). Shirke et al., (2018) introduced a genetically engineered yeast to produce a bacterial cutinase. The produced enzyme is 'glycosylated cutinase' and it has degraded more PET than the nonglycosylated protein.

CARBIOS technology

CARBIOS, pioneer company announced that they optimized the process of biorecycling of PET plastic wastes. They reported that, the hydrolysis of PET plastics into their monomers at conversion rate of 97% in merely 16 hours of time by using their proprietary enzyme technology for plastic biorecycling. Their recycling process is based on

optimised cyanobacterial enzymes that permit for 100% decomposition of PET to its monomers. Their technology uses enzymes to break down PET into its main components ie., PTA (terephthalic acid) and MEG (monoethylene glycol) and can be reused in all applications in which the original material was used (Carbios, 2019).

Conclusion

Biorecycling of the environmentally accumulated plastics could be the most efficient way to tackle the problem of plastic pollution. Tailored enzymes and genetically improved microorganisms can be utilized effectively towards the biorecycling of the plastic wastes. Moreover, mere breaking down of PET or other plastics to monomers may not solve the problem of plastic waste accumulation into the environment. In order to uncover several other eco-friendly applications, further optimization of the PET degradation method under industrial amenities is basically required.

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Effect of Chitosan-TPP nanoparticles in bio - remediation of effluents from Aqua industry

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Abstract

The aquaculture industry has become an axis for criticism from environmental groups because of an apparent negative effect on the environment from the release of waste water. Enormous pressure is exerted from environmental control institutions worldwide for wastewater treatment in aquaculture before water is released into the environment. Thus, the aquaculture industry has recognized that, in addition to the requirement of a continuous supply of clean water, they also must develop technology for the treatment of wastewater which will minimize ecological and social problems and provide greater long-term economic safety for operation of the industry and sustainability. In this context, present investigation was carried out to analyze the effect of chitosan and chitosan TPP nanoparticles in clarifying aqua effluents flocculation process in different experimental conditions. Various physico-chemical parameters of shrimp farm and hatchery effluents such as alkalinity, total hardness, total suspended solids, total ammonia and BOD, were evaluated before and after treatments in laboratory scale. Chitosan and chitosan TPP nanoparticles exhibited efficient removal of various pollutants originating from the shrimp culture pond. It played various roles in the coagulation, adsorption, bacteriostasis, and even combination processes to achieve the recycling of aquaculture wastewater.

Keywords: Aqua effluents, Bioremediation, Chitosan , Nanaotechnology, Sustainable aquaculture

1. INTRODUCTION

Aquaculture not only requires the supply of clean water, but also, the release of clean water into the environment which is important for the protection of the aquatic environment and reuse of water sources. Volumes of literature exist on the prospective environmental effects on marine and freshwater systems from aquaculture industrial operations based on the rapid growth of the industry in the world (Boyd et al., 2001). Hyper-nutrification and eutrophication with resultant algal blooms, oxygen depletion and deprivation of benthic habitat in the surrounding area of open cage operations with no waste collection system and limited flushing are the

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principle waste water issues (Boyd, 2001). The appearance of ammonia related to Persistent Organic Pollutants (POPs) in waste water is likely to continue into the future if the problem is not addressed with urgency. Wastewater is extremely hazardous both to health and to the environment; if not well-treated, can seriously alter the total ecosystem of the planet.

Thus, the aquaculture industry has recognized the the need to develop technology for the treatment of wastewater which will minimize ecological and social problems and provide greater long-term economic safety for operation of the industry (Doupe et al., 1999). In this direction Chitosan composites have already been tested in waste water treatments for adsorption of dyes and heavy metals (Ravi Kumar, 2000). Apparently, no major studies have been done to clarify the aqua effluents by using chitosan and chitosan TPP nano particles in coagulation and flocculation process. Therefore, this study was carried out to analyze the effect of chitosan and chitosan TPP nanoparticles in clarifying aqua effluents flocculation process in different experimental conditions.

2. MATERIALS AND METHODS

2.1 Collection of aquaculture pond effluent samples

Aquaculture pond effluent samples were collected randomly from different locations in Nellore district in duplicate (Table1)

Table.1 Sampling sites with sampling code in detail

S.No	Effluent Source	Sample ID	Sampling site
1	Pond effluents	A1	Kothakoduru
2		A2	Muthukuru
3		A3	Mypadu
4		A4	Kota
5		A5	Gangapatnam

2.2 Determination of physico-chemical parameters of the waste water

The samples were collected and analyzed for different physic-chemical parameters like, Ammonia, Total Dissolved Solids (TDS), Biochemical Oxygen Demand (BOD), Alkalinity and Total Hardness. The techniques and methods for collection, preservation and analysis were followed as per APHA, (2002).

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2.3 Treatment of effluent samples with chitosan and chitosan TPP nano particles

Different concentrations of chitosan and chitosan nanoparticles (5,10,15,20 mg/ml) were prepared and added to effluent samples (100ml) (Maram et al., 2010). The beakers were agitated followed by immediate initiation of flash mixing by 300 rpm for 10 minutes. The mixing rate was then reduced to 30 rpm and held at this level for 20 minute. Finally, a quiescent settling period of 30 minute was allowed. At the end of the settling period, a sample of the supernatant was analysed for the different physico-chemical parameters. All tests were performed at an ambient temperature in the range of 26-30°C.

2.4 Statistical analysis

Analysis of variance (ANOVA) was used to measure the treatment effect using statistical software package GraphPad Prism V5. Differences were considered to be significant when the p-values are ≤ 0.05.

3. RESULTS AND DISCUSSION

Evaluation of various physico-chemical parameters of shrimp farm effluents such as alkalinity, total hardness, total suspended solids, total ammonia and BOD, was done before and after treatments using Chitosan and Chitosan TPP nanoparticles in laboratory scale.

3.1 Effect of chitosan and chitosan TPP nano particle on Alkalinity (mg/l) of aqua pond effluents :

The amount of alkalinity of the effluent samples collected in the study area ranged from 1550 to 1600 mg/L after treatment with chitosan and chitosan TPP nanoparticles and is reduced to 239 mg/l in aqua effluents (Fig 3.1). According to APHA (2002) the desirable limit for total Alkalinity is 350 mg/L as $CaCO_3$ and compared to the desirable limit, the values of the samples were found to lie within the limit after treatment with chitosan and chitosan TPP nanoparticles which was satisfactory.

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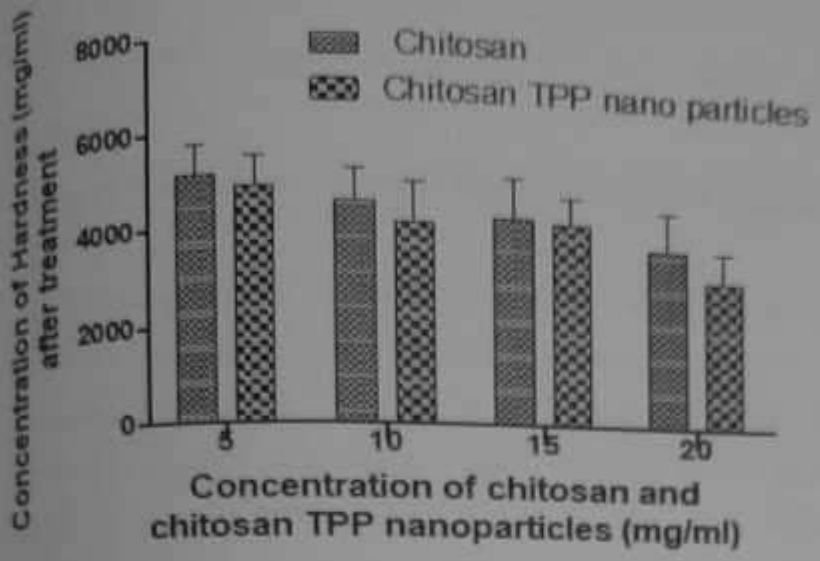

Figure 3.2 Effect of chitosan and chitosan TPP nanoparticles on Total Hardness (mg/L) in aqua pond effluents

3.3 Changes in Total Suspended Solids (mg/L) of aqua pond effluents with chitosan and chitosan TPP nano particle application

After treatment with chitosan and chitosan TPP nanoparticles, all the analysed samples possess a lower value of TSS (3.1) than the standard value of 100 mg/L (APHA 1998). A similar observation was reported by Singh et al., (2010) for waste water of Raniganj industrial area in India.

Table 3.1 TSS (mg/L) of aqua pond effluents before and after treatment with different concentrations of chitosan and chitosan TPP nanoparticles

Sample ID	TSS (mg/L) before treatment	TSS (mg/L) after treatment							
		Concentration of chitosan(mg/ml)				Concentration of chitosan TPP nano particles(mg/ml)			
		5	10	15	20	5	10	15	20
A1	180	167	120	89	65	147	105	72	53
A2	175	159	122	88	62	142	103	69	57

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A3	182	160	123	92	64	145	106	68	63
A4	185	164	119	90	67	140	105	70	56
A5	190	162	125	88	65	138	102	72	60

3.4 Changes in BOD (mg/l) of aqua pond effluents with chitosan and chitosan TPP nano particle application

BOD is the most reliable parameter for judging the extent of pollution in the water (Mishra and Saksena, 1991). Waste waters from aqua culture operations can be very high in BOD (Lawrence et al., 2005). In present study it varied from 160 to 220 mg/L, whereas in hatchery effluents it ranges from 195 to 215mg/L. After treatment with chitosan and chitosan TPP nanoparticles, BOD reduced to 21 mg/mL (Table3.4). Chitosan TPP nanoparticles showed more efficiency compared to Chitosan. According to APHA, (2002) the desirable limit for BOD is 30 mg/L and the obtained values were satisfactory.

Table 3.4: BOD (mg/L) of aqua pond effluents before and after treatment with different concentrations of chitosan and chitosan TPP nanoparticles

Sample ID	Concentrations of BOD(mg) before treatment	Concentrations of BOD(mg) after treatment							
		Concentration of chitosan (mg/ml)				Concentration of chitosan TPP nano particles (mg/ml)			
		5	10	15	20	5	10	15	20
A1	160	128	117	72	40	125	85	54	23
A2	169	132	112	70	42	120	88	52	21
A3	180	159	121	82	45	135	91	55	25
A4	200	155	125	80	48	139	98	63	27
A5	220	162	120	76	55	140	90	62	30

3.5 Changes in concentration of ammonia (ppm) in aqua pond effluents with chitosan and chitosan TPP nano particle application

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The amount of ammonia present in the effluents of selected aqua pond effluents before and after treatment with Chitosan and Chitosan TPP nanoparticles was estimated and presented in Fig 3.3. Before treatment the ammonia concentration ranged from 1.8 to 3.0 ppm in aqua pond effluents which were too high in all the samples analyzed. After treatment with Chitosan and Chitosan TPP nanoparticles ammonia concentration was reduced up to 0.2 ppm and fall in APHA limits. The results proved that both Chitosan and Chitosan TPP nanoparticles showed efficient removal of ammonia from aqua pond effluents and Chitosan TPP nanoparticles showed even high efficiency than Chitosan alone.

Organic matter in the wastewater often consumes large quantities of oxygen, further inhibits nitrification, and conceals pathogens (Chen, 1994). Hence, their removal is essential regardless of whether they are degradable or non degradable organic compounds. N-containing compounds are other worrisome substances if the effluent of aquaculture waste water is to be recycled to cultivate aquatic organisms. Among the compounds, NH_3 is usually regarded as the most toxic to aquatic organisms (Handy, 1993) and thus concentration of less than 2.0 ppm is recommended during the cultivation process (Zweig ,1999).

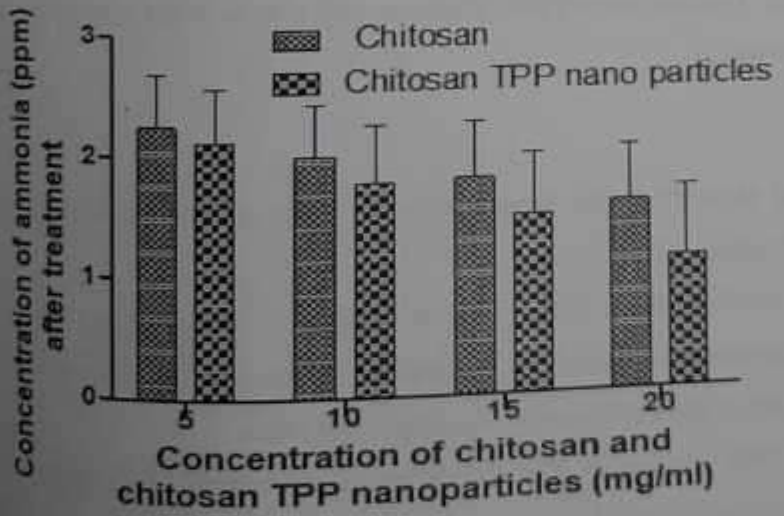

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Figure 3.5 Effect of Chitosan and chitosan TPP nanoparticles dosage on Ammonia (ppm) in aqua pond effluents

Two-way ANOVA was employed to find the significant differences in all the parameters analysed from aqua pond effluents over a concentration of 5, 10, 15 and 20 between Chitosan and Chitosan TPP nanoparticles. Bonferroni Post-T replicates by row were performed to compare the significance of means. The considered significant level is at $P<0.05$ in all investigated paramets by using the statistical software package GraphPad Prism V5.

4. CONCLUSIONS

Chitosan and Chitosan TPP nanoparticles exhibited efficient removal of various pollutants when it was applied in aquaculture waste waters originating from the effluent of shrimp culture pond. They played various roles in the coagulation, adsorption, bacteriostasis, and even combination processes to achieve the recycling of aquaculture wastewater. The physio-chemical characterization of the treated effluent is below the standard limit prescribed by Andhra Pradesh Pollution Control Board.

From the results of the present investigations chitosan and chitosan TPP nanoparticles showed good coagulating properties, and has many advantages compared to chemical coagulants and does not affect the pH, alkalinity or conductivity of the water. Further multifunctional environmentally friendly biopolymer Chitosan will play a larger role in the recycling of aquaculture wastewater.

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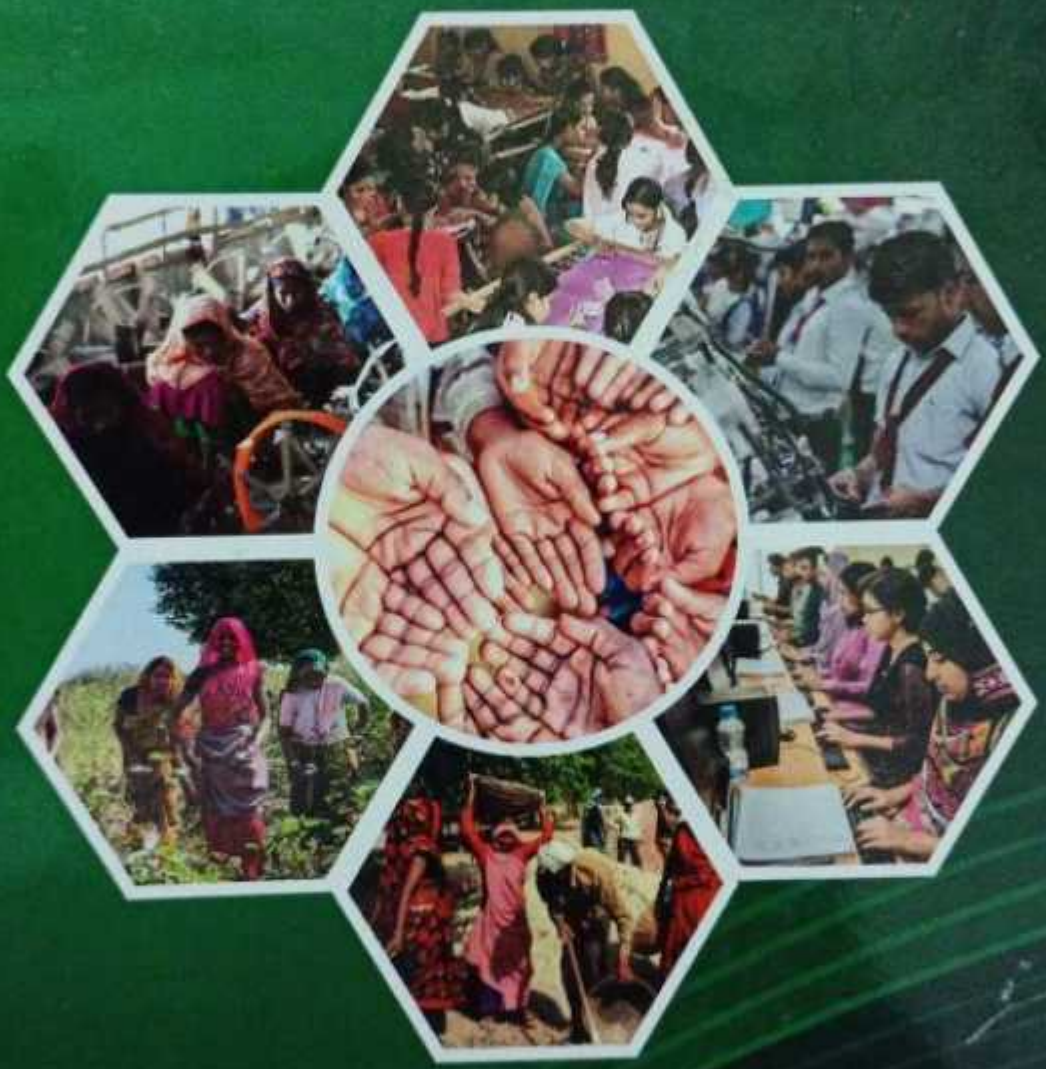
EMPLOYMENT GENERATION AND POVERTY ALLEVIATION



Editor
Prof.Chilumuri Srinivasa Rao

Poverty alleviation through overall economic and social development by ensuring equitable access in resources and skills, as well as by widening the opportunities for employment among the deprived sections of the society, is the major objective of the rural development programmes in India.

The employment generation programmes for poverty alleviation in India is most important to improve the standard of living, to reduce rural-urban migration, to create durable assets, to improve self-sufficiency and to enhance livelihood skills.

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He has published books on Demonetisation Impact and Prospects, Personality Development and Soft Skills, E-Commerce and E-Banking, Urban Bus Passenger Transportation, Performance Appraisal of APSRTC and books related to social aspect Madigala Charitra Samskruthi, Dandora Ambedkar Abheestam and How long to Wait for Social Justice.

He has published 19 Research articles in refereed International Journals /Conference Proceedings and 11 Articles in daily newspapers /magazines. He participated in 7 International, 20 National Seminars/Conferences and presented research papers. He has organised three National Seminars/Conferences.

He completed a Major Research Project sponsored by UGC New Delhi for the period of 2009-2011 and is presently working on a Minor Research Project. His areas of specialisation are Banking, Transportation, Financial Management, Personality Development and Soft Skills, E-Commerce and Economics. He has 25 years of teaching and research experience. Seven Research Scholars are working for Ph.D. under his guidance.

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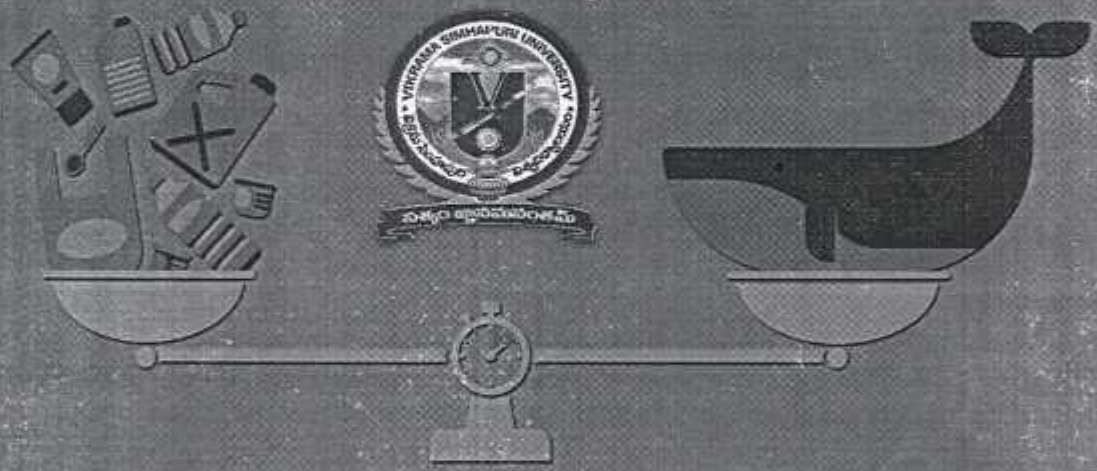

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Reuse

If you cannot avoid using plastic bags or other products for some reason then it is suggested to at least reuse them as many times as you can before disposing them off. We are in a habit of throwing the plastic bags and containers we get with packed food almost immediately after use even though these can be used a couple of times before disposing off. We should reuse these instead. This can be our contribution towards reducing the plastic waste and bringing down plastic pollution.

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IMPACT OF PLASTIC USE ON THE SOCIETY

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INTRODUCTION

India has been chosen as the global host of the **World Environment Day** that will focus on galvanising greater action against single-use plastic pollution on June 5th of this year by the United Nations Environment Programme (UNEP). After demonstrating global leadership on climate change, India will lead the charge on 'Beat plastic pollution', the theme for World Environment 2018.

Ever since independence of India, Plastic industry has made a significant progress for the production of Polystyrene. At present there are about 30,000 plastic processing units which produce a variety of plastic products and 150 Plastic Processing Machinery manufacturing companies in the country. Most of these industries operates as Small & Medium Enterprises, providing direct employment to 40 lakh people with an investment in fixed assets is about Rs.1,000 crores. The exports of plastic products account at 1 percent of total exports of the country. The per capita consumption of plastic products is increasing and it is 8 percent of GDP.

According to UN estimates, every year the world uses 500 billion plastic bags while half of the plastic used is of single use or in disposable items such as grocery bags, cutlery and straws. Each year, at least eight million tonnes of plastic end up in the oceans, the

equivalent of a full garbage truck every minute. In India, 70 percent of total plastic consumption is discarded as waste. Around 5.6 million tonnes per annum (TPA) of plastic waste is generated in country, which is about 15,342 tonnes per day (TPD).

Consequences of plastic use:

1. Plastic products will use a very long time to degrade.
2. Plastic bags can "block" stomach on birds, sea animals and other animals and they will die slowly and painfully.
3. Plastic bags, cups, other polymers will float on water or sink to the bottom causing water pollution.
4. Plastic products are 'silent fires' and easily flammable causing home fires.
5. Some plastic products have additives and toxic which causes environmental problems and harmful to human beings.

Pros and cons of plastic

The plastic production should be banned because -- ban on the plastic help the ecology of the ocean which provide sustenance to millions of people; burning of plastic damages the fertility of soils when it releases harmful gases; ban prevents pollution of air, soils and water; and Plastic chock severe line and cause floods etc.Production of Plastic opposed by the Traders and manufacturers; it is inconvenient to the people; less weight to transport, distribute, use and durable; easy to produce and less cost of production when compare to others; it is recyclable; and indirectly it saves natural resources like forests, trees and cotton.

Role of Indian Government

The Indian government has committed in organizing and promoting the World Environment Day celebrations through a series of engaging activities and events generating strong public interest and participation. Indian government also initiate plastic clean-up drives in public areas, national reserves and forests to simultaneous beach clean-up activities. Government data shows that 17 states and union territories have imposed complete ban on manufacture, sale and use of plastic carry bags, but there is "no proposal to impose ban on the use of polythene bags completely throughout the country".

Government set up around 100 cities across the country to develop as smart cities making them citizen friendly and sustainable. Civic bodies have to redraw long term vision in solid waste management and rework their strategies as per changing lifestyles.

Conclusion

Plastic products are carry bags, water bottles & cups, polythene covers, packing material, etc., used widely everywhere in our life and without plastic, modern civilization would indeed look very diverse. Use of Plastic products causing human health problems like irritation in the eye, vision failure, breathing difficulties, respiratory problems, liver dysfunction, cancers, skin diseases, lungs problems, headache, dizziness, birth effect, reproductive, cardiovascular, and gastrointestinal issues.Plastics occur serious environment pollution such as soil pollution, water pollution, and air pollution. Application of proper rules and regulations for the production and use of plastics can reduce toxic effects of plastics on human health and environment.

The government, law implementing agencies and health authorities of the country should take more steps and pay attention to sustainable production, use, and disposal of plastics. Every company must take their responsibility in terms of the reduction of unnecessary plastic consumption. A full of information about all existing chemicals in consumer products must be required so that people become aware to use of those products.

The governments and industry working together can support the development and promotion of sustainable alternatives in order to phase out the single-use plastics

progressively. Governments can encourage Micro, Small & Medium Enterprises by offering financial and non-financial incentives for the creation and production of eco-friendly alternatives for plastics.

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POLYLACTIC ACID AS A POTENTIAL SOURCE OF BIOPLASTICS AND ITS SYNTHESIS

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ABSTRACT

Polylactic acid (PLA) is biodegradable, highly versatile, aliphatic polyester which can be produced from 100 % renewable resources, like corn and beets. PLA proved to be a promising alternative to petroleum-based polymers as its properties are on a par with currently widely used polymers like PET, PVC etc. PLA can be used as a decomposable packaging material, either cast, injection-molded, or spun. Cups and bags have been made from this material. In the form of a film, it shrinks upon heating, allowing it to be used in shrink tunnels. It is useful for producing loose-fill packaging, compost bags, food packaging, and disposable tableware. In the form of fibers and nonwoven fabrics, PLA also has many potential uses, for example as upholstery, disposable garments, awnings, feminine hygiene products, and diapers. It is known for its bio-compatibility and biodegradability .In this experiment the method of synthesis of PLA was explained in detail . Being able to degrade into innocuous lactic acid, PLA is used as medical implants in the form of anchors, screws, plates, pins, rods, and as a mesh(Rafael et al 2010).Depending on the exact type used, it breaks down inside the body within 6 months to 2 years. This gradual degradation is desirable for a support structure, because it gradually transfers the load to the body (e.g. the bone) as that area heals.

Introduction:

Plastics are a wide family of materials derived from organic products, like cellulose, coal, natural gas, salt and crude oil. Plastic materials are considered as extremely resource efficient not only during their production phase, but also during their use phase, meaning that

IMPACT OF GLOBALIZATION ON MSME'S

PROSPECTS, CHALLENGES AND POLICY IMPLICATIONS ON GROWTH

IMPACT OF GLOBALIZATION ON MSME'S— PROSPECTS, CHALLENGES AND POLICY IMPLICATIONS ON GROWTH

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PRATHAM PUBLICATIONS

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Policies and Its Implications of MSMEs on Indian Economic Growth

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Introduction

Till independence, only cottage industries, village industries, rural industries or agro-based industries were considered to be small industries. The National Planning Committee, set up in 1938 under the Chairmanship of Pandit Jawaharlal Nehru, constituted a panel to study this problem. With the dawn of the planned era in the country, the Government has been following a policy of promotion as well as protection of the small industries sector, but the protection was gradually reduced as and when promotional activities began to produce results.

It's true to say that Small, Medium and Micro Enterprises (SMEs) have always been the backbone of the Indian economy from the starting and secondary sector in later. Micro, Small and Medium Enterprises (MSME) sector has emerged as a highly vibrant and dynamic sector of the Indian economy. MSMEs not only play crucial role in providing large employment opportunities at comparatively lower capital cost than large industries but also help in industrialization of rural & backward areas, thereby, reducing regional imbalances, assuring more equitable distribution of national income and wealth. MSMEs are complementary to large industries as ancillary units and this sector contributes enormously to the socio-economic development of the country.

The concept of Small Scale Industrial Undertakings/Ancillary Industrial Undertakings was popular till the date of coming into force of the Micro, Small and Medium Enterprise Development Act, 2006 (**MSMED Act effective from 2nd October 2006**). On 9 May 2007, the erstwhile Ministry of Small Scale Industries and the Ministry of

scale up. The Ministry of MSME runs various schemes aimed at financial assistance, technology assistance and up-gradation, infrastructure development, skill development and training, enhancing competitiveness and market assistance for the development of MSMEs.

Features of MSMED Act of 2006 (The Act)

- The Act has been introduced in order to facilitate the promotion and development and enhancing the competitiveness of micro, small and medium size enterprises.
- The Act defines new concept namely 'Enterprise' instead of 'Industrial Undertaking' and also defines the 'Micro, Small & Medium' Enterprise
- The Act provides clear cut provisions for registration of the enterprises under the Act
- The Act provides for measures for recovery of delayed payments
- The illustrative list of activities of manufacturing and / or activities relating to service providing which can be registered has been issued under the Act through various circulars.
- The Act makes a provision to notify exit route to the enterprises registered under the Act

Policy Initiatives towards MSMEs

The emerging economic scenario in the changed liberalized and competitive economic environment, due to initiation of economic reforms, necessitated structural and fundamental changes in the policy framework for the development of Micro, Small and Medium Enterprises (MSMEs), caused a shift in focus from protection to promotion. In the post-reform period, the government took a number of initiatives including partial de-reservation, change in investment limits, facilities for foreign participation, establishment of growth centres, export promotion, marketing assistance, incentives for quality improvements, etc. A number of statutory and non-statutory bodies work under the aegis of the Ministry of MSME.

Initiatives from within the sector to lobby favourable policies and increasing credit flow are credible. The sector has also realised the need for technological and modernisation initiatives. However, with economic liberalisation and changes in the trade policy, MSMEs have now started facing increased competition from foreign companies. As global competitiveness becomes intensive, MSMEs are transitioning to a new

Recent Policy Initiatives:

1. Ministry of MSME has notified a simple one-page registration form 'Udyog Aadhaar Memorandum', which is an official Website for Online Registration for MSMEs.
2. The Ministry of MSME, notified a 'Framework for Revival and Rehabilitation of MSME' to provide a simpler and faster mechanism to address the stress in the accounts and to facilitate the promotion and development.
3. Ministry of MSME notified 'MSME Development(Furnishing of information Rules, 2016)' for facilitating the promotion and development and enhancing the competitiveness of MSMEs.
4. All welfare and subsidy schemes have been brought under 'Direct Benefit Transfer (DBT)' with the aim to reform Government delivery system by reengineering the existing process in welfare and subsidy schemes.
5. Ministry of MSME had made elaborate arrangements for smooth roll out of GST.
6. The Ministry notified the 'Public Procurement Policy for Micro and Small Enterprises which mandates 20% of annual procurement from MSEs including 4% from enterprises owned by SC/ST entrepreneurs.
7. The Ministry launched the 'Public Procurement Portal' titled **"MSME-SAMBANDH"** on 08.12.2017for effective implementation and monitoring of the policy.
8. Ministry of MSME is implementing Technology Centre Systems Programme (TCSP) to establish 15 new Technology Centres (TCs) and upgrade existing TCs across the country.
9. The Ministry of MSME approved a scheme for setting up of National Schedule Caste and Schedule Tribes (SC/ST) Hub to provide professional support to SC/ST entrepreneurs.

Performance of MSMEs

MSMEs play a significant role in the economic growth of the country owing to their contribution to production, exports and employment. The sector contributes 8 per cent to the country's GDP, 45 per cent to the manufactured output and 40 per cent to the country's exports. It provides employment to 60 million people through 28.5 million enterprises. Presently, there are around 29.81million MSMEs in India. The size of the registered MSME sector is estimated to be 15,63,974. Of the total working MSMEs, the proportions of 94.94

Policy Implications

The special policy support provided to small firms has its economic rationale embedded in the facts that – 1) these firms are more labour intensive; 2) these firms use the scarce resources in a more productive manner; and 3) small firms face higher factor costs which results in a sub-optimal size of the MSME sector in the economy. The policy support to the MSME sector in India can be classified into —1) promotional versus protective; 2) one-shot versus continuous; and 3) discretionary versus non-discretionary. It is worth mentioning here that the earlier reservation policy for the SSI sector has been criticised for distorting the size structure of firms within Indian manufacturing and deterring the growth of small firms by providing perverse incentive to these firms to remain perpetually small. As a result, such protectionist policies were gradually replaced by promotional measures after liberalisation. In recent years, the policy for MSMEs in India has largely been promotional and discretionary in nature. However, successful implementation of any discretionary policy depends crucially on careful identification of target firms, which is very difficult due to the information asymmetry present between various government agencies and the beneficiaries. Possibly, because of this, MSMEs, which are located in major urban centres, found to have significantly better productivity as compared with MSMEs located in remote areas concerted effort of various government agencies responsible for designing such policies.

Challenges Faced by the MSMEs

The majority of MSMEs are resistant to grow, thus, resulting in the reduced productivity. Others grasp firmly to the basic concept of staying small and comfortable and tend to avoid any regulatory and taxation related problems.

Those who are under the concept of growth have a different set of problems which they need to deal with, especially with 'financing'. A survey was conducted with over 15,000 listed and unlisted companies from different sectors such as power, agriculture, textile and IT, the common solution to everything showed that small and medium enterprises exposed to bank credit were immensely falling due to the high-interest rate.

Whilst the majority of big companies that buy from MSMEs get the benefit of an interest-free repayment timeline for almost 120 days, whereas MSMEs get only 60 days prior to pay back their interest-loaded loans. Because of this, the majority of SMEs have now chosen to do a reduction in their exposure to bank credit.

In addition to all this, individual sectors have the tendency to face their own challenges. Due to the disturbance in West Asian countries and fewer demands in European countries, exports industries have seen

they try hard to maintain the high quality whilst dealing with the low profit.

Conclusion

Starting a business today is a bit simpler as compared to the last decade. There are numerous accelerators, investors, incubators, and mentors available to handhold a business just to ensure they see the future of every business. Today MSMEs in India are move up the global value chain and the importance of market access can hardly be overstated. Access to markets can be achieved by building and coordinating the efforts of various institutions at state, regional and cluster levels and also by involving MSME Associations in the country to undertake various marketing functions. As MSME face competition from global giants due to which they ask for protection, technological and financial support from the State. The ever-growing mobile/internet penetration has opened up both the rural and international markets. So India should integrate into the global supply chain, bid for outsourcing businesses, and increase their own productivity. To gain the competitive edge, enhance efficiency and manage communication, this sector is set to focus on ICT enablement. In this context, the 'Udyog*Aadhaar*' (Official Website for Online Registration) initiative is a welcome move.

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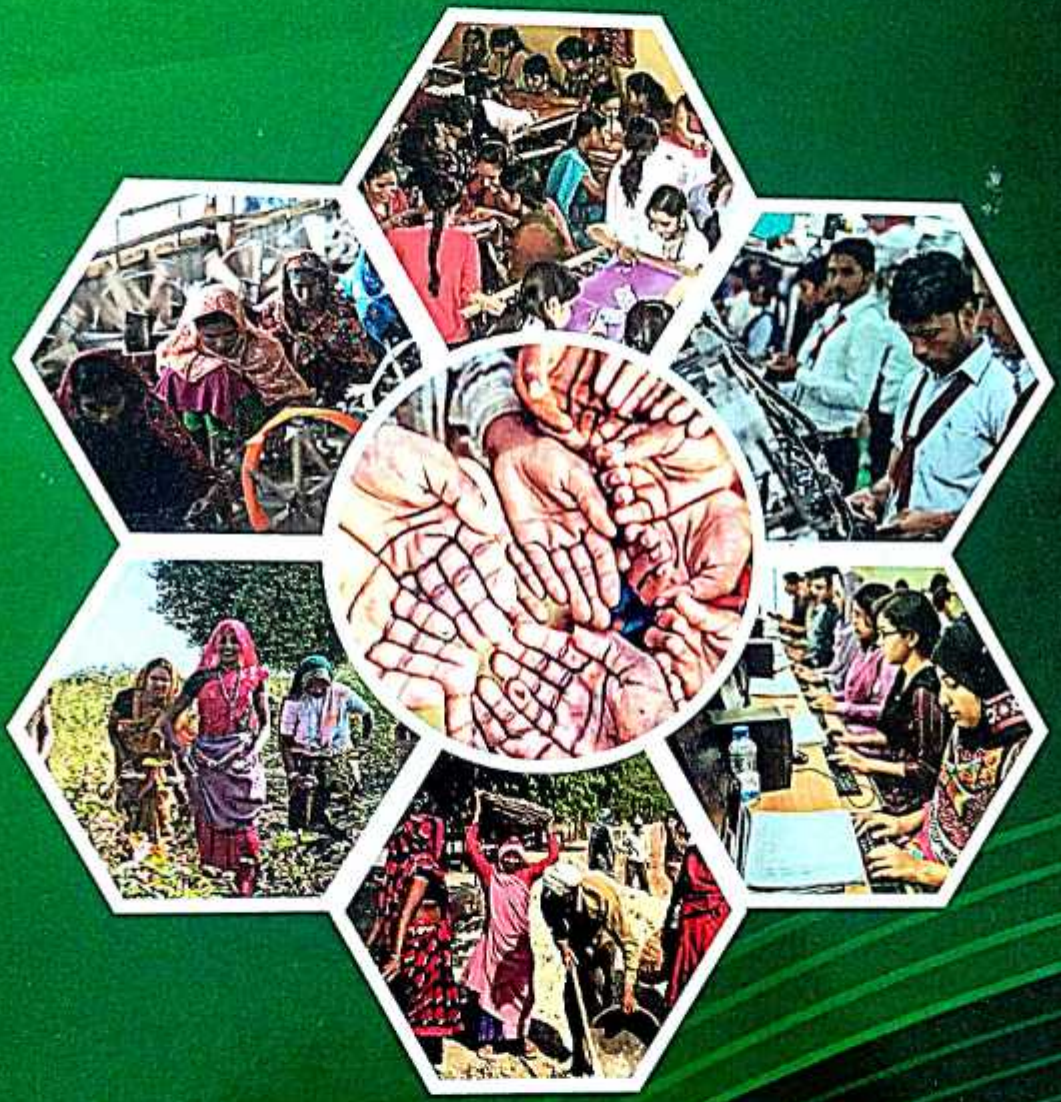
EMPLOYMENT GENERATION AND POVERTY ALLEVIATION



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EMPLOYMENT GENERATION AND POVERTY ALLEVIATION

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Hyderabad

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Employment Generation and Poverty Alleviation

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Poverty alleviation through overall economic and social development by ensuring equitable access in resources and skills, as well as by widening the opportunities for employment among the deprived sections of the society, is the major objective of the rural development programmes in India.

The employment generation programmes for poverty alleviation in India is most important to improve the standard of living, to reduce rural-urban migration, to create durable assets, to improve self-sufficiency and to enhance livelihood skills.

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He has published 19 Research articles in refereed International Journals /Conference Proceedings and 11 Articles in daily newspapers /magazines. He participated in 7 International, 20 National Seminars/Conferences and presented research papers. He has organised three National Seminars/Conferences.

He completed a Major Research Project sponsored by UGC New Delhi for the period of 2009-2011 and is presently working on a Minor Research Project. His areas of specialisation are Banking, Transportation, Financial Management, Personality Development and Soft Skills, E-Commerce and Economics. He has 25 years of teaching and research experience. Seven Research Scholars are working for Ph.D. under his guidance.

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PLASTIC POLLUTION – A REASON FOR EXTINCTION OF SEA TURTLES

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ABSTRACT

Finding a carcass of sea turtle on the shores of Nellore district was a rare sight one or two decades ago. But have now become a common phenomenon nearly every fortnight (on an average), across various beaches in Nellore. This article is hence focussed on the various threats for the sea turtles and the possible preventive measures. Plastic pollution being the biggest threat, it is elaborated here.

Introduction

There were believed to be many species of sea turtles. But only seven types of sea turtles are recorded to be extant in the waters of Indian ocean (Olive Ridley Project, 2017) - Green sea turtles, Loggerhead turtles, Kemp's Ridley sea turtles, Olive Ridley sea turtles, Hawksbill sea turtle, Flatback sea turtles, Leatherback sea turtles. Except Leatherback sea turtle, rest of them belong to the class Chelonidae and only Leatherback turtles belong to the class Dermochelyidae. Chelonidae are sea turtles with scutes. Dermochelyidae are sea turtles which are scuteless. Feeding habit: Green sea turtles feed on sea grasses and algae; Loggerhead sea turtles, Kemp's Ridley sea turtles and Olive Ridley sea turtles feed on crabs, shrimps and molluscs; Hawksbill sea turtle and Flatback sea turtles feed on algae to crustaceans and Leatherback sea turtles depend on jellyfish and soft bodied animals for food.

Threats

Though each sea turtle lays hundreds of eggs on a suitable nesting ground, out of which 0.2% turn up into hatchlings and only 1% of them reach the age of sexual maturity (Gaia Vince, 2017, Lal Mohan, 1983). Many reasons are observed and listed, which are – artificial lighting, magnetic interference, oil spills, tourism, boats, fishing, poaching, global warming, natural mortality, disease and majorly : plastic pollution.

Plastic pollution

Plastic debris affects at least 86% of the sea turtle species in India (Teriin factsheet, 2018). Plastic pollution refers to many types of pollution which ends up in leaving plastic in the oceans which include dumping wastes into oceans and ghost fishing. Plastic dumped into oceans, due to buoyancy floats and shines reflecting the natural light. Sea turtles mistake these plastic covers to be their favourite prey – jelly fish and ingest them immediately. This eventually, clogs the digestive system causing the individuals death. Plastic caps, tubes and broken pieces of plastic dumps damage the gut lining leading to mortality. Microplastics are observed to accumulate in the tissues of the organisms and prove fatal. Ghost nets act as traps for the hatchlings and entice them to die. Accidental

fishing is also a reason for the low survival of hatchlings, commonly caught on longline, trawl and gillnets.

Preventive and conservation measures

As all the plastic in the ocean cannot be practically taken out to their sources, creating awareness among the individuals from schooling to higher education regarding the methods of using and discarding might help in the betterment of the situation. Bioplastic is found to be optimistic only under specific conditions which are not found in oceans resulting in the very slow pace of degradation in the open oceans. Fishermen must be educated about the alarming issue and strict legislation might be hoped for. Honorarium of Rs 500 per person is given by The Forest Department of Maharashtra for finding one turtle nest (Sugukumar, 2017). West Bengal Forest Department displayed sign boards to prohibit the sale and use of turtle products (Rajagopalan, 1983). Coringa Wildlife Sanctuary near Kakinada decided to extend its boundaries and prohibit the use of trawlers and fishing nets during the mating and nesting season of Olive Ridleys (Rao,1985). Accidental catch of Olive Ridley turtles were released back into sea (Behera, 2013).Such measures should be progressively implemented in all the parts of India, throughout the coast.

Conclusion

According to The Federation of Indian Chambers of Commerce and Industry (FICCI) 2014-15 report, the average per capita consumption of plastic in India is about 11 Kgs and predicted to rise in the coming years. Mumbai, Kerala, Andaman and Nicobar islands are among the worst polluted beaches in the world (Teriin factsheet, 2018) and plastic travels with wind currents forming gyres or garbage patches spreading in the surrounding waters. With these projected data, we understand the need to stop polluting the oceans with the plastic which is the reason for the extinction of around 52 fish species in India and bringing all the sea turtles to the endangered species list.

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PHYTOCOMPOUNDS

Sources and Bioactivities

About the Book

This book provides a systematically reviewed up-to-date information on several aspects of bioactive phytocompounds, their natural resources and production. Several classes of phytocompounds, such as phenolics, flavonoids, alkaloids, glycosides, etc., and their prospective biomedical applications are discussed along with their pharmacological importance. Phytocompounds and their curative properties against various human diseases, including cancer, diabetes, atherosclerosis, neurological diseases, skin diseases, other microbial infections, rheumatic pains, fever, and many more are discussed. Further, the occurrence of less explored medicinal plants and their pharmacologically active phytocompounds have been emphasized in this book. This information will be very useful for the scientific community to further examine for many other unknown compounds and their potential pharmacological benefits in detail. Topics covered in this book include medicinal plants ethnopharmacology, phytochemistry, extraction methods, challenges in medicinal plants cultivation, use of biotechnological approaches, toxicological effects, clinical studies, mode of action, targeted therapy, newly identified potential phytocompounds, novel drug discovery approaches, and drug-delivery strategies including computational approaches and nanobiotechnology are discussed in detail. Overall, this book will be a valuable resource for researchers to work towards identifying and characterizing new phytocompounds possessing bioactivity from a diversified flora, and to enable the discovery of novel therapeutic leads in the near future against various human ailments. Besides this, the book will produce a good information for the students, teachers, scientists, and research professionals involved in the drug discovery research.

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Drug Discovery Approaches and the Role of Plant Products in Treating Neuronal Disorders

PICHILI VIJAYA BHASKAR REDDY[1]*, CHADIPIRALLA KIRANMAI[3] AND PANKAJ KALITA[1,2]

ABSTRACT

Phytotherapy plays a key role in traditional medicine system in the management of diseases. Traditional medication practices have been serving as an effective alternative source of medicine among many societies in spite of the availability of well-established drug therapy. Natural products have been playing vital role in the traditional treatment as well as in medication system for hundreds of years, in parallel with the development of the pharmaceutical industry. These natural products contain complicated mixtures of organic chemicals, which may include fatty acids, sterols, alkaloids, flavonoids, glycosides, saponins, tannins, terpenes and so forth. Use of medicinal plants against neurological disorders is an age old practice. The traditional system of utilizing medicinal plants is effectively applied to improve the brain function. The pharmacogenic plant extracts interact with the targeted signaling pathways affecting the pharmacology and thereby potentially playing a role in human disease and treatment. Neural drugs work by balancing of particular chemicals (neurotransmitters) or by selective enhancement of cerebral blood flow, cerebral oxygen usage, metabolic rate

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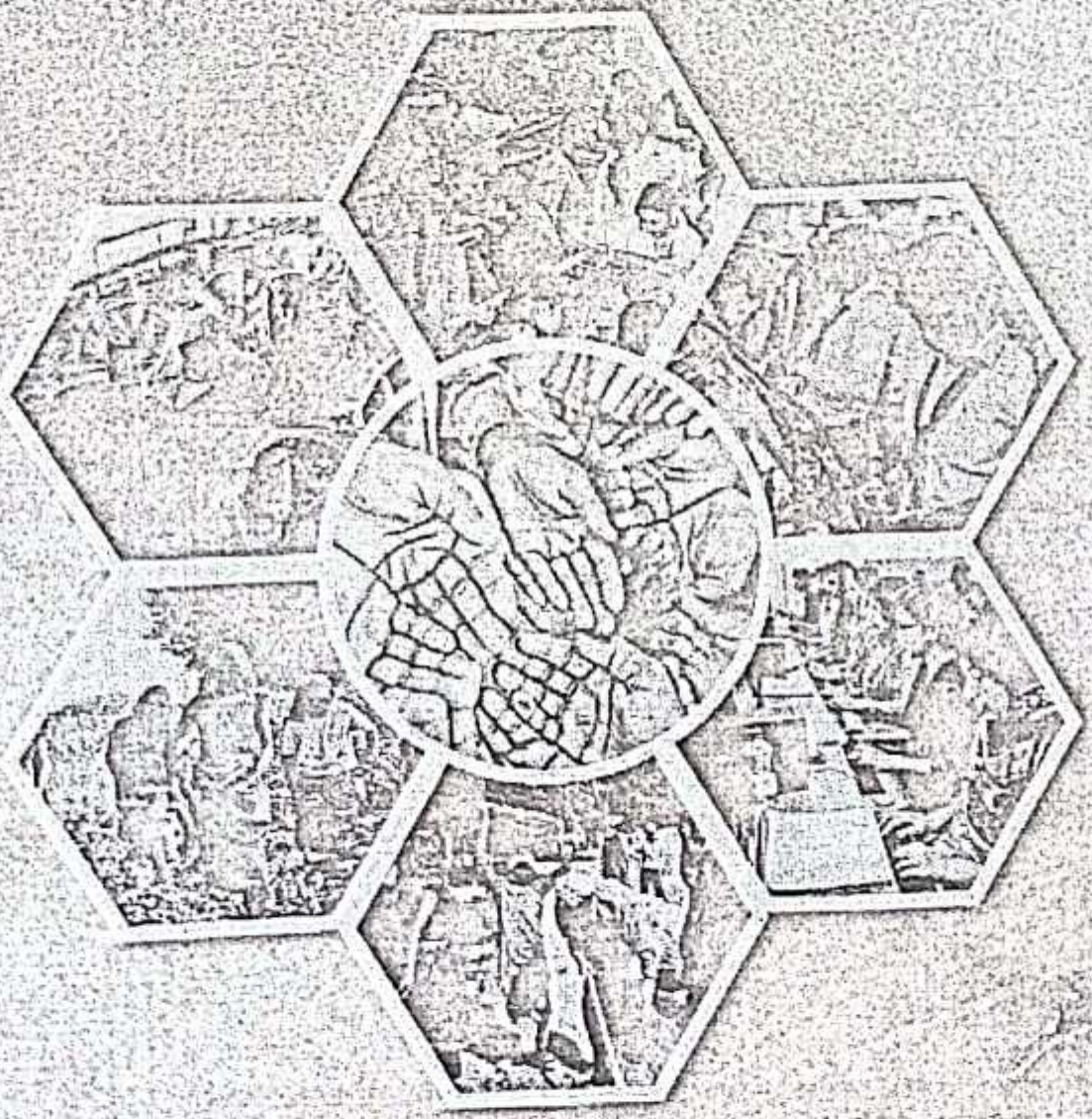
EMPLOYMENT GENERATION AND POVERTY ALLEVIATION



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EMPLOYMENT GENERATION AND POVERTY ALLEVIATION

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DEMONETISATION

Impact and Prospects

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IMPACT OF DEMONETISATION ON RURAL ECONOMY

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ABSTRACT

The Indian Economy which is highly unorganized is primarily cash based. Mostly people in rural areas depend on cash for their day to day activities. The Prime Minister's decision of demonetisation on 8 November, 2016 badly hit the livelihood of rural people with regard to cash transaction. This paper analyses the effect of recent demonetisation on rural economy and for country as a whole and also to evaluate the impact of demonetisation and cashless digital economy in the rural sector .This work attempts to establish the fact that loss in consumer spending and decrease in wage rate in rural sector by demonetisation effect have to be handled with proper care with modern infrastructure along with proper allocation of MGNREGA and agri-credit and higher agricultural insurance benefit. However, preparation for demonetisation was lop sided and its impacts were terrible on the rural people. The idea of cashless economy must be implemented taking into consideration a more holistic approach, such as strengthening legislation and capacity-building of regulators and anti-corruption watchdogs.

Key words: Rural Economy, Demonetisation.

INTRODUCTION

The Prime Minister of India, Mr Narendra Modi, announced in a broadcast to the nation that Rs. 500 and Rs. 1000 currency notes would no longer be recognized legally as currency. The total currency in circulation in India was Rs. 16.42 lac crore (US$240 billion) of Rs. 1000 and Rs. 500 notes. While as per dictionary demonetisation means "ending something (e.g. gold or silver) that is no longer the legal tender of a country", one needs to see if there is anything more to the word. The process of demonetisation involves either introducing new notes of the same currency or completely replacing the old currency with new one. There are various reasons as to why nations demonetize their units of currency. As per Modi Government, the agenda of this move has 3 fold: (i) To eliminate counterfeit currency; (ii) To shrink the size of the parallel economy and black money in India; and (iii) To reduce corruption. iv) To stopping the funding of terrorism, A decision like this can result in the sweeping up of a system for which many trust that it could not be done, as earlier attempts did not have rich impact. However, the decision by Prime Minister Mr. Narendra Modi is one the most historical steps in India. A decision like this can help control inflation, recapitalise banks, minimizing the interest rates and making the economy vibrant, with capital inflows. The result was that millions lost precious work hours to queue up at banks to exchange their old currency notes; workers were plunged into distress with wage payments delayed; farmers were unable to access crop loansand commodity supplies in rural markets declined. The suffering ofa vast number of people standing patiently in serpentine queues infront of banks and ATMs for withdrawing their own money tells the Story. India is the second most populated country in the world with nearly a fifth of the world's population. Out of the total 121 crore Indians of Indian population, 83.3 crore of population live in rural areas while 37.7 crore stay in urban areas, said the Census of India 2011. As a rural populated country most of the rural population is engaged in agricultural activities as most of the population of rural areas depends on agriculture. Agriculture forms are the backbone of the country's economy. The agricultural sector like forestry, logging and fishing accounted for 17% of the GDP contributes most to the overall economic development of India. it is the largest employment source and a important piece of the overall socio-economic development of India.

OBJECTIVES OF PAPER

- To study the impact of demonetization on common person of India
- To study the impact of demonetization on agricultural sector and farmers of rural India.
- To study the impact of demonetization on economy of India.