

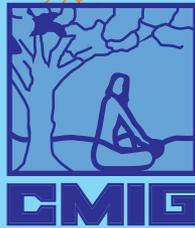
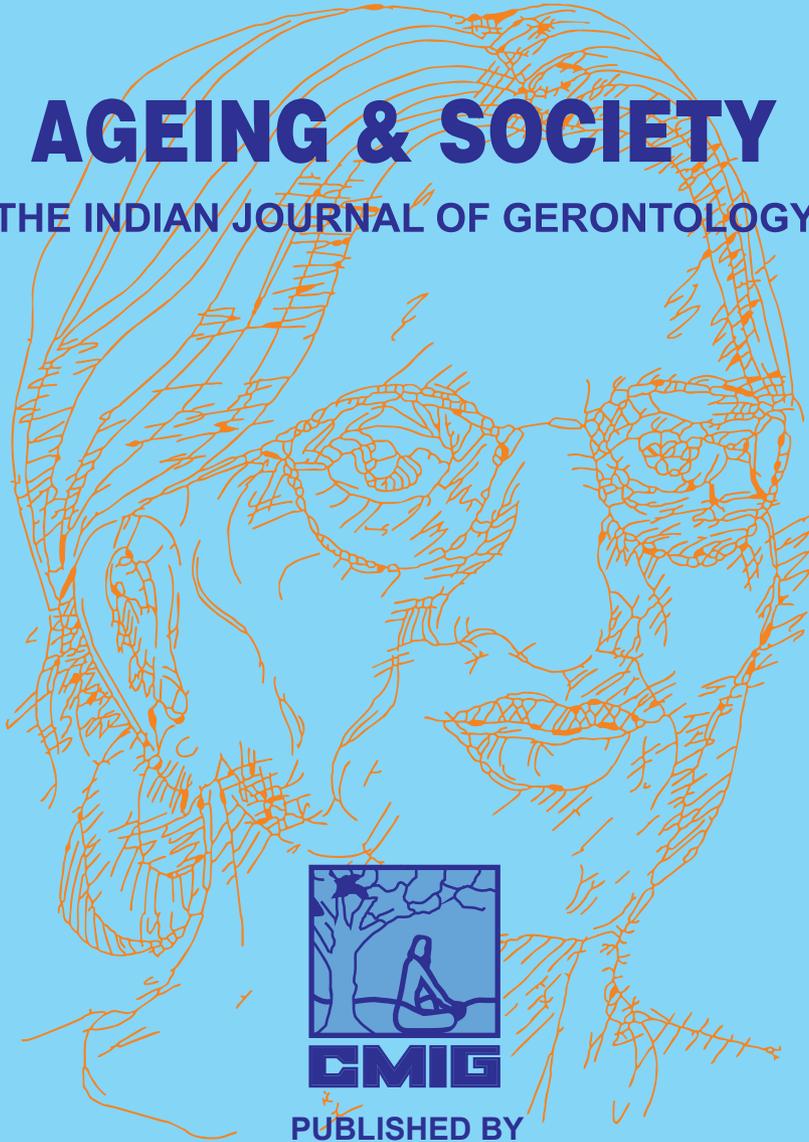
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Household Stress and Family Maladjustment among Female Bank Employees at Different Life Stages and the Moderating Role of Social Support

Suneeta Yadav*
Reeta Kumar

Abstract

The study aimed at comparing the level of household stress and family maladjustment among female bank employees at different life stages and assessing the moderating effect of social support on the relationship between the two. Household Demand Schedule, Family Adjustment Inventory for Working Women (high score denotes maladjustment), and Social Support Scale were administered to 250 women employed at clerical level in Nationalized banks in Varanasi in three life stages, viz., Stage-I (< 30 yrs.), Stage-II (30-40 yrs.) and Stage-III (> 40 yrs.). Women belonging to the three stages differed significantly from each other on both household stress and family maladjustment with the youngest group scoring highest on both followed by women in Stage-II and Stage-III in that order. Correlation between the two variables was significant at Stages-I & II but not at Stage-III. Moderator analysis revealed that the relationship between household stress and family maladjustment was moderated by emotional support at all the life stages, by Informational support at Stage-II only, by Practical support only at Stage-III, and by Companionship support only at Stage-I. The findings point to the varying support needs of employed women at different age groups and need to address these by providing them with the specific type of support that they are in need of in order to ensure a smooth functioning of the family at all stages of their lives even while being pulled apart by work on one hand and family related responsibilities on the other.

Furthermore, the employers should also take into cognizance the fact that working conditions and facilities within the workplace be such that there are no negative influences on the family adjustment of these women, by taking appropriate measures. Women suffering from maladjustment be identified and be provided assistance by ensuring facilities for availing psychological counseling.

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Modified version of paper presented at 19th Biennial Conference of the Association of Gerontology (India) & Multi-Disciplinary Workshops on Emerging Scenario of Population Ageing. Organized by Department of Biophysics, in collaboration with Department of Anatomy and Department of Geriatric Medicine, AIIMS, New Delhi. Aug. 17-18, 2019.

Keywords: Life Stages, Household Stress, Family Maladjustment, Social Support, & Female Bank Employees.

Introduction

The women in employment are faced with a unique situation, on one hand the employment provides them opportunities for self enhancement in social, psychological as well as material terms but on the other hand it makes incessant demands on their energy and time. The family and its responsibilities also present a conflicting situation for women as they need to take time away from family responsibilities in order to perform work related duties, but they are equally pulled by the ties of love, affection, and care towards the family members, especially their children. They are hence, subjected to stresses emanating from both work and family.

Stress is a situation or an emotional experienced when one feels that “demands go beyond the personal and social resources the individual is able to marshal” (Lazarus, 1966). It is a situational feeling when one thinks one has lost control of events (Dar, Akmal, Naseem, & Khan, 2011). Stress can have a wide ranging and negative impacts on the well-being of the individual and his or her day-to-day functioning. This is observable at physical level (e.g., exhaustion, headaches, high blood pressure), at psychological level (e.g., depression, anxiety, low self esteem) and at cognitive level. However, not all stress reactions are negative. A certain amount of stress is actually necessary for survival. Scott (1966) proposed an inverted U-shaped relationship between stress and employee’s response. The stress reaction maximizes the expenditure of energy which helps prepare the body to meet a threatening or challenging situation and the individual tends to mobilize a great deal of effort in order to deal with the event.

Even though a lot of work was being done in context to occupational stress, the stress stemming from home and its consequences have received less attention. In this context, the concept of ‘daily hassels’ which has been defined as the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment (Kanner, Coyne, Schaefer, & Lazarus, 1981)

appears to be meaningful. Hassles may be perceived as harmful or threatening because they involve demands that tax a person's resources (Lazarus, 1984). Daily hassles are relatively minor events arising out of day-to-day living, such as the everyday concerns of work, caring for others, and commuting between work and home. They can also refer to small, more unexpected events that disrupt daily life, such as arguments with children, unexpected work deadlines, and a malfunctioning oven. Comparatively fewer studies have examined the potential transfer effects of chronic home stressors on increased exposure or reactivity to daily hassles at work or at home. There is considerable evidence that daily hassles cross from work to home, and vice-versa (Bolger, DeLongis, Kessler, & Wethington, 1989, 1990). In the present research, household stress has been conceptualized in terms of daily hassles of working women that is related to family life, and being exposed to constraints on effort, time, and money while performing household chores, preparing meals, caring for a child or pet, maintaining the relationships with other family members, friends, neighbors and co-workers etc.

Even though, the employment for women has become an accepted fact, yet for most of their family members and their husbands the realization has still not set in that family life pattern is expected to change under these circumstances. These duties are still considered to be exclusively the responsibility of the women with complete disregard for her out-of-home employment. The man of the house, in most cases may not be prepared to share these employed women's household, child care and elderly care responsibilities. The family and its responsibilities also present a conflicting situation for women as on one hand they need to take time away from family responsibilities in order to perform duties related to work but they are equally pulled by the ties of love, affection, and care towards the family members, especially their children. In addition to this, their employment still does not mean control over money or economic independence and thereby decisions related to procuring facilities to ease their burden like employing a maid to take care of household work or children, buying a vehicle for transportation, etc., are still not within

their purview. Thus, their dual responsibility, inner conflict, lack of recreation, and social interaction, role conflict and role stress along with inability to have a control of their circumstances result in problems of adjustment.

According to Gates and Jersild (1973), "Adjustment is a continual process by which a person varies his behavior to provide a more harmonious relationship between himself and his environment". Adjustment leads us towards a happy and contented life, helps to maintain a balance between our needs and the capacity to meet these needs persuades us to change our way of life according to the demands of the situation, and gives us strength and ability to bring desirable changes in the conditions of our environment. Marriage and the employment increase the roles and the responsibilities handled by women. It is highly difficult for married working women to fulfill their role requirements adequately and satisfactorily when they play such multiple roles. Many times they are forced to fulfill either of them or both in a dissatisfactory fashion or with inadequate concentration in performances. This in turn leads to adjustment problems.

Social support has emerged as an important factor in context to factors that play a role in countering the consequences of stress that lead to maladjustment. The conceptualization of social support stems from attempts to mobilize families in dealing with personal crisis and has been incorporated into the stress process generally (Payne, 1980, Pearlin, Menaghan, Lieberman, & Mullan, 1981). Social support has been defined in different ways, e.g., it has been referred to as support which is "provided by other people and arises within the context of interpersonal relationships" (Hirsh, 1981), in general, and as " an exchange of resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient " (Shumaker & Brownell, 1984).

Hagihara, Tarumi and Miller (1998) defined social support as "the provision and receipt of tangible and intangible goals, services, and

benefits (such as encouragement and reassurance) in the context of informational relationships (e.g., family, friends, co-worker, & boss). Social support is the physical and emotional comfort given to us by our family, friends, co-workers and others. Social support refers to interpersonal relationships and social interactions that help to protect individuals from the effects of stress (Kessler, Price, & Wortman, 1985, Nielson, Carlson, & Lankau, 2001). Social support has consistently been related to increased health and well-being (Cohen, 1988, House, Landis, & Umberson, 1988). Social support, perceived to being received from one's spouse has been taken as the moderating variable for this study.

Women may perceive their work or home related stresses differently depending on their status and life stage within family and profession. Gilligan (1980) and Bardwick (1980) have highlighted the fact that the adult development of women may be of a different nature from that of men. Gallos (1989) went on to draw implications of this difference for the career development of women, her most important conclusion being that the career paths designed for men may not be entirely suitable for women. Focusing her attention on adult working women, Bardwick (1980) identified four basic life phases for women that contrast with the life stages of a man. These are: early adult transition years (17-28 years), the settling-down period (30-40 years), middle adulthood (40-45 years), and the "age 50 and older" phase. Literature on women's attempts at balancing family and work life suggests that each stage may be associated with different levels and types of stresses due to varying levels of job and family demands. It is to be expected that consequences for their well-being may vary with age or stage of life. O'Neil and Bilimoria (2005) exploring the nature of women's career experiences over the life course (N=60, 24-60 yrs) revealed distinct patterns of how women's careers develop over time, particularly with regard to the impact of career contexts (societal, organizational, and relational) and women's own changing images of their careers and career success. They proposed, on the basis of obtained results, a three-phase, age-linked model of women's career development: the idealistic achievement

phase; the pragmatic endurance phase; and the reinventive contribution phase.

When considering the relationships among household stress, family maladjustment, and social support, a number of researchers have suggested that social support moderates or buffers the relationship between stress and psychological well-being, therefore, a selective review of the literature on household stress, social support and adjustment is being presented here.

Literature Review

In context to possible age or stage related differences, Lopata (1966) in his model of family stages, proposed that demands on the time and energy of parents are the strongest in families with infants or children at the preschool age. There is strong evidence that mothers of children aged 0-6 years are at great risk of psychological distress (Barnett, 1993), and they experience more conflict than mothers of older children do (Beutell, & Greenhaus, 1980, Pleck, Staines, & Lang, 1980). Kirkcaldy and Martin (2000) in a study of 276 nurses in Northern Ireland concluded that age did emerge as being significantly related to total stress and mental health with older nurses reporting more stress, and the younger nurses experiencing better psychological health. Gordon, Beatty and Whelan-Berry (2002) in their study on professional women (N=36) who were married, had children, and had enduring careers revealed that age, family characteristics and employment characteristics influence the transition. In addition the women rebalance and develop new perspectives at midlife and make internal and external recalibrations which resulted in increased satisfaction and overall well-being. Yadav and Kumar (2015) found that the bank employed women, as compared to the teachers, in early adulthood, experience more household stress particularly in the economic constraint area and also have poorer mental health. The results, thus, suggest that being in banking profession may be all the more stressful for the younger

women in their early adulthood than in the teaching profession, though at mid adulthood the difference may not be so marked. Thus, there seems to be contradictory evidence regarding level of stress at various stages among women as well as a comparative paucity of research in this area which needs to be addressed.

In context to social support, it has been proposed that it may either have a main effect on psychological well-being by reducing the perception of stress itself or may act as a buffer reducing the negative impact of stress even though stress is experienced by an individual. A number of studies record the buffering role of social support. Holahan and Gibert (1979) reported that spouse's pro-feminist attitude, positive attitude towards the wife's career, and emotional support all help to reduce work-family conflict. In a number of earlier researches, increased spousal support is shown to be associated with higher levels of psychological well-being (Cohen & Wills, 1985, Ganster, Fusilier, & Mayes, 1986), greater life satisfaction (LaRocco, House & French, 1980), and better marital adjustment (Frone, Russell, & Cooper, 1992). One's ability to juggle various roles has its limits, however, when women lack sufficient child care and household help from spouses and work in psychologically demanding jobs, their health and well-being may suffer (Hughes & Galinsky, 1994, Piotrkowski, Hughes, Pleck, Kessler-Sklar, & Staines, 1993). Parasuraman, Purohit, Godshalk and Beutell (1996) conclude that instrumental spousal support eases the burden of family demands and enables individuals to devote more time to work, whereas emotional spousal support enhances feelings of self-efficacy both at home and at work. Adams, King and King (1996) suggested that the relationship between work and family can be simultaneously characterized by conflict and support. Higher levels of work interfering with family predicted lower levels of family emotional and instrumental support. Higher levels of family emotional and instrumental support were associated with lower levels of family interfering with work.

Daga and Hussain (2001) indicated that social support acted as a buffer against stress for the working Indian women (N=300). Gordon

and Whelan-Berry (2004) commented that women on an average still have more responsibility for home, family life, and child care than men. While examining the roles women in early, middle, and late life (N=744) they found that differences exist in women's perceptions of how spouses or partners manage family finances, support the women's careers, contribute to household management, and provide interpersonal support. Specific roles and the resulting support are related to the life satisfaction, job satisfaction, and work-life balance of some but not all cohorts of the women surveyed. Van Daalen, Sanders and Willemsen (2005) in a study on 459 men and women from dual earner families revealed that women report higher life satisfaction than men and receive more social support from colleagues than men, while both receive support from their supervisor, equally. As for the non-work related sources of social support, men received more social support from their spouse, while women received more social support from relatives and friends.

Nelson (2006) interviewed 90 women at three different times over an 18-month period and found that that support and coping have a health-enhancing effect on positive affect. However, life strains interacted with support and coping to predict negative affect. Both support and coping buffered the effects of life strains, suggesting that social support has a health-protecting effect on negative affect. Social support has been identified in research as an important resource capable of protecting individuals from the harmful effects of stress (Geller & Hobfoll, 1994) either as a main effect or as a moderator or buffer, however, it is still not established whether it is the former or the latter. This indicates that more research is required in this area. A critical question, thus, is whether relationship between household stress and family maladjustment will be moderated by dimensions of perceived social support at different life stages of employed women.

Studies related to work-family life stages suggest the possibility that there may be unique patterns of relationship between household related stress, social support and well-being, however, surprisingly

to this date, there are very few empirical studies conducted in India taking the developmental phases into consideration. The present study is an attempt to address this gap in literature. It was, therefore, considered meaningful to ascertain and compare the levels of household stress and family maladjustment along with exploring the relationship between the two variables at different stages of the employed women's lives in the present study. Furthermore, the present study also aimed to focus on exploring the moderating role of social support in the relationship between household stress and family maladjustment. In view of the reviewed literature the following objectives and hypotheses were formulated for exploration.

Objectives:

i. To explore the differences between women at different work-family life stages on household stress and family maladjustment among female bank employees.

ii. To explore the relationship between household stress and family maladjustment among female bank employees at different work-family life stages on.

iii. To explore the moderating effects of perceived emotional, informational, practical, and companionship support on the relationship between household stress and family maladjustment among female bank employees at different work-family life stages.

Hypotheses:

H1: Women at younger work-family life stages will score higher on household stress and family maladjustment as compared to those at older stages among female bank employees.

H2: There will be a positive correlation between household stress and family maladjustment at different work-family life stages among female bank employees.

H3: Emotional, informational, practical, and companionship support will moderate the relationship between household stress and family maladjustment at different work-family life stages among female bank employees.

METHODOLOGY

Sample

The sample for the present study consisted of 250 female bank employees in the age range of 25-50 yrs educated at least up to the level of graduation and employed in nationalized banks in Varanasi and nearby regions. The subjects were categorized into three stages on the basis of developmental phases proposed by Bardwick (1980) relevant in context to women as given below.

Table-A: Sample Distribution by Work-Family Life Stages

Age Groups	Work-Family Life Stages	N	%
Below 30yrs (Early adult transition phase)	Stage-I	97	38.8
30-40 yrs (Settled Down phase)	Stage-II	76	30.4
Above 40 yrs (Transition to Mid Adulthood)	Stage-III	77	30.8
Total		250	100.0

Tools

The following instruments were used for assessing the various aspects under study.

1. Life Demand Schedule (Kumar, 1998): Developed empirically, it assesses the stresses resulting from day to day household related demands to be met by women, within three areas, viz., physical constraints (17 items), time constraints (20 items) and financial constraints (16 items). Each item is to be answered on a 5 point scale ranging from 'very high' (5) to 'not at all' (1). The scale was used to assess household stress.
2. Family Adjustment Inventory for Working Women (Singh, 1987): It assess the family adjustment of married working women in context to adjustment within five areas, viz., personal, family, children, husband

and elders and relations. It may be pointed out at the outset that high scores on this scale denote maladjustment in the particular area hence, the term 'Maladjustment' has been used instead of 'Adjustment' in the results and other sections which follow. The scale thus gives measures of personal maladjustment (11 Items), family maladjustment (16 Items), maladjustment with children (13 Items), maladjustment with husband (15 Items), maladjustment with elders and relations (11 Items) and overall family maladjustment.

3. Social Support Scale (Arora & Kumar, 1998): The scale was specially developed for working women, consisting of 38 items divided into four areas of functional support, viz. emotional, informational, companionship, and tangible/practical support and it assesses the structural and functional aspects of perceived social support. Each item can reveal information regarding sources of actual or expected support and amount of actual or expected support depending on the type of instructions given. In the present study perception of actually available support from the spouse was assessed.

The tests were administered to the subjects individually after explaining the purpose of the study and establishing rapport with them.

RESULTS

Comparison of the various stages on household stress and family maladjustment was done by applying t-Test (Table-1). The mean scores of subjects on household stress at Stages I, II and III were 133.99, 124.54 and 113.06 respectively. Intergroup comparison revealed that the subjects at Stage-I scored significantly higher than those at Stage-II ($t = 2.05, p < .05$) and Stage- III ($t = 4.39, p < .01$) and subjects at Stage-II scored significantly higher than those at Stage-III ($t = 2.13, p < .05$).

Table-1: Differences on Household Stress and Family Maladjustment between Ss at various W-F Life Stages

Variables	Stage-I (N=97)	Stage-II (N=76)	Stage-III (N=77)	't-values'		
				Stage-I Vs. Stage-II	Stage-II Vs. Stage-III	Stage-I Vs. Stage-III
Household Stress	133.99 (28.31)	124.54 (32.19)	113.06 (34.52)	2.05*	2.13*	4.39**
Family Maladjustment	165.26 (26.69)	156.32 (29.52)	151.43 (27.95)	2.09*	1.05 ^{NS}	3.33**

*Significant at .05 level; **Significant at .01 level

The mean scores on family maladjustment for work-family life stages I, II and III were 165.26, 156.32 and 151.43 respectively and comparison of scores revealed that subjects at Stage-I scored significantly higher than those at Stage- II ($t = 2.09$, $p < .05$) and Stage-III ($t = 3.33$, $p < .01$), however, no significant difference existed between subjects at Stage-II and Stage-III ($t = 1.05$, NS). Thus, a decreasing trend in mean scores was obtained with increasing age. A similar trend was also obtained on family maladjustment, however, not all difference were found significant.

Correlational analysis (Table 2) revealed that the correlation between household stress and family maladjustment was significant and positive at Stage-I ($r_{95} = .42$, $p < .01$) and Stage-II ($r_{74} = .59$, $p < .01$), however, at Stage-III it was not found to be significant ($r_{75} = .18$, NS).

Table-2: Correlation between Household Stress and Family Maladjustment at various W-F Life Stages

Correlation Coefficient	Stage-I (df=95)	Stage-II (df=74)	Stage-III (df=75)
Pearson's 'r'	0.42**	0.59**	0.18 ^{NS}

*Significant at .05 level; **Significant at .01 level

Hierarchical regression analysis was applied to test the moderating effect of various aspects of social support on the relationship between household stress and family maladjustment at Stage I, II and III separately (Tables 3 & 4). The F-values for the interaction terms for household stress and emotional support, have been found to be significant for all the life stages, viz., for Stage-I ($F=8.249$, $p<.01$), Stage-II ($F=48.677$, $p<.01$) and Stage-III ($F=9.646$, $p<.01$). In case of informational support, the F-values for the interaction terms appears to be significant only for Stage-II ($F=8.762$, $p<.01$) but not for Stage-I ($F=1.058$, NS) or Stage-III ($F=1.024$, NS).

Table-3: Moderating Effect of Emotional & Informational Support on the Relationship between Household Stress & Family Maladjustment

Life Stages	Emotional Support				Informational Support			
	Variables	R ²	R ² Change	F Change	Variables	R ²	R ² Change	F Change
Stage-I	HS	.272	.129	15.736**	HS	.272	.129	15.736**
	ES	.493	.221	38.384**	IS	.384	.112	16.045**
	HS x ES	.537	.044	8.249**	HS x IS	.392	.007	1.058
Stage-II	HS	.383	.326	35.874**	HS	.383	.326	35.874**
	ES	.527	.144	20.428**	IS	.507	.125	16.944**
	HS x ES	.728	.201	48.677**	HS x IS	.565	.058	8.762**
Stage-III	HS	.213	.028	2.436	HS	.213	.028	2.436
	ES	.486	.274	36.202**	IS	.325	.112	11.288**
	HS x ES	.551	.065	9.646**	HS x IS	.335	.010	1.024

HS: Household Stress, ES: Emotional Support, IS: Informational Support

Table-3: Moderating Effect of Practical & Companionship Support on the Relationship between Household Stress & Family Maladjustment

Life Stages	Practical Support				Companionship Support			
	Variables	R ²	R ² Change	F Change	Variables	R ²	R ² Change	F Change
Stage-I	HS	.272	.129	15.736**	HS	.272	.129	15.736**
	PS	.550	.278	54.287**	CS	.396	.123	17.967**
	HS x PS	.553	.003	.607	HS x CS	.453	.057	9.089**
Stage-II	HS	.383	.326	35.874**	HS	.383	.326	35.874**
	PS	.390	.007	.795	CS	.538	.155	22.473**
	HS x PS	.398	.008	.905	HS x CS	.539	.001	.163
Stage-III	HS	.213	.028	2.436	HS	.213	.028	2.436
	PS	.343	.130	13.490**	CS	.361	.149	15.831**
	HS x PS	.402	.059	6.671**	HS x CS	.394	.032	3.592

HS: Household Stress, PS: Practical Support, CS: Companionship Support

The F-values for the interaction terms for household stress and practical support has been found to be significant only for Stage-III (F=6.671, $p < .01$), but not for Stage-I (F=.607, NS) or Stage-II (F=.905, NS). The F-Values for the interaction term for household stress and companionship support was significant only for Stage-I (F=9.089, $p < .01$) but not for Stage-II (F=.163, NS), and Stage-III (F=3.592, NS).

DISCUSSION

The main aims of the present study were to compare the levels of household stress and family maladjustment along with exploring the relationship between the two variables at different stages of the employed women's lives, and also to explore the moderating effect of social support on the relationship between household stress and family maladjustment.

A overview of the obtained results indicates that the women belonging to the younger age groups did experience higher levels of household stress and family maladjustment as compared to those belonging to the older stages. Therefore, the hypothesis H1 which states, "Women at younger work-family life stages will score higher on household stress and family maladjustment as compared to those at older stages among female bank employees.", has been supported by the obtained results. Furthermore, household stress and family maladjustment were found to be positively associated for the two younger groups but not in case of the women belonging to the oldest group, therefore, the hypothesis H2 which states "There will be a positive correlation between household stress and family maladjustment at different work-family life stages among female bank employees.", has been partially supported only in context to younger women aging below 40 yrs.

In context to moderating role of social support, the results indicate that emotional support moderated the relationship between household stress and family maladjustment at all the life stages, whereas informational support moderated at Stage-II only, practical support at Stage-III only, and companionship support moderated only at Stage-I. Therefore, hypothesis H3 which states, "Emotional, informational, practical, and companionship support will moderate the relationship between household stress and family maladjustment at different work-family life stages among female bank employees.", has been fully supported in case of emotional support but only partially in context to informational, practical, and companionship support.

Stated briefly it appears that as compared to the women at older stage, higher levels of household stress as well as family maladjustment is being experienced by women at younger stages and it is at these younger stages only that a positive association exists between the two variables. The results can be explained in context to the fact that even though all these women are balancing between their job and home related responsibilities, women at younger stages are likely to be more inexperienced at managing the two worlds together. With the changing scenario for women over the past few decades, women in younger generations are more likely to give higher priority to their work role and thereby may approach their home and family responsibilities less positively leading to their reporting higher levels of household stress as well as family maladjustment. However, before drawing any conclusions it may be advisable to take an overview of studies that indicate that women, in general, irrespective of the generation they belong to, despite playing active roles in the world of work, are mostly making active efforts to avoid neglecting their household and family related responsibilities through ensuring availability of social support. Roebuck, Smith, and El Haddaoui (2013) had concluded that though work-life balance is not defined similarly across the three generations, but most women report struggling with finding a balance by either not choosing to invest in professional commitment at the cost of personal commitments or finding effective support system in order manage juggling between personal and professional obligations effectively. Thus, a general theory promoting integration of work-life commitments instead of balancing was proposed by them. Supporting this contention Evans, Millsteed, Richmond, Falkmer, Falkmer, and Girdler (2016) on the basis of their study propose six within-role balance strategies: living with integrity, being the best you can, doing what you love, loving what you do, remembering why and searching for signs of success, and six between-role balance strategies: maintaining health and wellbeing, repressing perfectionism, managing time and energy, releasing responsibility, nurturing social connection and reciprocating, that women adopt in order to maintain the balance between their work and home life. These findings emphasize the role of social support for women's lives.

In the present study also it has been found that irrespective of the age and stage, the mere presence of emotional supports appears to reduce the negative impact of household stress on family maladjustment by moderating their relationship, conveying that emotional support acts as a buffer whenever household related stress is experienced. Emotional support conveys being given unconditional love, care, acceptance and respect. Since, in the present study, the social support received from the spouses had been reported, this finding becomes all the more significant. It appears that that when the husbands convey such unconditional regard to their wives, they tend to find their household related responsibilities less stress producing and thereby they have a more positive adjustment with their family members. Rogers (1951) in context to his person centered theory of personality had also proposed the importance of unconditional positive regard for development and maintenance of self-worth and confidence which help in their becoming a fully functioning individual.

Apart from emotional support, the moderating or buffering role of other types of social supports appears to be age specific. Thus, companionship, informational, and practical support appear to be acting as buffers at respectively Stage-I, Stage-II and Stage-III exclusively. The buffering role of any type of social support implies that it operates once the threat is perceived or it helps under the acknowledged presence of the stressor.

Companionship support implies having people around you with whom you may be able to relax and enjoy and share. It seems that for the youngest group (< 30 yrs), this companionship is of greatest value to ward off the consequences of household stress. These women have just come out of their college lives and being with friends can help to take them away for a short while from the still novel and tedious responsibilities of household. Furthermore, sharing with similar age friends, may help them to realize that they are not alone in this type of situation and this may reduce their stress. However, for the women in the settled down stage (30-40 yrs.) it is the informational support that buffers against negative consequenc-

es of stress. Informational support comes in form of advice regarding how to manage within the given circumstances in the best way. These women have already accepted their roles as a working woman as well as householder and are likely to want to make the best of the situation. Receiving useful advice from others regarding how to tackle the various issues in this dual role is likely to make them feel more competent and thus suffer less from maladjustment. In case of the oldest group (above 40 yrs.) it is the practical support that buffers against stress. Having grown older and with multiple responsibilities of children as well as older parents to be handled, it is natural for them to find any help offered for sharing the load of household work as most beneficial for reducing stress.

Overall, the results convey that buffering effects of social support may play a significant role in reducing the deleterious effects of stress, though, it also points towards the possibility that different types of social support may be effective at different stages of the working women's lives. Thus, the study reaffirms the conclusions drawn in other research studies which report a buffer effect of social support like those of House and Wells (1978), La Rocco et al. (1980), and Winnubst et al. (1982). Nelson (2006) also concluded that both support and coping buffered the effects of life strains, suggesting that social support has a health-protecting effect on negative affect or negative emotions. It needs to be, however, kept in consideration that the results of previously conducted studies, by no means, conclude that all stressors were buffered, nor do they indicate that buffering may affect all the dependent variables and it alone may not be able to counter the ill effects of stress. Rao, Apte and Subbakrishna (2003) had also concluded that for working women in multiple roles, strengthening the use of supporting network is very essential and important for their well-being.

It is essential to remember that women have now entered the world of work and there is no turning back. All through their phase of dual responsibilities they are involved in finding the best way to balance both the fronts without making compromises on any of them, there

fore, it is necessary to recognize the kind of support they require at every stage and take necessary measures to provide it to them. The results especially draw attention towards the need to focus on women belonging to the younger age groups as they seem to be most affected. The organizations employing younger women, thus, seem to have a greater responsibility towards ensuring their welfare and making such provisions that their work as well as home life may become more comfortable. Measures like granting permission to work from home, providing crèches for their newborn young babies, providing housing near the workplace, etc., may be considered for their welfare. On the other hand, an acceptant atmosphere at home and sharing in household responsibilities by other family members may also have a beneficial effect on the adjustments of these employed women and they may have full opportunity to reach their potential that they desire and deserve.

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Iron deficiency anemia in elderly patients- A cross-sectional study from a tertiary teaching and research hospital in north India

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Abstract

Prevalence of Iron Deficiency Anemia (IDA) in India is more because of low dietary intake, poor availability of iron & chronic blood loss due to hook worm infestation. A microcytic hypochromic anemia in an elderly individual means iron deficiency due to blood loss until proven otherwise. 433 cases of anemia who were aged 60 years and above attending geriatric and medicine out-patients' department of a tertiary care hospital were evaluated clinically and investigated thoroughly to establish the type and etiology of anemia. Anemia of chronic disease accounted for 43.64% (n=189) of total cases and 39.72% (n=172) were having IDA. Chronic blood loss was responsible for IDA in 70.35% (n=121). Worm infestation was the most common cause of gastrointestinal blood loss (30.6% of blood loss cases, n=37). Most common worm infestation involved hookworms (30 patients, 81% of worm infestation) followed by *Ascaris lumbricoides* in 7 patients (19%). Hemorrhoids were the cause of chronic blood loss in 35 patients (28.9% of blood loss cases). From our study it is evident that iron deficiency anemia accounted for more than 1/3rd of total number of anemia patients which is higher than the incidence of IDA in elderly population of the western world. The importance of early diagnosis and management of worm infestation is also emphasized by our findings.

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Keywords - anemia; elderly; iron deficiency; etiology

Introduction

Anemia in elderly is a public health crisis. It is a public health problem because 164 million elderly who constitute 23.9% of the elderly population are suffering from anemia globally. It is a crisis because it increases the risk of death by 40%[1]. Iron deficiency anemia is one of the common conditions seen in everyday clinical practice which has become a global health problem. Iron deficiency refers to the reduction of iron stores that may precede overt iron-deficiency anemia which is a more severe condition in which low levels of iron are associated with decreased hemoglobin and the presence of microcytic hypochromic red blood cells.

Because iron is involved in many metabolic processes besides the production of hemoglobin, iron deficiency results in a variety of defects which are manifested at biochemical, tissue, and functional levels, including increased frailty[2], muscle weakness[3] and falls[4]. Being an easily treatable condition, diagnosis of iron deficiency anemia should not be an end in itself but should rather be the initiation of a search for its cause.

A microcytic hypochromic anemia in an elderly individual means iron deficiency due to blood loss until proven otherwise[5]. It is less often attributed to dietary deficiency in industrialized nations, because of prevalence of iron fortification in wheat, as well as diet heavy in meats containing heme iron; but situation may be different in Indian elderly who are largely vegetarian and there is no national programme for iron fortification. Prevalence of Iron Deficiency Anemia (IDA) in India is more because of low dietary intake, poor availability of iron & chronic blood loss due to hook worm infestation[6] whose predominance varies with geo-cultural diversity with most studies having been reported from southern part of India and paucity of data in elderly from northern part. The present study was undertaken to bring to center-stage the causes of iron deficiency anemia among elderly (aged 60 and above) residing in northern India.

Material & Methods

433 cases of anemia (Hb <12 g/dL for females, <13 g/dL for males, according to hemoglobin cut-off levels defined by the World Health Organization (WHO)) who were aged 60 years and above attending geriatric medicine or medicine OPD of a tertiary care hospital (Sir Sunderlal Hospital, Banaras Hindu University) were evaluated clinically and investigated thoroughly to establish type and

cause of anemia. Patients were evaluated for hemoglobin level, mean cell volume, platelet count, peripheral blood picture, complete blood count with differential counts, renal and liver function tests, serum iron, total iron binding capacity (TIBC), ferritin, fecal occult blood test (FOBT) and ova/cyst detection. Bone marrow examination was performed to estimate iron stores. Upper gastrointestinal endoscopy and colonoscopy were done in patients with fecal occult blood test positive to know the cause of blood loss. Further tests were performed as per indication to evaluate coexisting illness and to look for etiology of anemia. Bone marrow examination for iron staining to establish diagnosis of IDA was done in 108 patients. IDA was diagnosed on the basis of transferrin saturation less than 15% or serum ferritin $<15\mu\text{g/L}$ or absent iron stores on bone marrow smears.

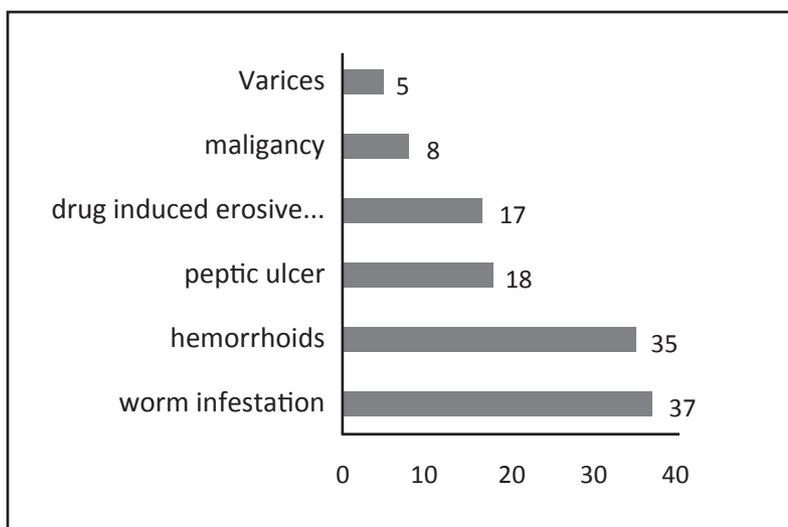


Fig 1 - Causes of chronic blood loss as an etiological factor of iron deficiency anemia.

RESULTS

Anemia of chronic disease accounted for 43.64%(n=189) of total cases and was the leading cause of anemia. Out of 433 patients with anemia, 39.72%(n=172) were having IDA, with mean age 66.26 ± 6.1 years (range 60-93 years) and Male:Female ratio=1.16:1. The mean Hb level was 8.1 ± 2.0 gm% (2.1-10.0gm%) while mean MCV was 72.0 ± 4.7 fL (range 56-78fL).

Table 1. Symptoms at presentation in IDA patients.

Category of symptoms	Symptoms	Number of patients	Percentage
General	Generalized weakness and easy fatigability	139	80.8%
Cardiovascular	Dyspnea on exertion	129	75%
	Palpitation	24	13.9%
	Angina	13	7.5%
	Edema	15	8.7%
Gastrointestinal	Anorexia	120	69.7%
	Pain abdomen	51	29.6%
	Irregular bowel habits	54	31.3%
	PICA	3	1.7%
Neurological	Paresthesias	3	1.7%

Table 2. Physical signs on examination in IDA patients.

Physical signs	Number of Patients	Percentage
Pallor	172	100%
Pallor of Palmar crease	46	26.7%
Nail changes	44	25.5%
Systolic murmur	34	19.7%
Signs of heart failure	30	17.4%
Angular stomatitis	22	12.7%
Tongue changes	16	9.3%
Splenomegaly	6	3.4%

Table 3 shows the distribution of different broad etiologies of IDA, whereas Figure 1 demonstrates the various causes responsible for IDA due to chronic blood loss. In patients with chronic blood loss, worm infestation was the most common cause (30.6% of blood loss cases). Hemorrhoids were responsible for chronic blood loss in 35 patients (28.9%). Most common worm infestation was hookworm (30 patients, 81%) followed by *Ascaris lumbricoides* (7 patients, 19%). 1 case of chronic blood loss was due to angiodysplasia of the colon (not shown in Figure 1). In 4 patients, the etiology of IDA could not be identified.

Table 3. The distribution of various etiological factors responsible for IDA.

Etiological Factor	Number of patients	Percentage
Suspected poor intake resulting in dietary deficiency	47	27.33%
Chronic blood loss	121	70.35%
Undetermined	4	2.32%

DISCUSSION

Majority of our patients were in the 7th decade of their lives, with males outnumbering the females. This is in accordance with the reports of McLennam *et al.*, 1973 which states that in post-menopausal women, hemoglobin increases by 0.6 mg/dl per decade and women may be less anemic than men in the elderly age group. However, this may also be a chance observation as there is male preponderance in population structure and hospital attendance in India. The most common general symptom was weakness and easy fatigability observed in 139(80.8%) patients. Commonest cardiorespiratory symptom was exertional dyspnea in 129 cases(75%). This is similar to traditional medical teaching of the symptoms of IDA.

According to Freedman *et al.*, 1993, a microcytic hypochromic anemia in an elderly individual means IDA due to blood loss unless proved otherwise[7]. In our study, chronic blood loss was responsible for IDA in 70.35%(n=121). Prospective studies in IDA have shown that this is associated with higher frequency of GI lesions[8]. Other extra intestinal causes of occult iron deficiency are probably rare, but carcinoma of the urinary bladder has been reported as a late finding after negative GI studies[9]. In our study, we did not find any cases resulting from extra-intestinal blood loss. A possible reason for this could be the fact that patients with massive hematuria seek urology consultations in our setup.

Hemorrhoids were the second most common cause of GI blood loss. This is in contrast to studies from Kepczyk *et al.*, 1991 where hemorrhoids account for less than 10% of total cases of iron deficiency anemia. In studies from western populations, colonic polyps and vascular malformations are the leading cause of chronic blood loss from lower GI tract. Commonest upper GI lesions in our study were peptic ulcers & drug induced erosive gastritis which were similar to that of studies from western populations. Malignancy accounted for 8 cases of iron deficiency anemia. There were 3 cases each of carcinoma stomach and carcinoma colon, 1 case each of carcinoma

rectum and periampullary carcinoma. Many cases of GI malignancy report to the surgical oncology service and may have been missed in our study. Dietary deficiency was found in 27.3% patients. Since in our study diet estimation was based on history alone & no measure of dietary iron was made, dietary iron adequacy cannot be diagnosed with certainty.

Worm infestation emerged as the leading cause of iron deficiency in our elderly patients and was present in 37 (21.5%) patients. Hook worm infestation was the commonest and was followed by round worm infestation. Hook worm infestation is widely prevalent in India (Arora, 1976). This is in contrast to the western population and southern India[10,11] where worm infestation accounts for negligible number of cases. In our study all these patients were from rural areas where walking bare foot and defecating in the fields is still a common practice.

From our study it is evident that iron deficiency anemia accounted for more than 1/3rd of total number of anemia patients which is relatively higher than that of incidence of IDA in elderly population of western world. Chronic blood loss accounted for around 70.35% cases of IDA and surprisingly worm infestation is still among the leading causes of anemia in elderly in the developing world. This is a relatively underestimated problem that can be easily treated, resulting in a significant decrease in mortality and increase in functional independence.

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Cancer in Older Adults : Challenges and Opportunities

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Abstract

Older adults represent a growing population with a special risk of cancer. Several older adults suffering from cancer do not get access to clinical trials. The aim of this review article is to highlight and briefly discuss the approach towards cancer in older adults with focus on comorbidity, cognition, screening and diagnosis, staging and treatment. Inadequate data is available about clinical and behavioral response of older adults to cancer treatment. Careful patient selection can help older adults benefit from different treatment modalities and palliative care. It is important to have more representation of older adults suffering from cancer in treatment trials.

Co morbidity in older adults

Older adults suffer from several chronic conditions such as diabetes, heart disease, respiratory disorders, renal or liver problems. These diseases may complicate the effective response to cancer treatment often causing drug interactions on administration of chemotherapy. There may be changes in drug absorption, distribution, metabolism and excretion leading to toxicities and altered pharmacodynamics and pharmacokinetics (Cohen *et al.*, 2007; Litchman *et al.*, 2007). These complications might obstruct the administration of optimal doses of chemotherapy to older adults (Surbone *et al.*, 2007). But most treatment trials do not take into consideration the complications of co morbid conditions. Older adults have also been under represented in adjuvant trails (Muss *et al.*, 2007). In cases of co morbidity and reduced organ function, palliative care can be a preferred choice

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to suboptimal levels of drug administration (Extermann, 2003). Comprehensive Geriatric Assessment can help in patient selection for palliative care (Morrison *et al.*, 2001; Hurria *et al.*, 2007). It encompasses physical status, Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), co morbidities and current medications, psychological and nutritional status and overall social support (Terret *et al.*, 2007). But CGA is not always conducted with treatment protocols and more research is warranted to establish its potential to influence treatment decisions. Assessment of prevalence of co morbidity, disability, geriatric syndromes and a combination of all these factors in older adults with cancer can help in identification of patients who can benefit from treatment and those who will suffer from toxicities and other adverse effects (Koroukian *et al.*, 2006). Better understanding of concepts of co morbidity as well as frailty and disability in older adults can be beneficial in formulating helpful strategies in diagnosis, care and research (Linda *et al.*, 2004). If patients can be ensured comprehensive medical evaluation and early detection then overall co morbid burden can be reduced alongside improved health related quality of life (Alan *et al.*, 2013).

Role of cognition in older adults

Cancer related cognitive impairment can be associated with chemotherapy and studies have reported difficulties with cognition while receiving adjuvant chemotherapy or endocrine therapy in breast cancer patients (Ahles *et al.*, 2008). Most studies on cancer and cognition focus on younger patients but some have also investigated the status of older adults. Lange and colleagues used neuropsychological tests in breast cancer patients to test two categories of memories-episodic memory and working memory in addition to testing executive functions and information speed and their results showed cognitive dysfunction in 41% patient before treatment. This is higher than the estimated population norms in older adults without cancer or their younger counterparts (Lange *et al.*, 2014). A total of 123 female patients >65 years with newly diagnosed breast cancer was chosen for this study and results were defined by z score ≤ 1.5 stan

dard deviations on two cognitive assessment tests and ≤ 2 standard deviation on a single test (Lange *et al.*, 2014). In another study Mandelblatt and colleagues studied changes in cognition newly diagnosed breast cancer patients before they received chemotherapy for treatment. They found no difference in cognition compared to the control group without cancer. The prevalence of cognitive impairment was close in both groups with 14% in the test group and 15% in the control group (cognitive impairment was defined by z score ≤ 1.5 SD below control mean on two cognitive assessment tests or ≤ 2.0 SD on a single test). The study excluded patients with neurodegenerative disorders and those who had a Mini Mental Examination Score of < 24 . The study also found that patients with stage II or stage III cancers presented poorer executive functions. Strong association was also found between cognitive impairment and presence of two or more co morbidities in test group as compared to control (Mandelblatt *et al.*, 2014). This differed from the study by Lange which did not find any correlation between cognitive impairment and cancer stage. Although both the groups studied breast cancer patients who received adjuvant chemotherapy, the study group of Lange had lesser educational qualification as that compared to Mandelblatt. Thus this is indicative of the possibility that those with lower educational background can have more cognitive impairment. In addition the studies by Mandelblatt and colleagues compared their results against a control group which was missing in the study by Lange and colleagues.

Studies have also found that its particularly difficult for older cancer patients to participate in treatment involving intake of oral agents. These may be due to complex dosing pattern, chances of developing toxicity and therefore need based adjustment of doses are required to avoid complications (Cohen *et al.*, 2007; Hurria *et al.*, 2006).

Due to the complex nature of cancer treatment, closer supervision is essential for older patients with cognitive difficulties. The medical team should arrange for regular appointments, written instructions with reminders and regular visits for monitoring of patient condition (Magnuson *et al.*, 2016).

Screening and diagnosis of cancer in older adults

There is need to build clear guidelines for screening older patients with cancer. In most cases screening is left to the discretion of the patients and the parties offering screening programmes or facilities (Field *et al.*, 2008). The cut off age for screening vary widely among different guideline panels. Making individualised cancer screening decisions might be more beneficial than general screening guidelines. Taking into consideration the preferences and values of patients might also be beneficial (Walter *et al.* 2001).

Terry *et al.* found in their study that women with breast cancer were lesser likely to have mammograms if they did not visit their oncology surgeons or doctors for a year even if they had a high chance of recurrence. Improvements to surveillance care for breast cancer survivors need healthcare systems to formulate more comprehensive cancer survivorship program with improved inputs from primary care physicians (Terry *et al.*, 2007).

In contrast Prostate Specific Antigen (PSA) screening in older adults with prostate cancer is much higher than expected. PSA screening is not recommended in elderly men with low life expectancies because of the potential harms. Therefore prognosis is an important factor which should be considered when recommending screening for PSA in elderly males with low life expectancies (Walter *et al.*, 2006).

Staging and treatment of cancer in older adults

Appropriate cancer staging may be lacking in case of older adults. This might prevent them from accessing lifesaving interventions. But studies show that chronological age may not always determine efficacy of treatment but factors such as individual life expectancy, functional reserve, serum levels of interleukin 6 and D dimer, inflammatory cytokines and circulating level of C reactive protein can also influence decision making (Balducci *et al.*, 2007). Combination of comprehensive geriatric assessment, functional test and laboratory evaluation can be instrumental to determine a patient's life expectancy

and functional reserve (Balducci *et al.*, 2007). Many older adults can benefit from cancer treatment similar to their counterparts but still they stay excluded due to reduced tolerance. The treatment modalities in older adults may not be aggressive. For example, older breast cancer patients may not receive adjuvant chemotherapy, radiation therapy or hormone therapy. They may not undergo lymph node dissection. Many older patients miss axillary node dissection in Stage I breast cancer as part of breast conserving surgery. Women in other age groups may also be omitted but its more common among older women. The ten year survival rate is poor among women who do not receive axillary node dissection (Bland *et al.*, 1999). Older adults are often underrepresented in clinical trials and their referrals to specialized cancer centers is also low. Increased number of referrals to comprehensive cancer centers can help older adults access second opinions and broader treatment options (Wedding *et al.*, 2007)

Careful patient selection can lead to satisfactory tolerance to cancer treatment (Kemeny, 2004). Limited evidence suggests that patients with life expectancy of more than five years might even benefit from adjuvant therapy (Muss *et al.*, 2007). Data suggests several older patients who have undergone treatment for colorectal, pulmonary, prostate cancer and blood cancer have tolerated treatment well. In some cases they have also undergone successful pulmonary resection (Mastracci *et al.*, 2006). Molecular targeted therapies have also shown good response either alone or in combination with chemotherapy. Randomized controlled trials show that overall survival in older patients with metastatic colorectal cancer improved when administered with molecular targeted therapies as compared to the control group though further studies are needed to understand treatment related toxicities to optimize the use of these drugs (Chuan *et al.*, 2018). The Pediatric Research Equity Act and the Best Pharmaceuticals for Children Act makes the pharmaceuticals companies label their drugs safe by the Food and Drug Administration. This legislation has drastically increased data on toxicity and efficacy of pediatric drugs (Christensen *et al.*, 2012). Similar legislation in older

patients can help in administering optimal doses with reduced toxicities. In order to make effective choices about treatment it is important to understand how frailty and related factors can introduce adverse effects to treatment. There should be defined levels of frailty that can govern the inclusion or exclusion of patients in a treatment regimen. Frailty might include loss of weight, sarcopenia, osteopenia, loss of appetite (Balducci *et al.*, 2007). Evidence is required as to how these conditions can be aggravated as result of treatments like chemotherapy and radiotherapy (Chen *et al.*, 2007). Both pre frailty and frailty put patients at a higher risk of mortality and post operative complications. Proper assessment of frailty can not only guide treatment but help development of geriatric oncology services (Handforth *et al.*, 2015)

CONCLUSION

Cancer and ageing are multidimensional processes and require multidisciplinary approaches. There is need for pairing up of oncology and geriatrics to design more effective tools and treatment approaches for older adults. Chronological age alone may not be adequate to accurately assess response of older patients to cancer treatment and approaches. Development of patient reported measures in addition to existing clinical practices may be instrumental to improve the experience of older adults suffering from cancer.

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HDAC2 expression upregulation is associated with decreased anti oxidative stress enzymes in the cerebral cortex of drug-induced Parkinson's disease mouse model

**Garima Chandra
S. Prasad***

Abstract

Aging, a universal and unavoidable physiological process, is associated with an array of neurodegenerative disorders such as Parkinson's disease (PD). PD is characterized by resting tremor, rigidity, bradykinesia/akinesia, and postural instability. In addition, the disease is also reported to be linked with several non-motor symptoms such as intestinal disorders, autonomic insufficiency, sleep disorders, cognitive impairment, etc. However, the precise mechanism of such motor and non-motor changes in PD patients in general and the epigenetic aspects in particular is not understood. Current literatures suggest that PD is caused by degeneration of the dopaminergic neurons in substantia nigra pars compacta (SNPc). The molecular underpinnings of the PD-induced brain function disorder especially at the epigenetic level is far from clear. In the present study, we therefore investigated the alterations in the expression of the histone deacetylase (HDAC2), an enzyme responsible for deacetylation of the core histones (H3 and H4) leading to a global inactivation of the genes associated with cognition, α -Synuclein protein by Western blotting and anti oxidative stress enzymes activities by in-gel assay in the cerebral cortex of rotenone-induced PD mouse model. Our data reveal that a mouse model of PD was successfully developed as characterized by upregulation of α -Synuclein protein compared to control mice. This was found associated with significant decrease in

the activities of anti oxidative stress enzymes superoxide dismutase (SOD) and glutathione peroxidase (GPx) and reduced grip strength compared to the control mice. At epigenetic level, our Western blotting results revealed that the expression of the HDAC2 was significantly upregulated in the cerebral cortex of the PD mice compared to control. Our data suggests the association of epigenetic alterations with the genesis and possible progression of PD.

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Keywords: Aging, PD, epigenetics, HDAC2, SOD, GPx

Abbreviations: PD-Parkinson's disease; DMSO-dimethyl sulfoxide; SOD-superoxide dismutase; GPx-glutathione peroxidase; DNA-deoxyribonucleic acid; RNA-ribonucleic acid HDAC2-histone deacetylase2; HRP-horseradish peroxidase; IACUC-institutional animal care and use committee; H3-histone3; H4-histone4; HCL-hydrochloric acid; RIPA-radioimmunoprecipitation assay; TEMED-tetramethylethylenediamine; EDTA ethylenediaminetetraacetic acid; EGTA-ethylene glycol tetraacetic acid; PMSF-phenylmethylsulfonyl fluoride; CAT-catalase

Introduction

Aging is marked by a gradual decline in various physiological functions, increased susceptibility to certain infections, and increased risk of death [1]. It is the biggest risk factor for most of the neurodegenerative diseases [2]. The main cause of age-related accumulation of damage, a feature of all age-related diseases, is the inefficiency of maintenance, repair and turnover pathways. Molecular gerontology research aims at understanding the genetic and epigenetic regulation of molecular mechanisms at transcription, post-transcription processing, post-translational modifications, and interactions between different gene products levels [5]. The aggregation of disease-specific misfolded proteins in the central nervous system characterizes most age-related neurodegenerative disease. These include α -synuclein in PD, β -amyloid peptides and tau/phosphorylated tau proteins in AD, superoxide dismutase in amyotrophic lateral sclerosis, and mutant huntingtin protein in Huntington's diseases [4]. Biological correlates of a link have been elusive despite ample epidemiological data in favour of ageing as the key risk factor for PD in particular.

PD is a progressive neurodegenerative disorder associated with the misfolding of proteins [4]. This misfolded α -synuclein protein, accumulates and forms Lewy bodies in the dopaminergic neurons [4]. Lewy bodies' accumulation starts in the olfactory regions and the lower brain stem, slowly spreads to the middle brain and cortex [35]. The pathology of PD is the cellular loss of dopaminergic neurons in the SNpc region projecting to the striatum [36]. Clinical signs of PD, which include rest tremor, rigidity, and bradykinesia become apparent up to about 80% of striatal dopamine and 50% of nigral neurons are destroyed [36]. In longitudinal cohort analysis, dementia occurred earlier in older-onset patients with PD (> 70 years of age) and their disease course was much shorter than younger-onset patients [37]. The severity of PD, including the emergence of dementia and delusions, is related to the patients' age rather than the onset of illness [3].

An essential explanation for PD is the induction of epigenetic regulation of gene expression affected by environmental factors. Because of their possible involvement in PD, epigenetic mechanisms such as DNA methylation, histone acetylation/deacetylation, and altered micro RNA expression are being intensively studied [6]. Existing literature suggests that PD patients also suffer from cognitive impairment in addition to motor disabilities, however, the precise mechanism of this is not well understood. Also, the therapeutic approach to overcome cognitive loss is not known. The epigenetic mechanism to some extent has been studied in the case of PD leading to motor disorder, however, the involvement of this is not yet known during the PD-induced cognitive decline. The present study, therefore, was carried out to study alterations in the expression of the histone deacetylase (HDAC2), an enzyme responsible for deacetylation of the core histones (H3 and H4) leading to a global inactivation of the genes including those associated with motor, cognitive alterations which might be associated with oxidative stress system enzymes in the cerebral cortex of PD mouse model.

Materials And Methods

2.1 Chemicals and reagents

All chemicals used in the study were of the analytical and biochemical grade and were purchased from Sigma, USA or Merck, India. Anti HDAC2 primary antibody was purchased from Cell Signalling Technology, Inc. and HRP-conjugated secondary antibody against anti-rabbit primary antibodies was obtained from Genie, Bangalore, India. Rotenone and DMSO were purchased from Sigma, USA.

2.2 Animals

Adult Swiss strain albino male mice of approx. 20 ± 3 weeks were used. They were maintained at $25 \pm 2^\circ\text{C}$ RT with 12:12 hr light and the dark cycle respectively. All animals were fed with standard mice feed and water ad libitum. The present study was approved by Banaras Hindu University's Animal Care and Use Committee (IACUC), and the animal use and handling protocol were in accordance with its guidelines.

2.3 Treatment

Six mice were randomly selected for the treatment group and were injected subcutaneously with freshly prepared rotenone once daily at the same time (2 mg/kg WT dissolved in DMSO) for a period of 8 days. Control group (n=6) received equal volume of vehicle (DMSO only) or saline only (equivalent volume; n = 3). The wellbeing of all mice was monitored once daily. Motor impairment tests were performed one day sacrificing the animals. All tests were done after a 30–45 min habituation period to the testing room during the daytime under artificial light and acoustic exposure to reduce the adverse effects of impulsive noise.

2.4 Grip-strength measurement

Grip strength of the forelimbs was recorded using a digital grip force meter (MEDICRAFT GRIP STRENGTH METER). The rat was placed with the forelimbs to catch the grid and was pulled gently to measure the grip strength. The grip strength was measured in Kg.

2.5 Dissection

On 9th day, mice were sacrificed by cervical dislocation following the guidelines of IACUC of Banaras Hindu University. The skull bone was carefully removed by bilateral incision and the whole brain was carefully dissected out from the skull and put into ice-cold phosphate-buffered saline (PBS), the adherent blood was removed and transferred onto a wet blotting paper. Cerebrum from each brain was dissected out, pooled and was stored at -80 for further biochemical tests.

2.6 Analysis of anti oxidative stress enzymes

Total native protein extract was prepared for in-gel analysis of SOD and GPx activities by separately pooling cerebral cortical tissues and homogenizing in ice-cold buffers 50 mM Tris (pH 7.4), 1 mM EDTA, 0.5 mM EGTA to obtain a 10 % homogenate (w/v). The homogenate was centrifuged at 12,000xg for 20-30 min at 4°C. The supernatant was collected and its protein content was measured by the Bradford method [7]. The intensity of the resultant stained SOD and GPx bands was quantified using Alpha Imager 2200 software.

2.6.1 In-gel assay of SOD activity

In order to study the activity of SOD under different experimental condition, 60µg total protein from the experimental and control mice was mixed with sample buffer containing 10mM Tris HCl, Ph7.4, 10% glycerol and 0.0001% Bromophenol blue and resolved on 10% native polyacrylamide gel (PAG) polymerized in 0.375M Tris.HCl, pH7.4 and 250 Mm glycine. At the end of electrophoresis, the gel was carefully washed with triple distilled water, stained in a mixture containing 1.23Mm nitro blue tetrazolium (NBT) 28 mM TEMED for 20 minutes in dark and thereafter, the gel was placed under fluorescent light till the appearance of achromatic bands.

2.6.2 In-gel assay of glutathione peroxidase activity:

Native PAGE of tissue extracts was carried out to test the activity of glutathione peroxidase. The extract containing 80µg protein was loaded in each lane of 10% native PAGE as described earlier. After electrophoresis, the gel carefully removed and was submerged in a 50Mm Tris HCl buffer (pH 7.9) containing 13mM reduced glutathione (GSH) and 0.004%H₂O₂ with gentle shaking up to 5-10 min. The gel was then stained with 1.2 mM NBT and 1.6mM phenazine methosulfate (PMS) till the clear band zones against under fluorescent light appeared.

2.7 Western blot analysis

A 10% homogenate of the pooled cerebral tissue was prepared in RIPA buffer (50 mM Tris-Cl, pH 7.4, 1mM EDTA, 1mM EGTA, 150 mM NaCl) containing 100 µg/ml PMSF and 1µg/ml protease inhibitor cocktail. The resulting homogenate was centrifuged at 12,000Xg and the final supernatant was extracted and aliquoted in small volumes. The total protein content in the supernatant was estimated by the Bradford method [7]. The aliquoted supernatant was mixed with sample buffer (100 mM Tris-Cl, pH 6.8), 2% SDS, 2% β- mercaptoethanol, 20% glycerol and 0.2% bromophenol blue), heated on a boiling water bath for 5-7 minutes and centrifuged at 12,000Xg at 4°C for 20 min. Thereafter, the supernatant was collected. 20µg total protein was loaded onto 12% SDS-polyacrylamide gel and electrophoresis were carried out. After electrophoresis, the gel was carefully removed and

proteins from the gel were transferred onto polyvinylidenedifluoride (PVDF) membrane by wet transfer method. The membrane was then stained with Ponceau-S in order to ensure the protein transfer. Then, the membrane was blocked in 5% non-fat milk powder dissolved in 1X PBS for 3h at RT. The membrane was then incubated with anti-HDAC2 (1:1000 dilutions) primary antibody overnight at 4°C. Following the same protocol, 15% SDS- polyacrylamide gel electrophoresis was carried out for checking the expression level of the biomarker of Parkinson's disease that is α -synuclein protein. And the membrane obtained after transferring the protein from the gel was incubated with anti- α -synuclein (1:1000 dilutions) primary antibody overnight at 4°C. The next day, the membrane was washed 3 times for 5 min in PBST (PBS containing 0.1% Tween 20). After this, the blot was incubated with an anti-rabbit HRP-conjugated secondary antibody (1:1000 dilutions in PBS containing 5% non-fat milk for 3 h and then washed with PBST 3 times for 5 minutes each at RT. The same blot was also processed with rabbit monoclonal anti- β -Actin antibody (1:25,000 dilutions, Sigma-Aldrich, USA) side by side to determine the level of β -Actin as an internal marker. The signal intensity of the specific antibody-protein complex was detected on the X-ray film by the enhanced chemiluminescence (ECL) method. The signals on the X-ray film were densitometrically quantified using a computer-assisted densitometry program (Alpha imager 2200). The scanned value of individual protein signals was normalized with the scanned value of the β -Actin and the quantitation data was expressed as integrated density value (IDV) for HDAC2 expression and α -synuclein expression.

2.8 Statistical analysis

All the experiments were repeated thrice ($n = 3$). Data were expressed as bar value representing mean \pm standard error mean (SEM) using SPSS 16.0 software for windows. One way ANOVA and Student's t-test were used to analyze statistical differences between groups under different experimental conditions. For multiple comparisons, the Tukey's post hoc test was used after one way ANOVA. $p > 0.01$ was considered significant statistically.

RESULTS

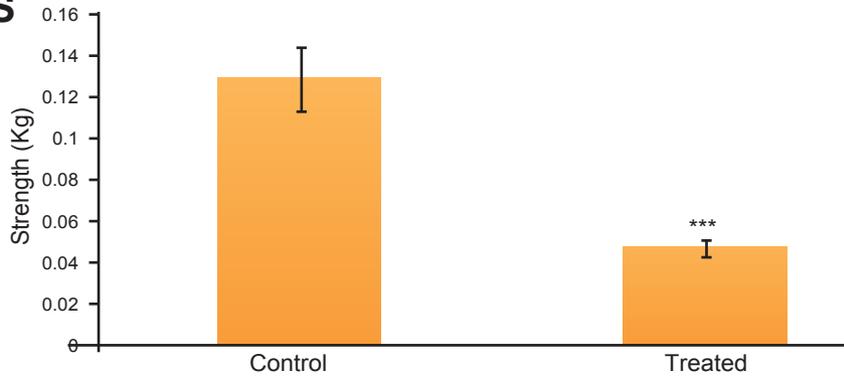


Fig.1. Forelimb grip strength test in control and rotenone treated groups of mice. Data were statistically analysed by student's t-test.
 * Signifies significant difference with N group. (***) $p < 0.001$.

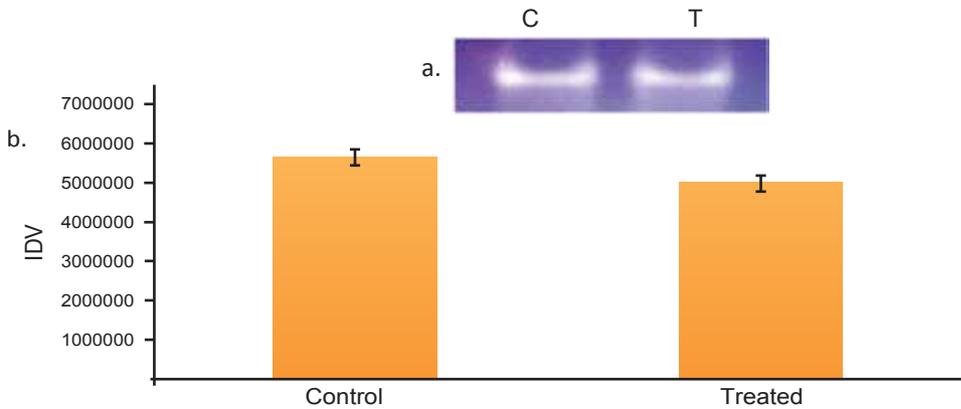


Fig.2(a). Affect of rotenone on the activity of superoxide dismutase (SOD) analysed In-gel Assay.
 (b). Densitometric analysis of SOD activity.

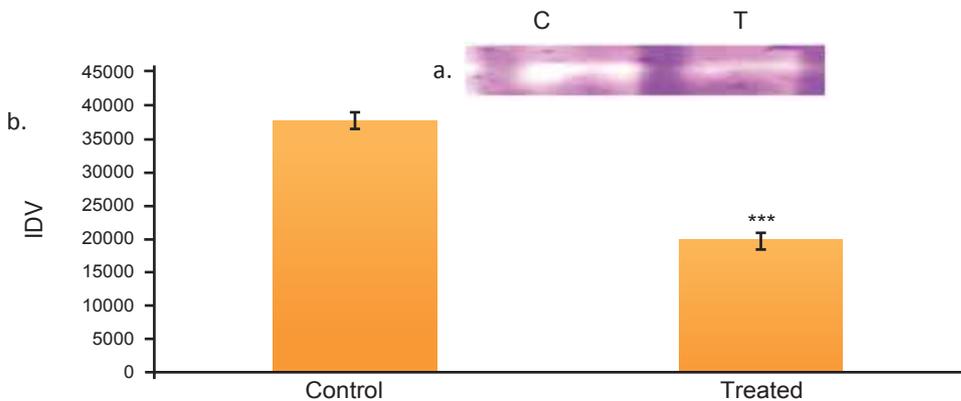


Fig.3(a). Affect of rotenone on the activity of Glutathione peroxidase analysed by In-gel Assay.
 (b). Densitometric analysis of Glutathione peroxidase activity.
 * Signifies significant difference with N group. (***) $p < 0.001$.

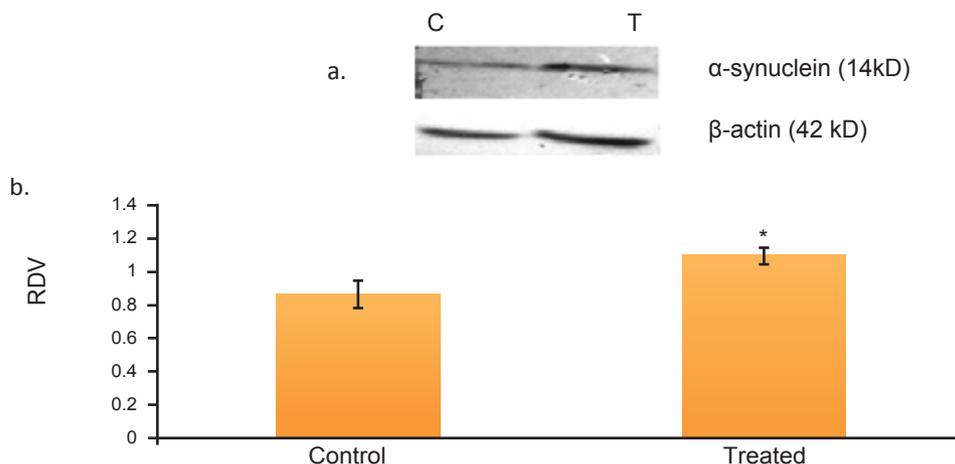


Fig.4(a). α -synuclein protein expression analysed by western blot in the brain of control mice and rotenone treated mice..
 (b). Densitometric analysis of α -synuclein at protein level.

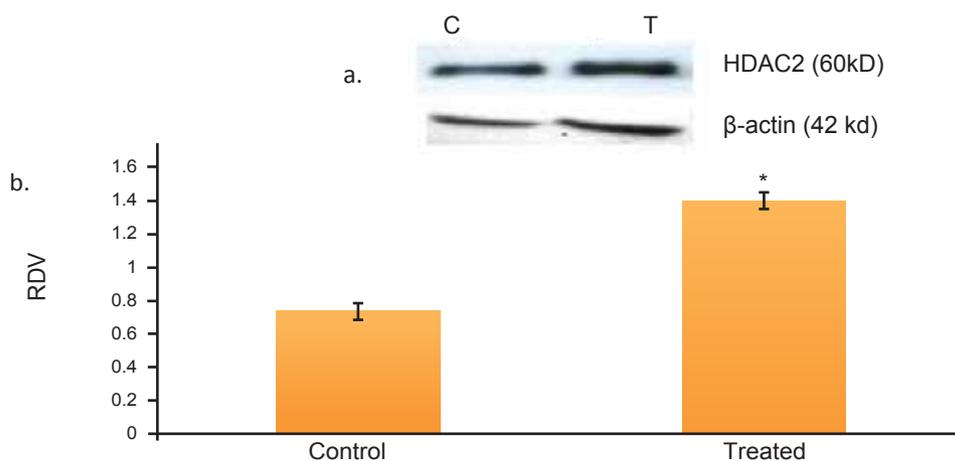


Fig.5(a). HDAC2 protein expression analysed by western blot.
 (b). Densitometric analysis of HDAC2 at protein level.

Two of the rotenone treated animals died during the injection period, resulting in a mortality rate of 22. Therefore, 10 mice were used for further analysis; 4 in the rotenone treated group, 3 in the saline group and 3 in the vehicle group. The saline and the vehicle group showed no difference in behavior and were pooled together in the control group.

3.1 Effect on grip strength activity in rotenone treated mice

Rotenone treated mice showed a significant decrease in grip strength activity during the course of treatment and a significant decrease was recorded at the end of the 8th day of rotenone exposure as compared to the vehicle control group. (Fig. 1)

3.2 Western blot analysis of α -Synuclein expression

Western blot data of the expression of α -synuclein reveal that levels of α -Synuclein protein increased in the cerebral cortex of rotenone treated mice groups in comparison to their levels in the control mice. Levels β -actin protein were found to be uniform and also indicated the uniformity of the lysate used in experiments (Fig. 2a, b).

3.3 Effects rotenone on SOD and GPx activities

Alterations in the activities of anti oxidative stress enzymes SOD and GPx due to rotenone-induced PD were analyzed by in-gel assay method [8] Our in-gel assay data on of their activities at band intensities levels reveal that rotenone causes significant decline in the activities of SOD (Fig. 3a, b) and GPx (Fig. 4a, b) in the cerebral cortex as compared to vehicle control.

3.4 Western blot analysis of HDAC2 expression

Western blot data of HDAC2 expression reveal that levels of HDAC2 protein is significantly uoregulated in the cerebral cortex of rotenone-treated mice in comparison to their levels in the control mice. Protein levels of β -actin were found to be standardized and the uniform value of the lysate used in experiments was also suggestive (Fig. 5a, b) of no effects on this. Our data also clearly shows that the rotenone-induced PD condition alters the expression of HDAC2 protein level.

DISCUSSION

The present data demonstrated behavioral effects of rotenone treatment in mice, such as a reduction of locomotor activity, grip strength, increase in α -synuclein protein which is a biomarker of Parkinson's disease and which could be interpreted as similarities to the clinical signs of PD. The present study also showed alterations in oxidative defense mechanisms and increased expression of HDAC2 protein-level.

Rotenone is highly lipophilic in nature that allows it to cross the blood brain barrier (BBB) and, unlike many other toxic agents, it bypasses the dopamine transporter (DAT) for entry in the cell [11]. Once inside the cell, it accumulates in subcellular organelles such as the mitochondria where it attaches directly to Complex I of electron transport chain disrupting mitochondrial respiration and increasing the production of reactive oxygen species (ROS) thus creating oxidative stress [9,10]. The rotenone model has been used in the present study to explore the different behavioral, biochemical and cellular changes involved in PD pathogenesis. Oxidative balance, mitochondrial Complex I and selective degeneration of dopaminergic neurons have recently been shown to be substantially affected by systemic rotenone administration [12,13]. Mitochondria plays an important role in energy metabolism, calcium homeostasis and the regulation of cell death. Therefore, mitochondrial dysfunction plays a major role in the of pathogenesis PD. The metabolism of dopamine and excitotoxicity increase oxidative stress in dopaminergic neurons [14,15]. Rotenone administration substantially damaged mitochondrial enzyme Complex I and further increased the oxidative stress by increasing lipid peroxidase (LPO), nitrite levels and decreasing glutathiones, SOD and CAT levels in mice. Glutathione plays a major role in the brain by removing ROS formed during the metabolism process, such as the utilization of oxygen by the mitochondria. According to the study, one of the most persuasive characteristics of PD is a decrease of approximately 40% in the levels of reduced glutathione (GSH) in the Substantia nigra in early PD [16]. SOD is a ubiquitous

enzymatic antioxidant found in most tissues and is one of the main antioxidants in the Central Nervous System (CNS) along with catalase and GPx[17]. Decreased activity of SOD in the rotenone treated mice indicates the inactivation of SOD by ROS[17] which leads to the conclusion of increased superoxide radical production. Low activity of SOD and GPx in rotenone-treated mice may also result from the inactivation of the enzymes by H₂O₂[18]. Enhanced superoxide radicals dissociated spontaneously to form H₂O₂. High levels of H₂O₂ may result in their metabolism of enzymatic antioxidants such as GPx being depleted.

Epigenetic modulation is responsible for inducing differential gene expression, a phenomenon that is essential throughout life in order to regulate multiple cellular responses such as development, cellular fate commitment and adaptation to the environment [6]. Environmental factors will threaten the establishment and maintenance of epigenetic modifications, thus filling the gap in our further comprehension of neurodegenerative disease origin and/or progression [6]. Characterized by motor dysfunction due to a loss of nigrostriatal dopaminergic neurons, PD will not be identified until motor symptoms start. There are, however, other non-motor symptoms associated with PD that can appear years, often decades before the motor phenotype begins [19, 20, 21]. These symptoms may include hyposmia, disturbed sleep patterns, gastrointestinal disturbance, anxiety, depression, autonomic dysfunction, and impaired cognition [19, 20, 21]. Ironically, during the first five years after initial PD diagnosis, cognitive dysfunction was recently identified as a prognostic variable for more serious development of motor failure and disability [22]. And while levodopa therapy is reasonably effective in reducing motor symptoms, many studies have shown low, or even unfavorable, therapeutic value in the treatment of cognitive PD symptoms [23,24,25,26,27]. This divergence indicates that the regulation of motor and cognitive symptoms requires specific neuronal networks [28]. Existing literature suggests that PD patients suffer from cognitive impairment, however, the precise mechanism of this is not well understood. Also, the therapeutic approach to overcome cognitive

loss is not known. Synaptic plasticity-related genes such as NMDA glutamate receptor and some of the immediate early genes like Arc and Homer are dysregulated during cognitive processes. The epigenetic mechanism to some extent has been studied in the case of PD leading to motor disorder, however, the involvement of this is not yet known during the PD-induced cognitive decline.

One of the most important purposes of the current study was to assess whether there is epigenetic involvement in motor or the cognitive loss in PD or not. We, therefore, investigated the alterations in HDAC2 activity. For mice, the rise in HDAC2 seems to result in a blockade of learning and memory genes [29]. Acetylation of chromatin-related histone proteins plays a key role in epigenetic transcription control and other cell functions, including neurons [30]. In animal models, decreased histone acetylation was documented in cognitive decline-characterized neurodegeneration, including Alzheimer's disease (AD) models [31]. Similar findings have been reported with PD models [32]. In a rat model of PD, valproic acid, a histone deacetylase antagonist, shows defense against rotenone [33]. Sirtuin-2 inhibitors rescue α -synuclein-mediated neurotoxicity in cell cultures as well as in vivo in a model of *Drosophila* PD [34]. Such findings suggest that a common cause for neurodegeneration in multiple neurodegenerative diseases is dysregulation of acetylation of histone or non-histone protein. Our results reveal that the level of histone deacetylation is up-regulated in the brains of mice injected with rotenone. Increased detection of histone acetylation is also observed in midbrain DA neurons of PD patients [29].

CONCLUSION

Our findings have implications that may underlie the epigenetic alterations in the expression of memory or synaptic plasticity-related genes such as NMDA and AMPA receptors, BDNF, CREBP and several of the immediate early expressed genes, which in turn may lead to PD- induced cognitive impairment.

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LIVED EXPERIENCES OF OLDER FEMALE SEX WORKERS AT SONAGACHI, KOLKATA:

A CASE STUDY

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Abstract

This article reveals the entire trajectory of the lived experiences of older female sex workers (hereafter FSW), starting from their childhood, their entry into sex trade, challenges faced by them in their profession, up to their old age. The unique feature of this study is that it attempts to cover their experiences during their old age. Narratives of 6 FSWs aged sixty years and above, who have been involved with Sonagachi sex trade industry has been recorded through this Case Study. The study reflects that their life experiences had repercussions on various aspects of their own life like poor health outcomes, financial stress, social and societal barriers for majority of the sex workers, and inadequate resources during their old age. Some were found to use it as a medium to recreate special identities for themselves by actively involving themselves with empowering fellow FSWs through collectivisation and capacity building. The article concludes that the need, preferences and challenges of FSWs during their old age needs to be considered and welfare schemes need to be designed to meet their unmet needs.

Originality/value

This study attempts to explore the experiences of older FSWs who have been involved with Sonagachi sex industry from life course perspective.

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Keywords: sex workers, old age, Sonagachi, lived experiences, life course perspective, case study.

BACKGROUND

The population is ageing and the rights, welfare and wellbeing of this cohort is becoming globally more prominent. Whilst research is leading the way and informing this for various groups of older people, this is not the case for older sex workers. Sex workers are discounted and discredited at large by societies and are rarely provided the opportunity to share about themselves and their experiences. This group is double stigmatised and marginalised because of their former professional engagement along with old age and therefore is highly vulnerable in various ways.

In this study older FSWs have been operationalised as those who were women, aged sixty years or older, who had delivered sexual services in exchange of monetary or material gains either regularly or occasionally at Sonagachi sex trade industry and consciously defined this activity as income generating and those who were not in the profession any longer.

1.1 Locale of the Study

This study was conducted at Ward Number Eighteen of Kolkata Municipality Corporation, Sonagachi, North Kolkata, West Bengal, in eastern part of India. It is located at the juncture of Chittaranjan Avenue, Shobhabazar and Beadon Street. Therefore, Sonagachi is the unit of observation. It is the Asia's largest pleasure district and is one of the cheapest sex trade markets. Sex workers here comprise of cisgender female involved in commercial sex work, but did not involve reproductive slavery. Sonagachi has several hundred multi-storeyed large complexes of brothels built in the winding alleys. It houses approximately ten thousand FSW (United Nations Office of Drugs and Crime, 2020). FSWs of Sonagachi not only come from different parts of India but also from neighbouring countries like Bangladesh, Nepal and Bhutan.

The unit of this study were older (aged sixty years and above) FSWs of Sonagachi, who are not in profession. The authors are not aware

of any prior scientific study on the experiences of sex workers of Sonagachi from life course perspective. This study captured the experiences of FSWs including their old age.

METHODS

The present study is qualitative in nature and there is no hypothesis and the outcome of this study are not at all predictable and the information collected through interviews will analyze a social phenomenon through the idiosyncratic perspectives of the group of participants (Babbie, 2008). Exploratory Research design will be adopted in order to explore into the lived experiences of women in sex work as this approach is content driven rather than hypothesis driven as the research doesn't take into account a specific prediction (Guest, MacQueen & Namey, 2011) Exploratory Research design was used to understand the lived experiences of FSWs through a qualitative intervention and therefore has no hypothesis. This study was content driven and not hypothesis driven, therefore the findings from this study could not be predicted beforehand (Hancock, 2009; Guest, MacQueen & Namey, 2011; Kielmann *et al.*, 2012). The older (aged sixty years and above) FSWs of Sonagachi constituted the universe of the study. The participants were recruited through purposive sampling, which is a non-probability sampling technique. The participants who were identified and selected had experience of working at Sonagachi for more than two decades. In addition to their knowledge and experience, their availability and willingness to participate in the research, and their ability to communicate their experiences and opinions in an articulate, reflective and expressive manner was also considered. Therefore, Purposive sampling was selected in order to understand the particular features of the experiences of the older FSWs. This technique is ideal for small scale in-depth studies. Six older FSW were selected through purposive sampling method and primary data was collected through case study method. Their experiences were recorded starting from their childhood, their entry into sex trade, typical day to day challenges in their profession and their experience during their old

age. Data thus collected were thematically analysed (Babbie&Ben-aquisto, 2008).

All procedures performed in this study were in accordance with the ethical standards of the 1964 Helsinki declaration and its amendments thereafter. Informed verbal consent was also obtained from each participant of the study in a language that they understood and utmost confidentiality was maintained during the process. Non-judgmental attitude, acceptance, and controlled emotional involvement were maintained throughout the data collection process, after which data was anonymised.

2.1 Reflexivity

Data collection was done by a female researcher in her late twenties from the month of October to December, 2019. The span of data collection 3 months. She had prior experience of 9 months of volunteering in an NGO which actively works for the rights of FSWs. Her prior experience facilitated her to gain access and acceptance among the research participants and establishing rapport with them. During field visit the researcher went with police protection primarily because of security concerns and the stigmatised environment of the Indian sex industry. During data collection only the researcher and the research participant was present.

2.2 Theoretical Perspectives

Lawton and Nahemow (1973) have argued that the late phase of the human life span is particularly sensitive to the nature and character of Person (P) – Environment (E) interchange, that is P–E interactions and this has been incorporated in the later ageing research and practice (Lawton et al., 1977, 1982, 1983, 1989; Scheidt and Norris-Baker, 2004). With age, people experience decline in their competence as a result of which the range of their activity decreases. Under such circumstances, the older people spend majority of their time in their immediate environment. Therefore, their immediate environment, becomes very important (Oswald et al., 2005). Lawton et al. (1977) suggested a broad understanding of the environment,

including housing, neighbourhoods, out-of-home areas. The major role played by the environment in ageing research has been well grounded, which shows that old age as a critical phase in the life course that is profoundly influenced by the physical environment (Carp, 1987; Lawton, 1982, 1989; Lawton et al., 1973; Rowles et al., 1978, 1983, 2004; Rubinstein, 1987, 1989; Scheidt and Windley, 2006; Wahl et al., 2012). P – E dynamic, that is, the role of the immediate environment on the older individual as proposed by Lawton et al. (1973) plays a significant role in gerontological research, although it's role has largely been neglected (Wahl & Weisman, 2003; Wahl et al., 2010, Wahl et al., 2012). Talley and Crews model (2007) shows older people situated within complex “societal, political, and scientific [forces] that shape their context of care (p-27)”. This ecological perspective illustrates the ways in which the world of older care, usually seen as a set of disparate parts, is in fact a complex whole (Eckenswiler, 2007). Therefore, this model helped us in understanding the experiences of the older FSWs at Sonagachi.

FINDINGS

3.1 Case I

Mrs. C, sixty-seven years old, a former sex worker was widowed at the age of nineteen years. She was facing a lot of problems [financial] and eventually started working as helper of a mason. One such mason suggested her to try prostitution. Thereafter whenever she remained out of work and/or money, she visited Sonagachi and engaged herself with delivering sexual services. In an average day she gave company to around four people and earned around Rs. 500. She rented room at Sonagachi at an hourly rate of Rs. 50. However policemen often arrested her from Sonagachi and imposed fine. Eventually she developed venereal disease and had to leave the trade. She has no savings for her future.

3.2 Case II

Miss. D, 61 years old, was born and brought up at Sonagachi, had completed her primary education and was the eldest among her 6

siblings. She joined the sex trade at an early age and earned approximately Rupees Eight Thousand after paying to Madam. She supported her family and rented her own apartment at Sonagachi. She shared that she once gave birth to a stillborn child. She reported facing problems due to police raid and few of her customers forced her to consume liquor. Miss D saved little money for her old age from her paltry income. She wishes to return to her family someday however she worries about being ostracised by the mainstream society.

3.3 Case III

Mrs. B, separated, sixty-six years old, was married at the age of sixteen years to a petty vegetable seller. Within few years her husband developed tuberculosis, died and she was forced to leave her in-law's home. She started looking for a job desperately as her father became incapable to work anymore. With the help of another villager, she went to the city for a job, however she was sold there. She started earning and took the responsibility of her aged parents. Eventually one of her regular customers became her babu (fixed partner) and they had three children. However, he deserted her after that. She raised her children by herself and tried to provide them better future. She developed syphilis and left the sex-trade and started her new career as an aya(untrained paid caregiver).

In the past violence and coercion was common at Sonagachi. She shared:

“exploitation by madams, moneylenders, gangsters and police raids was common and it influenced the life of FSW. As a result, we had no control over our earning and living.”

At present she cannot entertain her guests because of ageing and has become an activist for the rights of the older FSW. She said:

“after fifty years of age FSWs become discarded and destitute. Government also takes little interest in their welfare.”

3.4 Case IV

Ms. E, separated, 64 years old, entered the sex trade when she was

nineteen years old. She had enrolled herself in a college to pursue her undergraduate degree in legal studies. However due to the sudden demise of her father and the poor economic condition of their family she could not pursue further studies. She joined as a factory worker and started asking her acquaintances for better job opportunities. Eventually she was promised a job and brought to the city, though she was not aware of the nature of the job. She was brought to a home where many other women resided. Soon she found that all of them worked as flying sex workers. Initially she refused to engage herself with this profession but was forced to join. She earned enough after paying her house rent and was able to repay all her family debts within a year. She shared that apart from providing sexual services to customers, she had to give them company in consuming liquor as well and often premier hospitality industries also contacted her through brokers for accompanying their customers. Although she did not face any issues from the police and/or local hooligans she did face difficulty with brokers who forced her to work for additional hours, without remunerating for overtime.

After working in the industry for 7 years, Ms. E got married. However, after 4 years her husband got involved with other women and she returned to the sex trade. She started by renting an apartment at Sonagachi. Eventually she bought a room at Sonagachi, which she now gives for rent and earns her living. While working she got infected with syphilis and was outside the trade for a while. Later she got cured and is not engaged in the profession any more. She shared that she had “experienced extreme oppression of local hooligans and policemen”. She said that the condition of FSWs on Sonagachi has improved over the years, also cala NGO provides regular health-care support.

3.5 Case V

Miss A, never married, aged 61 years, had a firm wish to become an actress since her childhood. She said “I was blessed with beauty and was appreciated for it everywhere”. She knew that she can do it but

“the roadmap for becoming an actress was a nebulous concept” and ultimately, she ended up becoming a sex worker because of her dire family conditions.

She was born in a Brahmin family with indigence means in rural West Bengal and was the eldest among her three brothers and three sisters. Later their family relocated to Kolkata for better economic opportunities when she was fifteen years old and her father joined as a factory labourer. Since her father’s income was inadequate to support a family of 9, her mother took up tailoring work. Within few months her father lost his job due to factory lock out. Her younger brothers became street vendors and she joined her mother’s tailoring shop. During those days a theatre actress often visited her mother’s shop and she offered her a job. Eventually the actress turned out to be a madam of Sonagachi. The latter introduced the former to a businessman. The businessman sedated her and later Miss A found herself in a hotel bed, bleeding and traumatised. The madam helped her to overcome the situation, offered her expensive gifts and cash, and dropped her home. Her parents were able to understand everything and they were shocked, wept and blamed their fate and considered themselves as sinners. Her mother died within a week and her father got infected with tuberculosis. Amidst this family condition, Miss A contacted the madam and initiated her life as a sex worker and became a saviour for her family. Madam connected her with rich clients and took her commission as an agent. Within a brief period, Miss A hired her separate apartment at Sonagachi and was flooded with clients. She shared that although she personally did not face any problem at Sonagachi but others became the victims of violence. She said that these days FSWs are more ‘vocal about extortion and abuse’. Within 3 years with the help of her client, she relocated to Colaba, Mumbai for higher earning and she entertained high profile clients there. She mentioned that “around thirty-five years ago I earned approximately twenty to thirty thousand per month and took the financial responsibility of our family. I spent approximately four lacks for each of my younger sister’s wedding.”

At present, Miss A has left her profession but has settled at her own apartment at Sonagachi. She shared that she earned enough but she always saved for her old age through savings schemes of Bank and Post Office. She has developed some medical conditions like blood pressure, etc.

3.6 Case VI

Mrs. G, aged sixty-two years, lost her father at the age of ten. Due to severe financial crisis, she started looking for a job. However, she was being sold in the city at the age of twelve. She gave company to around ten men each day and was able to purchase her private room at Sonagachi. She gave birth to a son who is pursuing his undergraduate studies. In the past police raids were common. She shared that she took birth control pills as her customers refused to use condoms. As a result, she acquired sexually transmitted disease (STD) but got cured after a long-term treatment. Although she has stopped working, but she has kept her room at Sonagachi and continues to stay there. She shared that although she wishes she cannot go back to her village or anywhere in the mainstream society and therefore would like to spend the rest of her life in this room. She works with a local NGO for the rights of FSWs of Sonagachi and sustains her life from the small income that she generates from there.

DISCUSSION

Focusing on older FSWs subjective experience from their early days to old age, this study examined the obstacles faced by them, their social relationships and resources before becoming involved in sex trade, challenges of working in the industry and their life thereafter. The obstacles they faced during growing up has been a primary reason for their entry in this trade and revealed that economic adversities or poverty as one of the foremost reasons behind it.

Older FSWs at Sonagachi are not a homogeneous group and they varied widely in terms of socio-demographic variables, health condi

tion, place and nature of work they perform (brothel based, street based, hotel based), average load of client they entertained per day and the duration and nature (full time or part time) of involvement in sex work. This study found that many of them opted to remain in the sex industry vis-à-vis other employment prospects because of lack of alternate professional opportunities. Besides, it provided them more autonomy over their body, possibilities for higher earning, flexible working hours and other factors. However, many of them experienced various forms of community perpetrated exploitation, especially in the past. Some of them had also acquired sexually transmitted infections. However, money was not the sole reason for them to remain in this trade and multiple, interrelated reasons also played a crucial role. For instance, childhood poverty, early marriage, early motherhood, lack of education, lack of opportunity to become gainfully employed in their own communities, neglect, abuse and exploitation emerged as some of the pertinent themes.

It emerged that often older FSWs became destitute with advancing age and had nobody to look after them. They reported it to be difficult for them to assimilate themselves back to the mainstream society. They reported facing various challenges due to lack of opportunities for gainfully engaging in any kind of professional activity due to their past baggage, declining health condition, lack of skills and other factors. They also reported facing various challenges due to unavailability of pension schemes or adequate policies to meet their needs, including health care support. As a result, many of them made their second career as madams in brothels or as brokers. The study suggests the need to develop policies for vocationally training them for engaging in different kinds of job so that they can earn their livelihood from alternate income sources. Various other industries need to cooperate by opening their doors to accommodate them. It also suggests the needs to initiate welfare schemes including pension plans and developing separate old age homes for older FSWs.

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Ethical Approval

All procedures performed in this study were in accordance with the ethical standards of the 1964 Helsinki declaration and its amendments thereafter. Besides, informed consent was also obtained from each participant of the study.

Author's Contribution

This paper is a part of post graduate dissertation being conducted by CMIG & recognised by University of Calcutta. Esha Chakravarty designed the study. Piyasi Das collected data under the supervision of Dr. Indrani Chakravarty. Tulika Bhattacharyya prepared the manuscript under the guidance of Dr. Chakravarty.

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NOTES FOR CONTRIBUTORS

All Contributions and correspondence should be sent to Dr. Indrani Chakravarty, Calcutta Metropolitan Institute of Gerontology, E-1, Sopan Kutir, 53B, Dr. S. C. Banerjee Road, Kolkata-700 010. Contributors are requested to conform to the following norms and those articles that do not conform may not be considered.

Journal articles that deal with the biological, medical, psychosocial, service or other aspects of ageing are welcome.

Articles should be original contributions. Redundancy is discouraged. The articles should be written in English, free of grammatical or spelling errors, repetitions etc.

Articles shall contain: A brief introduction (reflecting the context, the review of relevant work and why the present study was planned) : relevant details of plan methodology, sample, (including standardization properties of tools) etc., the results or findings and their discussion and conclusions arrived at. At the beginning of the article the title and names of authors shall be mentioned. (Their affiliation may be given at the bottom of the page). This shall be followed by a brief abstract of the article (not exceeding 100 words) in single space, bold and set off the margins (inset by two spaces). Two or three key words of the article should be provided at the end of the abstract separately.

Articles may be computer generated. Two hard copies, double spaced in A4 size (one side only) with wide margin may be sent. The articles would be adjudicated by referees and the result would be communicated. When the article is accepted contributors are requested to send 2 corrected versions of the article (hard copies) and the same in an electronic version in CD, press ready.

(a) References as below in international style (e.g. journal of Gerontology) arranged in alphabetical order in the Text : (Altekar, 1973, Birren, 1959, Tyson 1983). End list of references:

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23,611-626.

Baltes, P. B. Reese, H. W., & Nesseiroade, J. R. (1988). *Life-span Developmental Psychology: Introduction to Research Methods*. Hillsdale, NJ : Erlbaum.

(b) Footnotes should be avoided unless absolutely essential.

(c) Tables and figures should be clearly laid out, typed in standard format, numbered consecutively, and designed to fit on the page of the journal "AGEING & SOCIETY" of CMIG.