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Effectiveness of Frenkel's Balance Exercises on Elderly People

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ABSTRACT

The objectives of this experimental study were to check the effectiveness of Frenkel's exercises using timed up and go test and Limits of stability component of Balance Master and to compare the effects of conventional exercises with Frenkel's exercises on randomly selected 30 elderly people, age varying from 60 years to 70 years of both the sexes. The subjects of the study were randomly allocated into two groups; the control and experimental group. Both the groups were pre-assessed and the control group was explained home-based exercises and the experimental group was given Frenkel's exercises for four weeks and four days in a week and were assessed after four weeks of intervention by TUG and LOS. It was found that the experimental group showed statistically significant improvement in balance using TUG where $p < 0.05$ but not much difference was found between the control and experimental group in LOS. Based on the present findings, it may be concluded that Frenkel's exercises were effective in improving balance using the Timed Up and Go test. It helped in increasing reaction time and improving gait speed in the elderly population thereby preventing falls whereas Frenkel's can be clinically useful in improving limits

of stability but not much difference was seen. Conventional exercises did not show satisfactory results in both TUG and LOS.

Keywords: Timed Up and Go Test, Limits of Stability.

Falls in older people are common and a major health problem. The pervasiveness of falls is more established in grown-ups. A recent study conducted by Prithviraj found that falls occurred in the morning were reported 44.92 per cent, the majority of falls occurred indoors is 65.43 per cent, 56.45 per cent of fallers reported had slips and 60.55 per cent of fallers had sustained injuries (Stephen and Richard 2001; Andreas Ejupi *et al.*, 2014).

The physiological components used to avoid falls are sensory intellect, reaction time, and responsive stride concerning ageing and the risk of fall in older people (Stephen and Richard 2001). Hence it is important to study age-related changes in the elderly population to focus on the type of training to be given for the prevention of falls.

Age-related changes in elderly people occur in – Skeletal muscles, muscle execution, Focal Neurological Changes, Fringe Neurological Changes, Walking Characteristics. All of the above changes lead to a decrease in muscle strength, poor reaction time, change in gait patterns which ultimately leads to loss of balance. Balance is a foundation of our ability to move and function independently.

Various strategies are employed to prevent fall risks in the elderly population which include: Pilates training, Otago exercises, Lower limb strengthening exercises, Balance training, Multicomponent exercise training, and balance training incorporated with strengthening or any other kind of exercises (Ji Eun Lee, and Hyein Chun, 2019).

A recent study conducted by Efeito da pratica (2018) states that Pilates training for two sessions per week for five weeks is effective in improving both static and dynamic balance in the elderly; similarly, a study conducted by I-Wen Pen, *et al.*, (2019), stated that individualized Tai Chi training for eight weeks improved balance in elderly people by increasing postural stability in them (Di Fabio, and Emasithi, 1997; I-Wen Pen, *et al.*, 2019).

Importance of Co-ordination in Balance

Co-ordination is a combination of optimizing intramuscular and inter-muscular cooperation skills using external and internal feedback mechanisms (Laurence, 2006). It is a process by which motion components are arranged in time and in succession to produce a practical movement design. Problems of coordination are increasing due to age which in turn reduces the reaction time. As the age increases there is slower reaction time. Reaction time is a measure of how quickly an individual can respond to a particular stimulus (Vivian, *et al.*, 2005; Laurence, 2006)

As depicted by Nashner, it is an unpredictable procedure including coordination of numerous sensory, motor, and biomechanical segments. An individual detects the situation of their body according to gravity and the environmental factors by joining visual, vestibular, and somatosensory information sources (Ibid.). Balance developments additionally include movements of the lower leg, knee, and hip joints which are constrained by facilitated activities of muscle along the dynamic chain (Ibid.). In this manner modification of balance capacity is a muddled procedure that requires a combination of tactile data and fitting postural reaction practice. Visual data, are articular and strong, tangible data are coordinated through the focal sensory systems by the visual substantial faculties and the vestibular frameworks to keep up an erect position (Laurence, 2006; Mohammad Reza and Athareh Amiri, 2018). In this manner modification of balance capacity is a muddled procedure that requires a combination of tactile data and fitting postural reaction practice.

Numerous instruments have been created to precisely evaluate balance in clinical settings. The Timed Up and Go Test is used as an evaluating tool for identifying older people at greater risk of falls. Some mechanized frameworks had additionally been created to survey static and dynamic steadiness as an approach to quantify balance in clinical or investigate settings. In the most recent decade, financially created balance assessment systems (Neurocom Balance Master) have been proposed as an approach to acquire increasingly exact, objective, and possibly progressively delicate estimations of the subject's postural soundness.

This programme comprises of an arranged arrangement of activities intended to assist tolerant with making up for the powerlessness to tell where the arms and legs are in space without looking.

Reaction time is a measure of how quickly an individual can respond to a particular stimulus. Frenkel's exercises are a series of motions of increasing difficulty performed to facilitate the restoration of coordination. These exercises are used to improve coordination which may improve reaction time and prevent falls in the elderly population.

Hence the need of the study is to check the effectiveness of Frenkel's exercises in improving balance in the elderly population. Frenkel's exercises are a movement of developments of extending inconvenience performed by ataxic patients to empower the remaking of coordination. Frenkel's activities are accustomed to bringing back the cadenced, smooth and developments. The activities are acted in prostrate, sitting, standing, and strolling positions.

Materials and Methods

This is a randomized control trial in which 30 subjects were included of 60 to 75 years of age. Both males and females were included in the study. Inclusion criteria were the subjects should have experienced fall at least once in the previous year, minimum berg balance score of 20 to 40 and grade less than 3 in Romberg test, tandem walk, heel to the shin, and heel to knee. Exclusion criteria consisted of disability in auditory sensation, vision loss, any neurological deficits which could be self-limiting such as parkinsonism, stroke. Outcome measures used in the study are timed up and go test, and limits of stability component of balance master.

Written informed consent was taken from the subjects before the commencement. Subjects were then randomly allocated into two groups by the chit method. The Control group consisted of 15 subjects. 15 subjects were included in the Experimental group. Pre-assessment was done and the control group was shown a set of conventional exercises and asked to perform the exercises at home for four weeks and four times in one week. The experimental group was given a set of Frenkel's exercises for four weeks and four times in one week. Out of the total 30 subjects, 4 subjects were dropped out.

Frenkel's exercises for the experimental group were given as follows:-

Sitting

1. Sitting; one leg stretching, to slide heel to a position indicated by a mark on the floor.
2. Sitting; alternate leg stretching and lifting to place heel or toe on the specified mark.
3. Stride sitting; change to standing and then sitting down again.

Standing

1. Stride standing; transference of weight from foot to foot.
2. Stride standing; walking sideways placing feet on marks on the floor.
3. Standing; walking placing feet on the mark.
4. Standing; turn around.
5. Standing; walking and changing direction to avoid obstacles.
6. Standing hip abduction and adduction in smaller arcs.
7. Standing hip flexion and extension in smaller arcs.
8. Walking in a straight line.

All the above exercises were given for 4 weeks and 4 times in one week. The exercises were progressed by increasing their complexity. The complexity of exercises was increased by altering the speed and commands. Consecutive exercises were given by giving stopping and starting of commands. All the exercises were given in fairly slow movements as slow movements require good coordination.

Precautions taken during exercises were as follows:

- Subjects were asked to wear appropriate clothing
- Exercises were avoided when the subject was ill such as fever, etc.
- Exercises were asked to stop immediately if the subject felt dizzy or complained of pain in the lower limb.

Frenkel's exercises educated the subjects to use optical, somatosensory, and vestibular signals to maintain balance and to avoid falling.

The Control group consisted of a set of conventional exercises which were as follows:

1. Quad drills
2. Hams curls
3. Side hip strengthening for abductors
4. Calf raises with and without hold support
5. Toe raises with and without hold support
6. Pelvic bridging

All the above exercises were asked to perform for ten repetitions with two sets each. Outcome measures used to assess pre and post readings were:

1. Timed Up and Go Test
2. Limits of Stability Component of Balance Master
- Timed Up and Go Test

The purpose of this test is to assess the balance in the elderly. The gear required incorporates a stopwatch, a standard rocker, and imprint a line on the floor at 3 meters or 10 feet from the edge of the front of the seat. The patient may utilize their typical strolling help and push off with their mind on the arms of the seat to hold up. An older adult who takes > or 10 seconds to complete the TUG is at high risk of falling.

- Limits of Stability component of Balance Master.

Balance was assessed through Neurocom Balance Master. This test assesses static postural sway, dynamic weight shift, and dynamic limits of stability on a stable platform. The LOS measures the greatest separation the patient can purposefully uproot their COG in the four cardinal ways and the four corner to corner headings, and keep up steadiness at those positions. Measured parameters used under this were Reaction Time (RT), Movement Velocity (MVL), Directional Control (DCL), Endpoint Excursion (EPE), and Maximum excursion Limitations (MXE) in patients. LOS may associate to hazard for falls or shakiness during weight-moving exercises, for example, inclining forward to take objects from a rack, reclining for hair washing in the shower, opening the cooler entryway, and so forth. In the Balance

Master Limits of Stability Test, the patient will be asked to follow a path where the centre target is the starting point, and each subsequent target will begin from forwarding, Right Forward, Right Backward, Right, Backward, Left Backward, Left Left Forward, Forward.

Analysis of Data

Statistical analysis was done using the statistical package: WinPepi (version 11.65), and Primer of Biostatistics (version 7). Initially, the normality of the data was analyzed using the Shapiro Wilk test in WinPepi software. Then the difference between the pre and post readings of both the outcomes was compared. The intra-group (within) comparison was done using the Student t-test and inter-group (between) comparison was done using paired t-test.

Findings and Discussion

Table 1
Mean Age, Height and BMI of subjects in both the groups

	Mean \pm SD
Control group	69.38 \pm 4.28
Experimental group	69.23 \pm 4.18
Height (m)	1.51 \pm 0.06
BMI (kg/m ²)	30.51 \pm 4.90

Table 2
Comparison of PRE-Treatment, and POST-Treatment mean score using Timed Up and Go Test.

Group	Pre means \pm SD	Post mean \pm SD	T value	P-value
A	18.69 \pm 3.59	15.15 \pm 3.59	4.56	0.00
B	20.07 \pm 3.75	9.92 \pm 2.59	4.56	0.00
Pre & Pre Control & Experimental (TUG)	T value 0.96	T value 0.96	–	–
	P-value 0.346	P-value 0.346	–	–

The above table shows that the pre-treatment mean in the control group is 18.69 and post mean is 15.15 which shows no significant improvement whereas the control group pre-treatment mean is 20.20

and post mean is 9.92 which indicates that there was a significant improvement.

Table 3
Comparison of PRE Treatment and POST Treatment mean scores using Limits of Stability Component of Balance Master

Group	Pre means \pm SD	Post mean \pm SD	T value	P-value
A	37.04 \pm 7.33	51.9 \pm 7.46	-4.81	0.00
B	39.82 \pm 7.74	53.74 \pm 6.96	-4.46	0.00
Pre & Pre Control & Experimental (LOS)	t-value 0.014	t-value 0.014	-	-
	P-value 0.989	P-value 0.989	-	-

The above table shows that the post mean score increased in both the control and experimental group but there was not much difference seen in the mean score between the groups.

This study evaluated the effects of Frenkel's exercises on balance in geriatric individual with 30 elderly subjects of which 4 were dropouts. All the subjects included in the study were aged 65 years and above having a history of falls in the previous year and were in the category of moderate risk of fall according to Bergs Balance Score. The subjects were selected according to the criteria mentioned and randomly allocated in the Control Group with a mean age of 69.38 years and the Experimental Group with 69.23 years. The duration of the study was four weeks. The primary assessment of the subjects was done by outcome measures like Timed Up and Go test and the Limits of Stability component of the Balance Master. The Experimental Group received Frenkel's exercises and the Control Group received Conventional exercises four times a week for four weeks. Post assessment outcome measures were taken after four weeks of intervention.

Balance and coordination bet on the complex connections within the cerebral cortex, cerebellum, basal ganglia, and peripheral and motor-sensory pathways which lead to a better balance. The super-sensory system involves the mechanisms liable for the intellect of a sensory stimulus along with the communication of the signal via neural pathways to the central nervous system. At the CNS, the signal

is defined by the various centers of the motor cortex and results in motor response which is appropriate for acting quickly or responding to a stimulus. Hence the major aim of the study was to check the effectiveness of Frenkel's exercises on balance and comparing Frenkel's exercises with the control group; whether one is better than the other. In this study, Frenkel's exercises has statistically significant improvement in the Timed Up and Go test variable better than the control group whereas the Limits of Stability component showed clinically significant results. This study shows that Frenkel's exercises proved to be significant in improving balance.

The limits of the stability component assessed the postural stability of the subjects in all directions under five components which are Reaction Time (RT), Movement Velocity (MVL), Directional Control (DCL), Endpoint Excursion (EPE), and Maximum excursion Limitations (MXE) which contribute to the risk of fall in the elderly population. In this study, there were no significant changes found in the postural stability of the subjects which may be because of the less sample size, and also only Frenkel's exercises may not contribute to increasing stability in patients. Wast component exercise programs came out to be the most effective mediation for developing the comprehensive health status of frail geriatric individuals. This statement is supported by literature, in which clear effects on the functional scope are more often observed when more than one physical component, i.e. strength, endurance, or balance comprises the exercises mediation. Physical activity slows the deterioration of the musculoskeletal system, helps prevent disease, and maintains postural control (Buchner *et al.*, 1992). Hence combining Frenkel's exercises with other intervention may give significant results in improving the postural stability of the subjects. (Thomas Cordes, and Laura L. Bishoff, 2019)

The Timed Up and Go test assessed the ability to maintain balance during locomotion. It additionally associates with self adequacy, i.e. the fall viability scale exhibiting the relationship that existed between the dread of falling and useful versatility in the older populace (Ji Eun Lee, and Hyein Chun, 2019). The post readings of the TUG scores showed significant improvement in both the groups but better results were seen in Frenkel's exercises group. The time

required for the subjects to complete the test was reduced in both groups but with more consistent improvement noted in the experimental group.

In agreement with other studies on the effect of exercise programs, there were improvements in balance performance. Lord *et al.*, (1998) evaluated the effects of two contrasting physiotherapy approaches consisting of an abetment approach and a task-aligned approach in Multiple Sclerosis patients. He found out that a rehabilitation program of five to six weeks pre and post-treatment values showed statistically significant contrast in each group, although he did not find any significant difference between the two groups.

Another study conducted by Alessandro Pin, *et al.*, (2011) indicated that there was a huge improvement after 14 meetings of Frenkel's practices in stroke tolerance. The exercises were given in the management of a person with ataxia after a hemorrhagic stroke and a compelling achievement concerning coordination, balance, and functional activities after these exercises were observed.

A study conducted by Grzegorz Manko, and Magdalena Pieniazek (2019) showed that Frenkel's exercises and coaching with the help of stabilometric floor were adequate in an improvement program and anticipated at compressing risk of fall in the elderly population. Though the outcome measures used in the above study were different from our study the study showed the effectiveness of Frenkel's exercise programme on the elderly population by reducing the risk of fall. Another study conducted by Vafaeenasab, *et al.*, (2018) demonstrated that Frenkel's practices developed both static and dynamic parity in individuals more than 60 years old. Our study also accepted the capability of these exercises. Hence In this study, we found out that Frenkel's exercises were effective in improving balance using the Timed Up and Go test. It helped in increasing reaction time and improving gait speed in the elderly population thereby preventing falls whereas Frenkel's can be clinically useful in improving limits of stability but statistically it was not observed.

Future Scope of the Study

This study can be used or compared with various upcoming strategies to improve balance in the elderly population thereby preventing

falls. This study had a low sample size which can be increased to give a better result. The duration of the study was four weeks which can be increased to achieve greater results.

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Life Satisfaction and Emotional Wellbeing among Aged, Living in Activity-Oriented and Non-Activity Oriented Elderly Care Providers

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ABSTRACT

The objective of the study was to determine the level of Life satisfaction and Emotional Well-being among 60 elderly people, (30 activity-oriented and 30 non-activity oriented) age varying from 60 years and above, living in old age homes in Bengaluru, (Karnataka). The tools used in the study were The Satisfaction with Life Scale (Diener, E., et al., 1985) and Emotional Wellbeing Scale (Shermilla and Portia, 2015). Results of the study indicate that there is a significant difference in the Level of Life Satisfaction among elderly residents who live in activity-oriented and non-activity-oriented elderly care providers, indicating the importance of planned activity-oriented old age care homes. Concerning emotional wellbeing, no significant difference between elderly residents who live in activity-oriented and non-activity-oriented elderly care providers was noticed. Furthermore, it was found that there are no significant gender differences in perceived level of life satisfaction and emotional wellbeing among elderly living in old age care homes. The researchers did not find a significant association between life satisfaction and emotional well-being among the elderly, which calls for more research attention and recommendations in future works.

Keywords: Life Satisfaction, Emotional Well-being, and Elderly care Provider.

Life satisfaction is one of the indicators of 'apparent' quality of life. Together with indicators of mental and physical health, it indicates how well people thrive (Veenhoven, R., 1996). The life events that could be highly stressful, due to financial problems, may have a little negative effect on an individual if he or she feels there is some choice (Krause, *et al.*, 1991). The critical point of life satisfaction is that in almost all cases the individual's perception of control within his or her situation appears to be more important than objective measures. Life satisfaction among the elderly has become a key concern area in geriatric care. The dynamic change in lifestyles, the uncertainty of jobs, a shift from joint to nuclear family structures has led to increased neglect of the elderly by families and community.

The field of ageing is concerned with how the dynamics of well-being is perceived as people grow older. Social gerontology has been launched as a field of research with a key emphasis on whether life satisfaction was affected by the ageing process (Neugarten, *et al.*, 1961; Lawton, M.P., 1975). Initial research revealed that ageing was not as strongly linked with a decline of overall wellbeing (Shmotkin, D., 1990). Most of the studies indicate that psychological well-being remains constant or even increases with age irrespective of biological and social changes among the elderly, but life satisfaction does not necessarily decrease in later life (Mercier, *et al.*, 1998).

On average elderly appear to perceive positive and satisfying effective lives. Some disciplines have traditionally viewed late-life results as emotional flattening and disengagement. Adding to this in recent research have indicated that older adults remain emotional beings who not only experience a full range of emotions, but who also seem more proficient than their younger age counterparts in handling the negative affective states (Carstensen, L.L., Pasupathi, M., Mayr, U., & Nesselroade, J.R; Charles, S.T., Reynolds, C.A., & Gatz, M., 2001).

Aging is the strongest clue that time is finite, and individuals may become more optimistic with age by proactively regulating their socio-emotional world (Markides, K.S., & Martin, H.W. (1979; Carstensen, *et al.*, 1999) determined that functional capacity, including the ability to perform activities of daily living, is a predictor of life satisfaction. Even in the oldest old population, greater functional

capacity is associated with greater life satisfaction. The sense of being in control of one's life represents 23 important dimensions of life satisfaction among older adults. Locus of control influences wellbeing, health, and functional capacity, as well as the ability to access social support (Newsom, J. T., & Schulz, R., 1996). Wellbeing and Indicators of health are vital for successful ageing, especially physical health is likely to become compromised in late life, and therefore, both are often assumed to be critical for life satisfaction.

Emotional Well-being

Emotion regulation comprises two approaches (a) cognitive reappraisal and (b) suppression. Cognitive reappraisal allows individuals to modify their evaluation of a potentially emotion-laden situation by reducing negative emotions or increasing positive emotions. It characterises an antecedent-focused strategy, whereas suppression is a response-focused strategy, as it inhibits emotional expression after the emotion onset (Gross and Levenson, 1993). The reappraisal is adaptive, it improves control and buffering of emotional responses, concerning the suppression of emotional behaviours may lead to a surge of emotional intensity resulting in negative consequences in terms of perceived control, as well as cognitive and executive functioning (Gross J.J., 2002; Gross, J.J., & John, O.P., 2003; John, O.P., & Gross, J. J., 2004; Franchow, E.I., & Suchy, Y., 2017).

According to a cross-sectional study, involving Canadian participants in three different life stages, the study showed a strong association of aging with higher levels of emotional well-being and autonomy, and with lower levels of personal growth and purpose (Mackenzie C.S., *et al.*, 2018). Furthermore, a longitudinal study from Sweden showed that the age-related increase in perceived autonomy, mastery and emotional well-being is constantly showing that perceived internal locus of control and emotional stability moderately impact chronic diseases on satisfaction with life among elderly people (Berg A.I., *et al.*, 2011). Adding to this, in another study indicated that high levels of perceived control and the preferential use of adaptive coping strategies are associated with wisdom and both hedonic and eudemonic well-being (Etezadi, S., & Pushkar, D., 2013).

The recurrent evidence of higher emotional stability in old age is confirmed by a few studies compared with younger participants, results indicated that the older adults report fewer negative emotions compared to younger participants (Mroczek, D.K., 2001) and show a preference for low arousal positive emotions (Mogilner C., *et al.*, 2011). Moreover, during social interactions suppression inhibits expressive signals relevant to information exchange, and it leads individuals to focus on the monitoring of their own emotions, rather than on the information coming from their interlocutor (Butler E.A., *et al.*, 2003).

The observations have been interpreted from the perspective of socio-emotional selectivity theory (Carstensen, L.L., & Mikels, J.A., 2005), according to this theory ageing leads individuals to place increasing value on emotionally meaningful goals rather than on long-term, cognitively demanding ones. This preferential resource investment promotes more effective emotion regulation, which is defined as the process through which individuals control their emotional experiences and expressions (Gross, J. J., *et al.*, 1997; Carstensen L.L., *et al.*, 1997; Gross, J.J., 1998). Furthermore, comparative studies at different life stages have highlighted that older adults report more frequent use of cognitive reappraisal and lower use of suppression compared to adolescents and young adults (Urry and Gross, 2010).

Objectives of the Study

- (a) To assess the level of Life satisfaction and Emotional Well-being of the aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities.
- (b) To assess gender difference in perceiving life satisfaction and emotional wellbeing among elderly who are residents of elderly care.
- (c) To determine the relationship between Life satisfaction and Emotional Well-being among aged living in elderly care.

Material and Methods

Sample

60 elderly persons, age varying from 50 years and above, were selected by purposive sampling method from old age homes in Bangalore city in this study. These elderly were divided into two groups: activity-oriented group (15, males and 15 females) and non-activity group (15, males and 15 females).

Procedure

The study was carried out in two phases. The first exploratory phase was carried out using an interview method, where the researchers attempted to understand the nature of activities organised for physical and mental engagement by Elderly care providers. Table 1 below shows the list of activities that are organised by elderly care providers. Every day starts with a set of planned activities such as a laughing session, yoga, and physical exercise.

Table 1
Showing the list of planned activities.

<i>DAY</i>	<i>Kinds of Activities</i>
Monday	Move it or lose it (Physical activity)
Tuesday	Gardening
Wednesday	Singing without seeing lyrics
Thursday	Passing the parcel
Friday	Mind games math riddles
Saturday	Ludo
Sunday	Best cupboard

Tools Used for the Study

- (a) A personal data sheet developed by researchers was used to collect the basic socio-demographic details.
- (b) The Satisfaction with Life Scale (Diener, E., *et al.*, 1985). A 5-item scale designed to measure global cognitive judgments of one's life satisfaction (not a measure of either positive or negative affect). Participants indicate how much they agree or disagree with each of the 5 items using a 7-point scale that ranges from 7 strongly agree to 1 strongly disagree. The tool has good internal

consistency with Cronbach's alpha of 0.88. SWLS showed adequate concurrent validity, with a correlation index with LSI 0.77. It will take approximately 5minutes to complete the test.

- (c) Emotional Wellbeing Scale by Shermila. A, Joycilin & Portia, R., (2015). It is a 26 item, three-point scale. The computed reliability coefficient 0.898 shows that the tool is exceptionally reliable. The computed Cronbach's Alpha values ranging from 0.75 to 0.864 uphold the internal consistency of the instrument. It will take approximately 15minutes to complete the test.

Results

The observed Life satisfaction of the group mean is 50.38 with an SD of 4.31 and for Emotional Well-being is 16.37 with an SD of 5.29. A normality test was used to determine whether sample data in the present study has been drawn from a normally distributed population (within some tolerance). Several statistical tests, such as the student's t-test and the one-way and two-way ANOVA require a normally distributed sample population. If the assumption of normality is not valid, the results of the tests will be unreliable. Therefore, we computed the normality test for samples drawn in the current study (Origin Labs, n.d.)

Table 2
Showing results of Test for Normality.

<i>Test for Normality</i>	<i>Kolmogorov-Smirnova</i>		
	<i>Statistic</i>	<i>Df</i>	<i>Sig.</i>
Life Satisfaction _TOTAL	.163	60	.000*
Emotional Wellbeing TOTAL	.110	60	.069

The above table shows the results of the normality test for life satisfaction; the observed p-value for the Kolmogorov-Smirnov test is 0.001 which is less than 0.05, which is significant suggesting strong evidence of non-normality. Whereas the results of the normality test for emotional wellbeing, the observed value is 0.069 which is more than 0.05 rejecting suggesting evidence of normality.

H1. *There is no significant difference in the Level of Life Satisfaction among aged living in Elderly care that provides regular physical and*

mental engagement by Elderly care providers and compared to elderly care that does not engage in any planned activities.

We computed a distribution-free test to test H1 since the normal distribution for life satisfaction suggested strong evidence of non-normality. To determine differences between two independent groups, Mann Whitney test was used. A Mann-Whitney test indicated that the Level of Life Satisfaction among aged living in old age homes that provide regular activities for physical and mental engagement by Elderly care providers was greater than for elderly (Mean Rank = 44.39) than for aged in elderly care providers that do not provide regular activities for physical and mental engagement.

Table 3

Showing Mean of Life Satisfaction of with activity and non-activity (N=60).

<i>Life satisfaction</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>
Group 1 – Provides activity	44.38	1,331.50	33.500
Group 2 – Do not provide activity	16.62	498.50	
P-Value			.000**

H2: There is no significant difference in Emotional Wellbeing amongst among aged living in Elderly care that provides regular physical and mental engagement by Elderly care providers and compared to elderly care that does not engage in any planned activities.

Since the normal distribution for emotional wellbeing suggested strong evidence of normality, we computed a two-sample independent t-test to determine the difference between the two groups. The table beneath shows the results. The observed $t(58) = .297$, $p = 0.768$ which is not significant at 0.05 level. There is no significant difference in the score for the activity ($M = 51.00$, $SD = 4.91$) and without activity groups ($M = 50.67$, $SD = 3.708$).

Table 4

Showing group statistics for Emotional Wellbeing (N=60).

<i>Activity</i>	<i>Independent Samples Test</i>				
	<i>Mean</i>	<i>SD</i>	<i>t</i>	<i>Df</i>	<i>Sig. (1-tailed)</i>
Group 1 – With Activity	51.00	4.913	.297	58	.0768
Group 2 –Without Activity	50.67	3.708			

H3: There are no gender differences in perceiving life satisfaction among elderly who are residents of elderly care.

We computed a distribution-free test to test H3 since the normal distribution for life satisfaction suggested strong evidence of non-normality. To determine differences between two independent groups, Mann Whitney test was used. The table below shows the results of two groups (N=60). The observed mean rank value of males is 50.60 and female is 51.07. The obtained Mann-Whitney U score is 404.500 with a p-value of 0.499, which is not less than 0.05 significance level. Hence, we accept the null hypothesis. This states that there is no significant gender difference in the level of life satisfaction among elderly care that provides regular activities and those that do not engage in planned activities.

Table 5

Showing Mean of Life Satisfaction of with activity and non-activity.

<i>Life satisfaction</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>
Group 1 – MALE	32.02	960.50	869.5
Group 2 – FEMALE	28.98	869.50	
P Value	.499		

H4: There are no gender differences in emotional wellbeing among elderly who are residents of elderly care.

Since the normal distribution for emotional wellbeing suggested evidence of normality, we computed a two-sample independent t-test to determine the difference between the two groups. Table 6 beneath shows the results.

Table 6

Showing group statistics for Emotional Wellbeing (N=60).

<i>Independent Samples Test</i>					
<i>Activity</i>	<i>Mean</i>	<i>SD</i>	<i>t</i>	<i>Df</i>	<i>Sig. (2-tailed)</i>
Group 1–Male	50.60	4.375	.416	58	.679
Group 2–Female	51.07	4.323			

The observed $t(58) = .416$, $p = 0.762$ which is not significant at 0.05 level. This indicates that there is no significant difference in the score for the Male group ($M=50.60$, $SD = 4.37$) and the female group ($M=51.07$, $SD=4.323$). This states that the null hypothesis is accepted

and there is no significant gender difference in the level of emotional wellbeing among elderly care that provide regular activities and that do not engage in planned activities.

H5: There is no relationship between Life satisfaction and Emotional Well-being among aged living in elderly care.

Table 7
Showing correlation results for Life satisfaction and Emotional Well-being (N=60).

<i>Spearman's rho</i>		<i>Life Satisfaction</i>	<i>Emotional Wellbeing</i>
Life satisfaction	Correlation Coefficient	1.000	.159
Emotional Wellbeing	Correlation Coefficient	.159	1.000
Sig. (2-tailed)		.225	

Results of the Pearson correlation indicated that there was a weak positive association between life satisfaction and emotional wellbeing ($r = 0.15$, $p = 0.25$). Since the observed p-value is > 0.05 indicating that the null hypothesis is true. Hence there is no relationship between life satisfaction and emotional wellbeing among aged living in elderly care.

Discussions

The study aimed to assess the level of life satisfaction and emotional wellbeing of aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities. The observed results for H1 are in line with the study by Banjare, P. *et al.* (2015) on factors associated with life satisfaction amongst the rural elderly in Odisha, India. The findings of the study reveal that the most important variable which affects the level of Life Satisfaction of the rural elderly is cognitive health status. Furthermore, Low score on Activities of Daily Living and Instrumental Activities of Daily living was associated with dissatisfaction with life (Ibid.). In another study on the effects of physical activity programs addressed to older people highlighted their positive impact on adjustment to aging through the promotion of physical health (Battaglia, G., *et al.*, 2016).

Soleman H. *et al.* (2003) examined the relationship between life satisfaction and physical status, emotional health, social support, and locus of control in the frail elderly. Almost 40 per cent of participants reported high levels of life satisfaction. Multiple regression analysis identified four significant predictors of life satisfaction and they are (a) Perceived physical health, (b) (c) social support, and (b) emotional balance, and locus of control. Furthermore, a study investigating the effects of physical activity programs highlighted their positive impact on adjustment to aging through the promotion of physical health (Klusmann *et al.*, 2012; Battaglia *et al.*, 2016; Mack *et al.*, 2017).

Individuals with higher life satisfaction describe themselves as having more extensive, frequent, and reliable social support, as being more socially skilled, and as feeling more content in their relationships with others, as well as engaging in a greater number of pleasant activities. In a study on Life Satisfaction and Associated Factors Among People Aged 60 Years and Above in Six European Countries by Fagerström, C., *et al.*, (2007), the results of Logistic regression analysis revealed the factors associated with life satisfaction among six national samples were fairly satisfactory and unsatisfactory social contacts, poor financial resources, feeling greatly hindered by health problems and self-esteem. Furthermore, it was the ability to perform activities of daily living and the extent of social contacts that gave the greatest risk of low life satisfaction in all the six European countries. Therefore, it can be inferred that the level of Life satisfaction is higher among aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities. Several studies represented by physical health (Angner, E., *et al.*, 2013), social support from family and friends, free time investment (Adams, K.B., *et al.*, 2011; Brajsa-Zganec, A., *et al.*, 2011; Lee J.H., *et al.*, 2014), and physical activity (Klusmann, V., *et al.*, 2012). Leisure activities, arts and crafts, volunteering, sports, hobbies, attending cultural events, and reading (Stebbins, R.A., 2007), are important predictors of both hedonic and eudaimonic well-being (Ku P.W. *et al.*, 2016).

The interview with caretakers among the elderly care that engage in planned activities supports the findings of objective 1. According to Interviewee “At times it is difficult for us to break the ice with them it takes more than a month sometimes. And sometimes it is smooth; they

adjust and blend like a family” (Participant 04). According to another Interviewee “Here we follow one motto – we the members of this home are family we might come from different family backgrounds, but all are treated equally. As we have activities involved people look forward to their tasks every day, they look forward to the next day, they have their own strategy to win which is sweet”. (Participant 05)

Whereas for H2, the results indicated that there is no significant difference in the emotional wellbeing of aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities. This is in line with the study carried out by Tandon, M. (2017) on psychological wellbeing among the elderly, carried out in Lucknow, India. The result showed that there was no significant difference in psychological well-being among elderly residing in elderly care homes and residing in their own homes (Ibid.).

Concerning the second objective of the study, results indicated there are no gender differences in perceiving life satisfaction among elderly who are residents of elderly care (H3 and H4). The observed results are in line with a study on Gender Differences in Function, Physical Activity, Medication Use, and Life Satisfaction Among Assisted Living Residents from 64 assisted living settings across Maryland, Pennsylvania, and Massachusetts. The results showed that there are no differences noted by gender about satisfaction, with the care provided, relationships with staff, or the environment (Resnick, B., *et al.*, 2020). In contrary to observed results a study by Banjare, P., *et al.*, (2015) on the Indian population found out that the relationship between Activities of Daily Living and Life Satisfaction was different between males and females. This drew the researcher’s attention to that diversity presuming that cultural context might be a contributing factor. This required further comparative gender-based study across different regions (metropolitan cities) in India.

The last objective of the study was to determine the relationship between Life satisfaction and Emotional Well-being among aged living in elderly care. It is relevant to note that in an Investigation on Predictors of Life Satisfaction Among the Elderly, it was found that there were no significant effects of quality of life and emotional wellbeing on life satisfaction in subjects (Eshkoor, S., *et al.*, 2015). Furthermore, in a study investigating the relationships between

loneliness, need to belong and satisfaction with personal relationships, it was found that people who report a higher need to belong also report higher levels of loneliness. (Mellor, D., *et al.*, 2008). Therefore, it can be inferred that the relationship between emotional wellbeing and life satisfaction appears to present differently for different age and cultural groups.

Conclusion

The study aimed to determine the Life satisfaction and Emotional Well-being among elderly living in activity-oriented and non-activity-oriented old age homes. The results of the study show that (a) level of Life satisfaction is higher among aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities (b) There is no significant difference in the emotional wellbeing of aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities (c) There are no gender differences in perceived life satisfaction & emotional wellbeing (d) There is no relationship between emotional wellbeing and life satisfaction among elderly.

It is essential for us to bring to the attention that data is collected for the present study by purposive sampling method and with minimum sample size. Hence for future research work we suggest working with a larger sample frame. A comparative study of elderly care homes across the different cities in India is essential to understand the role of cultural diversity in facilitating life satisfaction and emotional wellbeing, and also to understand the role of gender differences. Furthermore, a comparative study of elderly residing in elderly care homes and family structure could be carried out to understand the commonality and differences in life satisfaction and emotional wellbeing. The use of mixed models with interviews or case study will benefit researchers to gain an in-depth understanding of findings from the study which are not directly measurable like family dynamics, vision, and objectives of elderly care organisations. These accounts of experiences and quality data will help to describe underlying factors contributing to life satisfaction and emotional wellbeing.

Despite these limitations, the findings of this study indicate that a significant difference among levels of Life satisfaction is higher among aged living in elder care that provides regular physical and mental engagement activities compared to elderly care that does not engage in any planned activities. Therefore, physical and mental engagement activities are essential and are strong predictors for successful aging. Leisure activities, arts and crafts, volunteering, sports, hobbies, attending cultural events, and reading are important predictors of Life satisfaction. Continued evaluation of Life satisfaction and emotional wellbeing in these settings should be done to help guide and plan activities and shape the structure and functioning of eldercare providers. Current study findings suggest that the deprescribing process may be particularly important for a gender perspective to focus on expanding activity options which include preferences that need to be considered in physical and mental activity assisted settings of elderly care.

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Geriatric Depression and Associated Factors in the Women in Darjeeling Hills

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ABSTRACT

The objective of this cross-sectional survey was to explore the prevalence and associated factors of depression for the 150 elderly women, aged 60 years and above in the Darjeeling hills of West Bengal. Depressive symptoms of the subjects were assessed using the Geriatric Depression Scale (GDS-15) short form developed by Yesavage, J.A., et al., (1982). It was found that out of 150 elderly women 58.7 per cent (n=88) were considered to be depressed. The highest risk factors were the decline in health, impairment of senses, decrease in enthusiasm, and economic insecurity. Depression, particularly mild depression, is common among elderly women and the result confirms that the majority of the elderly women have early onset of depression which was found to be positively associated with increasing age. Based on the present findings it is suggested that quality of life of the aged women can ameliorate if the geriatric health care services are to be improved by the society in general and governmental agencies.

Keywords: Ageing, Activities of daily living, Depression, Elderly, Geriatric, Mental health.

As estimated by the World Health Organization, (2001) the mental and health behavioural disorders are estimated to account for 12 per cent of the global disease. According to the report, some 450 million people suffer from a mental or behavioural disorder (Ibid., pp. 3) whereas major depression affects only about 1 per cent to 2 per cent of community-dwelling older persons (Beekman *et al.*, 1995). According to Hardy (2011), the physical symptoms of depression in the elderly are changing in appetite, bowel changes, looking sad miserable or unkempt, sleep disturbance, headaches, general aches and pains, palpitation.

The psychological symptoms are feelings of sadness, feeling fed up, feeling low or flat, loss of interest and reduction of participation in daily life, negative talks, preoccupation with morbid thoughts, and slow and monotonous speech. Depression in the elderly culminates from health problems, financial instability, lack of love, care, and respect, feelings of worthlessness, guilt, or low self-esteem.

Depression is more common in women than in men. Global Burden of Disease 2000 (GBD, 2000) estimates the point prevalence of unipolar depressive episodes to be 1.9 per cent for men and 3.2 per cent for women, and that 5.8 per cent of men and 9.5 per cent of women will experience a depressive episode in 12 months (World Health Organization, 2001, pp. 30). Sonnenberg *et al.*, (2000) showed almost twice as high a prevalence of depression for women than men. They also found that sex differences in association with risk factors were small, but females were considerably more exposed to risk factors than men.

Older women are of special interest as their absolute number is more than elderly males. According to the Population Census 2011, there are nearly 104 million elderly persons (aged 60 years and above) in India; 53 million females and 51 million males (Central Statistics Office, 2011).

The objective of this study was to find out the prevalence of depression as a mental health problem among the elderly women of Darjeeling hills, West Bengal.

Materials and Methods

Sample

In this cross-sectional descriptive study 150 elderly women, age varying from 60 years and above, were selected by stratified random sampling method from rural and urban areas of Darjeeling district and the newly carved Kalimpong district (an erstwhile subdivision of Darjeeling district) of West Bengal.

Informed consent was obtained from the interested elderly women respondents before the study began. Respondents suffering from deafness and severe mental deterioration were excluded. The respondents were assured that “the elicited information will be kept confidential and no potential conflicts of interest, financial or otherwise will be disclosed”.

Measure

A 15 item Geriatric Depression Scale (Yesavage J.A., *et al.*, 1982), which is a self-report scale, was used in the study. GDS, a self-reporting scale, is a shorter version of the scale consisting of 15 questions whereas the longer version consisted of 30 questions.

The respondents are asked to respond to 15 questions by answering yes or no based on how they felt over the past week in their life. Each negative answer carried 1 point and thus more the scores were, the more chances of having depression. The scores of 0–4 were considered normal; 5–8 indicated mild depression; 9–11 moderate depression and 12–15 severe depression. The maximum score one could get was 15 which would indicate severe depression.

Data Collection

A pre-structured questionnaire was used which consisted of socio-demographic information covering a diverse set of parameters including age, sex, marital status, education, economic dependency level, living arrangements, and activities of daily living (ADL). Stress contributes to psychological problems for elderly women which is the associated factor for depression. The questions related to major life stressors were sought from the elderly women as yes or no options and this was multiple response questions, ‘what are your major life

stressors: death of a spouse, staying away from loved ones like a child, conflict with children, marital conflicts, absence of family, economic insecurity, degradation of status in the community, a decline in health, cognitive decline, impairment of senses, decrease in enthusiasm, and altercation of sleep. The GDS-15 tool was used to screen the prevalence of depression among elderly women.

Statistical Analysis of Data

The data were analyzed by using SPSS (Statistical Package for Social Sciences) version 19. Frequency distribution tables were calculated for the variables. The chi-square test was used to test the relationship between two categorical variables. A p-value of <0.05 was taken as the criteria of significance for all purposes.

Result

Demographic Characteristics

Table 1
Socio-demographic Characteristics

<i>Characteristics</i>		<i>N</i>	<i>%</i>
Age Group	60–69	92	61.3
	70–79	40	26.7
	80 and above	18	12
Marital Status	Never married	5	3.3
	Married	60	40
	Widowed	78	52
	Divorced/Separated	7	4.7
Educational level	Illiterate	90	60
	Primary (I–IV)	26	17.3
	Upper primary (V–VIII)	15	10
	Secondary (IX–X)	10	6.7
	Higher Secondary (XI–XII)	4	2.7
	Graduation	4	2.7
Economic Dependency	P.G. & Professional	1	0.7
	Independent	50	33.3
	Dependent	100	66.7
Living Arrangement	Living alone	8	5.3

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	Living alone with a servant	3	2
	Living with spouse only	18	12
	Living with spouse & servant	2	1.3
	Living with children	65	43.3
	Living with spouse & children	39	26
	Others	15	10
Perform ADL	Yes	139	92.7
	No	11	7.3

Computed from fieldwork

Prevalence Estimates

Table 2
Prevalence of Depression among the Elderly Women as per Geriatric Depression Scale (n=150)

<i>Depression per GDS score</i>	<i>N</i>	<i>%</i>
Absent/Normal (0-4)	62	41.3
Mild (5-8)	56	37.3
Moderate (9-11)	22	14.7
Severe (12-15)	10	6.7
Total	150	100

Computed from fieldwork.

Table 3
Socio-demographic Characteristics and Depression (n=150)

<i>Variables</i>		<i>Normal (n=62)</i>		<i>Depression present (n=88)</i>		<i>x²</i>	<i>p-value</i>	<i>Significance</i>
		<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>			
Sex	Female	62	41.3	88	58.7			
Age Group	60-69	44	47.8	48	52.2	12.288	p<0.05	S
	70-79	17	42.5	23	57.5			
	80 and above	1	5.6	17	94.5			
Marital Status	Never married	1	20	4	80	17.275	p<0.05	S

Cot'd...

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Educational level	Married	34	56.7	26	43.3		
	Widowed	26	33.3	52	66.7		
	Divorced/Separated	1	14.3	6	85.8		
	Illiterate	28	31.1	62	68.9	20.969	p<0.05 NS
	Primary (I-IV)	14	53.8	12	46.1		
	Upper primary (V-VIII)	9	60	4	40		
	Secondary (IX-X)	3	30	7	70		
	Higher Secondary (XI-XII)	4	100	0	0		
	Graduation	3	75	1	25		
	P.G. & Professional	1	100	0	0		
Economic Dependence	Independent	29	58	21	42	12.712	p<0.05 S
	Dependent	33	33	67	67		
Living Arrangement	Living alone	2	25	6	75	32.230	p<0.05 S
	Living alone with a servant	0	0	3	100		
	Living with spouse only	8	44.4	10	55.5		
	Living with spouse & servant	2	100	0	0		
	Living with children	23	35.4	42	64.6		
	Living with spouse & children	23	59	16	41		
	Others	4	26.7	11	73.3		
	Perform ADL	61	43.9	78	56.1	30.196	p<0.001 S
	No	1	9.1	10	91		

S signifies Significant Computed from fieldwork

NS signifies Not Significant.

Screening of Depression Using the GDS-scale

Using the GDS-15 scale the depression of the elderly women in the Darjeeling hills was assessed. The GDS-15 scale included 15 questions where a score of less than 5 was normal and more than 5 was suggestive of depression. Table 6 lists individual GDS-15 items reported by elderly women. The most commonly endorsed symptom

was a major response of 'yes' (66.7%) to the question, 'Do you prefer to stay at home rather than going out and doing new things?'. 76.7 per cent of the elderly women said a 'no' when asked, 'Do you feel full of energy?'. The third most commonly endorsed symptom was a positive or yes response (65.3%) to the question, 'Do you often feel helpless?'. 82.7 per cent of the elderly women respondents feel that their situation is not hopeless and 60 per cent of the elderly women feel that they are better off than most people.

Table 6
Frequency of GDS-H Items of the Women Elderly population (n = 150)

<i>Depressive Symptoms (GDS-H items)</i>	<i>Yes</i>	<i>No</i>
1. Are you satisfied with life?	129(86%)	21(14%)
2. Have you dropped many of your activities and interests?	76(50.7%)	74(49.3%)
3. Do you feel that your life is empty?	66(44%)	84(56%)
4. Do you often get bored?	37(24.7%)	113(75.3%)
5. Are you in good spirits most of the time?	103(68.7%)	47(31.3%)
6. Are you afraid that something bad is going to happen to you?	11(7.3%)	139(92.7%)
7. Do you feel happy most of the time?	75(50%)	75(50%)
8. Do you often feel helpless?	98(65.3%)	52(34.7%)
9. Do you prefer to stay at home rather than going out and doing new things?	100(66.7%)	50(33.3%)
10. Do you have more problems with memory than most people?	67(44.7%)	83(55.3%)
11. Do you think it is wonderful to be alive?	142(94.7%)	8(5.3%)
12. Do you feel pretty worthless the way you are?	36(24%)	114(76%)
13. Do you feel full of energy?	35(23.3%)	115(76.7%)
14. Do you feel that your situation is hopeless?	26(17.3%)	124(82.7%)
15. Do you think that most people are better off than you are?	90(60%)	60(40%)

Computed from fieldwork

Associated Factor for Depression

Various life stressing events influence the behaviour of elderly women which affects their mental health culminating in depression. Most of the mental health problems originate because of stress which is a threat to the wellbeing of the elderly. The factors associated with the development of depression in elderly women are health problems like irritability, insomnia, and anxiety. Anxiety among elderly women develops when they think about their or other's future or from an

unsatisfactory interpersonal relationship. Lack of financial resources, death of a spouse, staying away from loved ones, family conflict, absence of family, work stress, degradation of status in the community, a decline in health, all of these contributes to changing behavioural attitudes which give rise to depression. Some stressful events become predominant among elderly women posing a threat to their mental as well as their physical wellbeing.

Discussion

The overall prevalence of depression among the elderly women in Darjeeling hills was found to be 58.7 per cent (Table 4). Swarnalatha, N. (2013) in a study of the prevalence of depression among the rural elderly in Chittoor district, Odisha found the prevalence of depression to be significantly more in elderly females (56.5%) than in the male subjects (37.5%). In most studies, it is reported that women have a higher prevalence of depression than men as is seen among the elderly Sudanese as reported by Assil, *et al.*, (2013, pp. 440).

In the present study, it is observed that the prevalence of depression increases with increasing age. In the age group of 60–69 years, 52.2 per cent of the elderly women were diagnosed with depression which can be called the early onset of depression (Table 4). This is the transitional period in the life of the elderly where one gets retired from active roles from their workplace or a significant reduction in social activities is noticed. This leads to depression among elderly women. Those with early-onset depression are more likely than those with late-onset depression to have a family history of depression, possibly implying that occurrence of the disorder was genetically influenced (Heun, R., *et al.*, 2001). Some of the reasons for the sudden increase in the prevalence of depression with advancing age may be increased economic and physical dependency, loss of a spouse, negligence by the family members, and loss of self-esteem (Swarnalatha, 2013, pp. 1359).

Increasing depression in older women was noticed in the study area among the widowed (66.7%) and divorced or separated (85.8%) elderly women (Table 4). It is observed that elderly women are less likely to be married and more likely to be widowed (Girgus, *et al.*, 2017, pp. 7). Divorced or separated status and prevalence of

widowhood of the elderly women degrade their social status, increases the negligence from the family members, financial and physical dependency on others may be the reasons for the increased prevalence of depression. In another study conducted by Sinha, *et al.*, (2013) in Sembakkam village of Kancheepuram district of Tamil Nadu found depression more common among the widowed (76.9%) compared to married and the findings are consistent with the present study. In the present study, 46.4 per cent of the elderly women considered the death of a spouse as a stressful event in their life which may be the cause of depression among the widowed elderly (Table 6). Compared to women, men are also more likely to become depressed following loss of a spouse and to remain depressed longer (Fiske, 2009, pp. 12). The sudden detachment of the emotional and positive support received from their husbands brings loneliness and social isolation among the elderly women which may be the cause of depression.

Elderly women who have suffered from the sudden break of lifelong relationships have undergone stress. Marital conflicts often break a relationship of trust and love leading to strained relationships creating depression among elderly women. In Darjeeling hills, polygamy is still prevalent and the second wife is referred to as '*Kanchi Boori*'. Both the wives try to attain a principal position in the life of their husband, but only one succeeds in attaining the favorite position. This gradually leads to the condemnation of the other wife and generally, the first wife is the sufferer. This emotional friction steers divorce or separation in the lifelong relationship among elderly women. Marital disenchantment may surface during the latter stages of the family life cycle resulting in reduced satisfaction with the relationship, loss of intimacy, and less sharing of activities (Kart, 1997, pp. 250).

In the present study area, it is observed that an increase in literacy status did not decrease the prevalence of depression as is seen that 68.9 per cent of the illiterate elderly women had depression (Table 4). The elderly females with a high educational level (senior high school or above) were not less likely to suffer from geriatric depression in this study. The findings are similar to those of the current study in China where older women with lower educational levels and incomes, poor social support, and fewer social activities contribute to a higher

prevalence of depression (Cong, *et al.*, 2015, pp. 31). The findings suggest that more attention should be paid to improve the education level of women and to enhance or inculcate the importance of education among the girl child.

Economic dependency depends on the financial status of the aged women. Economic insecurity is a major stress factor that culminates into depression. 45.7 per cent of the aged women in the study area regarded economic instability as a major stress factor (Table 6). In the present study, 67 per cent of the elderly respondents were prone to depression who were economically dependent on others (Table 4). Those who were financially stable were also prone to depression but the number is comparatively less (42%) (Table 4). Lack of financial resources has a great bearing on the life satisfaction and subjective wellbeing of aged women. With minimal financial resources at their hand, they can procure the necessary or comfortable amenities at their will without being dependent on others. Financial independence strengthens their willpower and they feel happy and complete that they are not a burden on anyone which also increases their self-esteem. According to Sonnenberg, *et al.*, (2000), the risk factor for women constituted of no longer being married, having completed a lower level of education, lower income, one or more chronic physical illnesses, and one or more functional limitations.

The elderly women in Darjeeling hills who were living alone with a servant (100%) and living alone (75%) had a high prevalence of depression (Table 4). The lowest prevalence (0%) was found with those aged women who were living with spouse and servant (Table 4). Living alone with spouse and servant is a major transformation in the living arrangement of our society. This had increased the companionship with their spouses and are happy together in each other's presence. Traditional large families and family ties are weakening. Children have migrated for employment leaving the elderly to look after themselves. But the rate of depression was high among those aged women who were living all alone or only with servants. The absence of family may be due to migration of children for employment, conflict with family members, or loss of a spouse. In the present study, 30.9 per cent of the aged women reported staying away from loved ones as a stress factor (Table 6). Similarly, 23.6 per cent of the aged

women reported conflict with children as major life stressors which culminate into loneliness, sadness, and melancholy (Table 6).

The loss of a spouse is one of the most important factors for the increased prevalence of depression among elderly women who are living alone or living with servants or children. Conflict with children, absence of family, and degradation of status in the community may be the reasons for the increased prevalence of depression among the aged women as compared to those who were living with their spouse or spouse and children. Those elderly women who are living with their children also have a high prevalence of depression (64.6%) (Table 4) which reflects that the void created after the death of a spouse cannot be filled which brings down an atmosphere of loneliness and insecurity. According to Symth (2016, pp. 2) which states that in Britain a million older people are lonely, a figure expected to increase by 6,00,000 within two decades and isolation has previously been linked to dementia and early death. Also, Nicole K. Valtorta *et al.*, (2016) analyzed data from 23 studies involving 1,80,000 people to conclude that lonely people were also more likely to get heart disease or have a stroke.

In the present study, it was found that the prevalence of depression increased irrespective of whether they were able to carry out their activities of daily living (ADL). 56.1 per cent of the aged women who were capable to carry out the ADL independently had depression, while it was 91 per cent of those who were dependent on others for the ADL had depression (Table 4). Differences in ADL prevalence may also stem from differences in the meaning of dependence and the availability of family help (Deeg, 2007, pp. 196). The inability to perform the ADL is primarily due to poor health status among the elderly. Elderly patients encountered with one or more chronic diseases are likely to suffer from geriatric depression and the disease which progresses and biologically weakens one's mechanism making them disabled further elevates the depression. 55 per cent of the elderly women stated that decline in health has been a major reason for stress (Table 7).

Many associated factors are associated with depression. Stressful events in late life include such factors as financial difficulties, bereavement, a new physical illness or disability in self or family

member, change in living situation, and interpersonal conflict (Fiske, 2009). If the frequency of the stressful event is increased the depressive symptoms are believed to aggravate. Cognitive decline/dementia is an inexorable part of growing old. The cognitive decline becomes cognitive impairment when impairment of memory plus impairment of at least one other cognitive function is sufficient to interfere with daily activities (Bond, 2004). Dementia gives rise to Alzheimer's disease where a person becomes forgetful. Girgus, *et al.*, (2017) find in a study of individuals with dementia that elderly women with mild dementia had more depressive symptoms. In the present study, 22.7 per cent of the elderly women reported cognitive decline or mental slowness (Table 7).

Table 7
The associated factor for depression among the elderly women

<i>Associated factor</i>	<i>Yes (%)</i>	<i>No (%)</i>
Death of spouse	46.4	53.6
Staying away from loved ones	30.9	69.1
Conflict with children	23.6	76.4
Marital conflict	5.7	94.3
Absence of family	15	85
Economic insecurity	45.7	54.3
Degradation of status in the community	19.3	80.7
Decline in health	55	45
Cognitive impairment	22.7	77.3
Impairment of senses	61	39
Decrease in enthusiasm	78	22
Altercation of sleep	38	62

With advancing age, there is impairment in the sensory process which can affect the sense of vision, taste, smell, and touch. The decline in any of these functions among the elderly leads to depression. 61 per cent of the aged women in the study area reported impairment of senses as an associated factor for depression (Table 7).

A decrease in enthusiasm is reported when the functional capacity declines. The functional capacity declines because of increased disability and diseases which degrades the cognitive and psychomotor abilities of the aged women. 78 per cent of elderly women echoed the

same that there has been a decrease in enthusiasm in their life (Table 7). As the elderly are not exposed to any kind of physical and social activities innumerable thoughts and tensions creep in their minds which gradually leads to depression.

Stress leads to altered sleep patterns. Sleep disturbance is a risk factor for depression among older adults. Among older adults, insomnia is a risk for both onset and persistence of depression (Fiske, 2009). The reduced duration of sleep intensifies irritability and anxiety among the aged women which have been mithered by 38 per cent of respondents (Table 7). Cong *et al.*, (2015) confirmed that sleep problems were positively related to a higher depression rate for elderly Chinese cadres.

Conclusion

Depression among aged women is a substantial problem in Darjeeling hills especially among the widowed and divorced or separated elderly. Elderly women suffer stresses in late-life which contributes directly to depression making them more vulnerable. The family members of the elderly women sometimes dismiss the depressive symptoms as being 'normal'. This attitude largely hinders the treatment of depressed elderly women. Moreover, discrimination and stigma regarding mental health have created a 'treatment gap' and therefore most of the aged women are reluctant to share their mental and psychological issues. Lack of awareness from society and improper mental health diagnosis of elderly women have created a setback in geriatric care. More research and involvement of health workers, as well as the positive attitude of family members towards mental health, may meet the problems of the elderly. It can be said that depression contributes to more stressful experiences which interfere with the day-to-day function of the aged women minimizing their well-being and personal control. This entails a tremendous loss in the quality of life of elderly women.

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Quality of Life in the Elderly: Role of Functional Autonomy and Psychological States

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ABSTRACT

The purpose of this study was to assess whether functional autonomy (FA) and the psychological states of distress, depression, anxiety and somatization in the elderly predicted their quality of life (QoL). Participants in this quantitative correlational study were 184 elderly individuals. QoL was measured using the Older People's Quality of Life Questionnaire (Bowling, 2009), FA was measured using the Katz Index of Independence in Activities of Daily Living (Katz et al., 1970) and psychological states were measured using the Four dimensional symptom questionnaire (Terluin et al., 2006). Results indicated that distress, depression, anxiety, somatization and functional autonomy predicted eight different dimensions of quality of life. The need for psychosocial interventions involving social support as well as psychological support was addressed.

Keywords: Functional Autonomy, Distress, Depression, Anxiety, Somatization, Quality of Life.

World Health Organization (WHO) in 1996 defines Quality of Life as an “individual's perception of life in the context of culture and value system in which she or he lives and in relation to her or his goals,

standards, expectations and concerns.” The rapidly growing population of the elderly across the world and increase in life expectancy owing to better healthcare and resource availability has made it risky as well as challenging to maintain their quality of life.

Functional autonomy is understood in the context of the study on elderly population as them being independently able to perform their activities of daily living (ADLs). Activities of daily living comprise of fundamental skills needed to manage basic physical needs in the areas such as eating, grooming/personal hygiene, transferring, dressing, toileting (Mlinac & Feng, 2016). Being functionally autonomous predicts physical fitness and the state of having an active as well as healthy lifestyle in the elderly.

Studies have also shown that the elderly face many health as well as psychosocial problems. The psychosocial problems that the elderly most often face are loneliness, depression, hopelessness, anxiety (Jamwal, 2016; Sarin, *et al.*, 2016; Adeleke, *et al.*, 2017). In addition to these, they also face abuse and violence. It is seen that the abuse affects their mental health severely (Evandrou, *et al.*, 2017).

The health problems that the elderly face are the diseases related to the cardiovascular system, endocrine, nutritional as well as metabolic diseases and non-communicable diseases. Some of the other chronic maladies that also affect them are those pertaining to the ears, eyes, urinary and breathing difficulties, renal and joint pains, choked nostrils, cachexia and in some cases even, paralysis (Ouslander & Beck, 1982).

The four psychological states taken into consideration in this study are distress, depression, somatization and anxiety. Distress is mainly associated with psychosocial dysfunctioning, while depression is associated with significant and marked impairment in daily functioning characterized by low mood, anxiety is characterized by one’s daily activities being interfered with strong feelings of fear and worry while somatization is characterized by the manifestation of bodily symptoms due to the presence of some psychological distress (Terluin, *et al.*, 2006).

Quality of Life is found to be diminished in those elderly with severe anxiety (Bourland, *et al.*, 2000). The study reports the reason being the highly reduced levels of optimism. Another study reports depression being one of the major disabling conditions in the older population. The risk of mortality increases and quality of life gets

influenced negatively. Depressed older individuals are also found to have poorer quality of life in comparison to their non-depressed counterparts (Sivertsen, *et al.*, 2015). The study reveals the severity of depression predicting poorer quality of life. While the relationship between quality of life and somatization hasn't been much investigated, poorer quality of life has been found to predict greater level of psychological distress (Atkins, *et al.*, 2013). Bornet, *et al.*, (2017) report that functional autonomy is one of the prime predictors of quality of life in the elderly. Increase in physical functioning and flexibility also leads to an increase in the quality of life and vice versa in the elderly population (Gonçalves, *et al.*, 2011).

To gain a better understanding, this study focuses on the role of functional autonomy and psychological states (such as distress, depression, anxiety and somatization) on the quality of life in the elderly.

Rationale

Though a considerable number of studies have been conducted on the elderly yet, most of the studies have taken depression or anxiety or both of them together as indicators of distress. These three variables have not been studied separately which this study investigated. Also, functional autonomy and psychological states have been explored most often in clinical population and rarely in the general population, while this study has explored them on healthy elderly individuals.

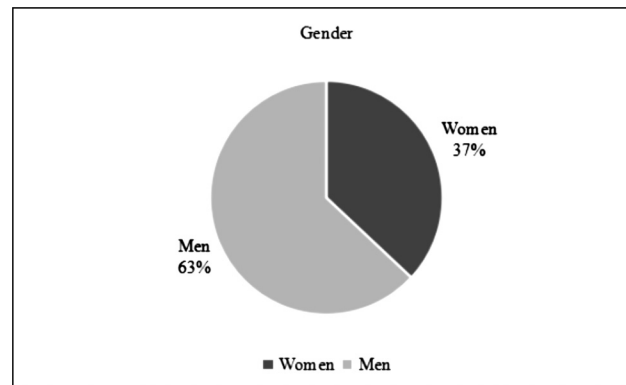
The objectives of the study are (1) to examine whether functional autonomy predict quality of life in the elderly and (2) to find out whether the psychological states of distress, depression, anxiety and somatization predict quality of life in the elderly.

Method

Sample

The participants for the study included 184 elderly participants (116 men, 63%; 68 women, 37%), living in their own homes or old age homes. These participants were recruited through convenience and snowball sampling, with ages ranging from 60 to 80 years ($M = 69.04$, $S.D. = 6.56$). Participants with terminal illness or diagnosed with psychological disorders or with history of mental illness were excluded from the study.

Figure 1
Number of men and women participants in the group.



Research Instruments

Instruments that have been used and validated in previous research on the geriatric population are used in the study. The instruments that were used are described below.

Older People's Quality of Life Questionnaire (OPQOL)

For measuring the quality of life specific to the geriatric population, 'Older People's Quality of Life Questionnaire' (OPQOL) developed by Bowling (2009) was used. It is a 35-item questionnaire and has 5-point likert scales that range from strongly agree to strongly disagree. The items measured 8 dimensions which are life overall, health, social relationships and participation, independence, control over life, freedom, home and neighbourhood, psychological and emotional wellbeing, financial circumstances and religion or culture. Out of 35 items, 27 were positively worded while 8 were negatively worded. The positively worded items were reverse scored that is they were scored from 5 to 1 while the negatively worded items were scored from 1 to 5. The scores were then summed up and higher scores were indicative of higher quality of life. This scale has been found to have a good internal consistency as well as construct validity (Bowling, 2009).

Katz Index of Independence in Activities of Daily Living (Katz ADL)

The 'Katz Index of Independence in Activities of Daily Living' (Katz *et al.*, 1970) commonly referred to as the Katz ADL, was used to

assess functional status as a consideration of the participant's ability of performing activities of daily living independently. The Index ranks appropriacy of performance in the six functions of bathing, dressing, toileting, transferring, continence and feeding. Participants score yes/no for independence in each of the six specified functions. A score of 6 demonstrates full function, 4 demonstrates moderate impairment and 2 or less demonstrates severe functional impairment.

Four Dimensional Symptom Questionnaire (4DSQ)

The Four Dimensional Symptom Questionnaire was used to assess the psychological states of distress, depression, somatization and anxiety. It has been developed by Terluin *et al.*, (2006). It is a 50 item scale where items are measured in terms of a 2-point scale ranging from 0 (no) to 2 (very often or constantly). It contains 16 items related to distress, 6 items related to depression, 12 items related to anxiety and 16 items related to somatization. A higher score is indicative of a higher problem in the respective dimension.

Along with the standardized questionnaires that have been described in this section, an informed consent form (written) and a demographic details form including gender, age, marital status, occupation, socioeconomic status, place of living, native place, health conditions (if any) and languages spoken were used to collect data.

Procedure

The participants were approached through convenient sampling and snowball sampling. After the participants gave their consent in writing, the questionnaires were handed over to them. The research investigator was present as each participant filled the questionnaires. The time taken for the administration of the questionnaires were 30–40 mins. At the end of the data collection, the participants were debriefed about the study. Any of their additional questions were answered. Then, the responses were scored and entered into SPSS for data analysis.

Results

Pearson's product-moment correlation was computed to find out the relationships among the variables while multiple regression was computed to find out the amount of prediction of each of the significantly correlated variables.

Table 1
Pearson's product moment correlation between Older People's Quality of Life questionnaire (its 8 dimensions), 4 DSQ and Functional Autonomy for the entire sample

(N = 184)

	FA	DIS	DEP	ANX	SOM
LO	-.086	-.789**	-.760**	-.594**	.138
HEA	.103	-.103	-.068	-.196**	-.390**
SR	.0	-.722**	-.696**	-.605**	.087
IND	.125	-.479**	-.486**	-.447**	-.115
HN	.150*	-.063	-.097	-.035	-.183*
PEWB	-.029	-.759**	-.736**	-.567**	.164*
FC	.104	-.739**	-.696**	-.575**	.017
REL	-.002	.328**	.281**	.221**	-.041

Note: FA = Functional Autonomy, 4DSQ = 4 dimensional symptom questionnaire including the following dimensions, DIS = Distress, DEP = Depression, ANX = Anxiety, SOM = Somatization, Older People's Quality of Life questionnaire including the following dimensions, LO = Life Overall, HEA = Health, SR = Social Relationships/leisure and Social activities, IND = Independence, Control over life and Freedom, HN = Home and Neighbourhood, PEWB = Psychological and Emotional Wellbeing, FC = Financial Circumstances, RC = Religion/culture.

* $p < 0.05$, ** $p < 0.01$.

Association Between Functional Autonomy, QoL and Psychological States

Correlation analyses were carried out among the variables to check for the association between them (Table 1).

There were significant negative correlations found between life overall and distress, $r(182) = -.789$, $p < 0.01$; depression, $r(182) = -.760$, $p < 0.01$; anxiety, $r(182) = -.594$, $p < 0.01$. Thus, an increase in distress, depression, anxiety was associated with a decrease in the life overall. There were significant negative correlations found between health and anxiety, $r(182) = -.196$, $p < 0.01$; somatization, $r(182) = -.390$, $p < 0.01$. Thus, an increase in anxiety and somatization was associated with a decrease in the health. There were significant negative correlations found between social relationships/leisure and social activities and distress, $r(182) = -.722$, $p < 0.01$; depression, $r(182) = -.696$, $p < 0.01$; anxiety, $r(182) = -.605$, $p < 0.01$. Thus, an increase in distress, depression, anxiety was associated with a decrease in the social relationships/leisure and social activities. There were

significant negative correlations found between independence, control over life and freedom and distress, $r(182) = -.479, p < 0.01$; depression, $r(182) = -.486, p < 0.01$; anxiety, $r(182) = -.447, p < 0.01$. Thus, an increase in distress, depression, anxiety was associated with a decrease in the independence, control over life and freedom. There was significant positive correlation found between home and neighbourhood and functional autonomy, $r(182) = .150, p < 0.05$ while significant negative correlation was found between home and neighbourhood and somatization, $r(182) = -.183, p < 0.01$. Thus, availability of good home and neighbourhood conditions was associated with an increase in functional autonomy and a decrease in somatization. There were significant negative correlations found between psychological and emotional wellbeing and distress, $r(182) = -.759, p < 0.01$; depression, $r(182) = -.736, p < 0.01$; anxiety, $r(182) = -.567, p < 0.01$ and significant positive correlation between psychological and emotional wellbeing and somatization, $r(182) = .164, p < 0.05$. Thus, an increase in distress, depression, anxiety was associated with a decrease in the psychological and emotional wellbeing while increase in somatization was associated with an increase in the psychological and emotional wellbeing. There were significant negative correlations found between financial circumstances and distress, $r(182) = -.739, p < 0.01$; depression, $r(182) = -.696, p < 0.01$; anxiety, $r(182) = -.575, p < 0.01$. Thus, an increase in distress, depression, anxiety was associated with a decrease in the financial circumstances. There were significant positive correlations found between religion/culture and distress, $r(182) = .328, p < 0.01$; depression, $r(182) = .281, p < 0.01$; anxiety, $r(182) = .221, p < 0.01$. Thus, an increase in distress, depression, anxiety was associated with an increase in the belief of religion/culture.

The results of the correlation analyses indicated that distress, depression, anxiety, somatization and functional autonomy have significant associations with various dimensions of quality of life in the elderly.

Indicators of QoL

Further, multiple linear regression analyses were carried out to find out the indicators of QoL. The independent variables were the psychological states (distress, depression, anxiety, somatization) and functional autonomy and the dependent variable was QoL and its

dimensions (Life Overall, Health, Social Relationships/leisure and Social activities, Independence, Control over life and Freedom, Home and Neighbourhood, Psychological and Emotional Wellbeing, Financial Circumstances, Religion/Culture).

Table 2

Summary of multiple linear regression analysis for indicators of dimensions of QoL such as life overall, health and social relationship/leisure and social activities

Variables	LO			Health			SR		
	B	SEB	β	B	SEB	β	B	SEB	β
DIS	-.435	.069	-.662**				-.262	.068	-.467**
DEP	-.682	.195	-.320**				-.494	.191	-.273***
ANX	.288	.119	.187*	-.088	.052	-.118	-.024	.116	-.019
SOM				-.238	.045	-.365**			
R ²		.654			.165			.539	
C		17.425			15.355			27.390	
F		113.506**			17.937**			70.012**	

Note: n = 184, B = Unstandardized beta coefficient, SEB = Standardized error of beta, $\hat{\alpha}$ = Standardized beta coefficient, DIS = Distress, DEP = Depression, ANX = Anxiety, SOM = Somatization, LO = Life Overall, HEA = Health, SR = Social Relationships/leisure and Social activities.

** $p < / = 0.001$, * $p < / = 0.05$, *** $p < / = 0.01$.

The results revealed that the combined predictors of distress, depression and anxiety explained 65.4 per cent of variance in life overall, $R^2 = 0.654$, adjusted $R^2 = 0.648$, $F(3, 180) = 113.506$, $p < 0.001$. Distress ($\hat{\alpha} = -0.662$, $p < / = 0.001$), depression ($\hat{\alpha} = -0.320$, $p < / = 0.001$), anxiety ($\hat{\alpha} = 0.187$, $p < / = 0.05$) were found to be significant. It was also found that the combined predictors of anxiety and somatization explained 16 per cent of variance in health, $R^2 = 0.16$, adjusted $R^2 = 0.156$, $F(2, 181) = 17.937$, $p < 0.001$. Somatization ($\hat{\alpha} = -0.365$, $p < / = 0.001$) was found to be significant. It was also revealed that the combined predictors of distress, depression and anxiety explained 53.9 per cent of variance in social relationships/leisure and social activities, $R^2 = 0.539$, adjusted $R^2 = 0.531$, $F(3, 180) = 70.012$, $p < 0.001$. Distress ($\hat{\alpha} = -0.467$, $p < / = 0.001$), depression ($\hat{\alpha} = -0.273$, $p < / = 0.01$) were found to be significant.

Table 2.1

Continuation of table 2, summary of multiple linear regression analysis for indicators of dimensions of QoL such as home and neighbourhood, psychological and emotional wellbeing and financial circumstances

Variables	HN			PEWB			FC		
	B	SEB	β	B	SEB	β	B	SEB	β
FA	.183	.097	.137						
DIS				-.353	.055	-.660**	-.365	.068	-.638**
DEP				-.462	.156	-.266***	-.413	.191	-.223*
ANX				.147	.096	.117	.154	.116	.114
SOM	-.086	.036	-.172*	.285**	.049**	.258**			
R ²		.052			.673			.561	
C		16.171			17.07			15.818	
F		4.979***			92.006**			76.722**	

Note: n= 184, B= Unstandardized beta coefficient, SEB= Standardized error of beta, $\hat{\alpha}$ = Standardized beta coefficient, FA= Functional Autonomy, DIS = Distress, DEP = Depression, ANX = Anxiety, SOM = Somatization, HN = Home and Neighbourhood, PEWB = Psychological and Emotional Wellbeing, FC= Financial Circumstances. **p < / = 0.001, *p < / = 0.05, ***p < / = 0.01.

The results revealed that the combined predictors of functional autonomy and somatization explained 5.2 per cent of variance in home and neighbourhood, $R^2 = 0.052$, adjusted $R^2 = 0.042$, $F(2, 181) = 4.979$, $p < 0.01$. Somatization ($\hat{\alpha} = -0.172$, $p < / = 0.05$) was found to be significant. It was also found that the combined predictors of distress, depression, anxiety and somatization explained 67.3 per cent of variance in psychological and emotional wellbeing, $R^2 = 0.673$, adjusted $R^2 = 0.665$, $F(4, 179) = 92.006$, $p < 0.001$. Distress ($\hat{\alpha} = -0.660$, $p < / = 0.001$), depression ($\hat{\alpha} = -0.266$, $p < / = 0.01$) and somatization ($\hat{\alpha} = 0.258$, $p < / = 0.001$) were found to be significant. It was also revealed that the combined predictors of distress, depression and anxiety explained 56.1 per cent of variance in financial circumstances, $R^2 = 0.561$, adjusted $R^2 = 0.554$, $F(3, 180) = 76.722$, $p < 0.001$. Distress ($\hat{\alpha} = -0.638$, $p < / = 0.001$) and depression ($\hat{\alpha} = -0.223$, $p < / = 0.05$) were found to be significant.

Table 2.2

Continuation of table 2.2, summary of multiple linear regression analysis for indicators of dimensions of QoL such as independence, control over life and freedom and religion/culture

Variables	IND			RC		
	B	SEB	β	B	SEB	β
DIS	-.046	.055	-.129	.096	.036	.452***
DEP	-.307	.154	-.267*	-.006	.1	-.008
ANX	-.118	.094	-.142	-.071	.061	-.142
R ²		.255			.114	
C		18.797			7.995	
F		20.553**			7.739**	

Note: n = 184, B = Unstandardized beta coefficient, SEB = Standardized error of beta, $\hat{\alpha}$ = Standardized beta coefficient, DIS = Distress, DEP = Depression, ANX = Anxiety, IND = Independence, Control over life and Freedom, RC = Religion/culture.

** $p \leq 0.001$, * $p \leq 0.05$, *** $p \leq 0.01$.

The results revealed that the combined predictors of distress, depression and anxiety explained 25.4 per cent of variance in independence, control over life and freedom, $R^2 = 0.254$, adjusted $R^2 = 0.243$, $F(3, 180) = 20.553$, $p < 0.001$. Depression ($\hat{\alpha} = -0.267$, $p \leq 0.05$) was found to be significant. The results further revealed that the combined predictors of distress, depression and anxiety explained 11.4 per cent of variance in religion/culture, $R^2 = 0.114$, adjusted $R^2 = 0.099$, $F(3, 180) = 7.739$, $p < 0.001$. Distress ($\hat{\alpha} = 0.452$, $p \leq 0.01$) was found to be significant.

From the results, it is evident that distress, depression, anxiety, somatization and functional autonomy emerged as predictors of various dimensions of quality of life in different combinations.

Discussion

The first finding of the current study that the states of distress, depression, anxiety and somatization significantly predict the quality of life is in conjunction with the findings of many previous studies that have reported depression, anxiety, distress being associated with poorer quality of life (Sivertsen, *et al.*, 2015) and so does somatization (Spitzer, *et al.*, 1995; Sheehan, *et al.*, 2005). This maybe because these psychological states have a negative impact on all the spheres of an individual's life. Distress, depression, anxiety and somatization are

negative psychological states so, their presence can have an adverse impact on the mental health of the elderly. As explained by Davidson, *et al.*, (2010) an unhealthy mental state is often unrecognized and as such does not receive the necessary attention and treatment, which could lead to the piling up of many other issues and an overall deterioration in condition. Quality of life also gets adversely affected by the feelings of burden, unpredictability, uncertainty and avoidance of familiar situations due to fear and worry associated with these negative psychological states (Connell, *et al.*, 2012; Di Mattei, *et al.*, 2018).

Earlier findings also support the second finding of the current study that functional autonomy marginally predicts quality of life in the elderly individuals (Newsom & Schulz, 1996; Fraga, *et al.*, 2011), but these studies also reported the presence of social support and other recreational programs along with good functional status which this current study has not explored and can be expanded to do it. The reason behind autonomous functioning leading to an improved quality of life can be that it keeps the elderly active physically. Physically active elderly have good muscle strength, memory functions as well as an improved psychological wellbeing (Perrig Chiello, *et al.*, 2006; Gao, 2018) as they are self-dependent. By being independent in performing the activities of daily living, the elderly remain engaged (Pernambuco, *et al.*, 2012) and as such are left with no time to indulge in unnecessary avoidable thoughts or behaviours.

Considering the above two areas, it may be imperative that psychosocial interventions involving social support as well as psychological support be planned to deal with psychosocial factors and to support functional autonomy. Basic expectations of the elderly such as communication from and with others, thus opening a scope for their sharing must be fostered. Psychosocial support in the form of enhanced communication, increased availability of near and dear ones who care and share as well as peer and family support may help in a long way. An encouraging environment and people contributing to functional autonomy may be supportive. This may lead to a feeling of being cared for and will contribute towards enhancement of their quality of life.

Limitations and Future Directions

This study did not explore the possible links, if any, between the sociodemographic details and the obtained findings. This could have

given even better findings regarding the reasons behind certain relationships that were identified. A mixed methods approach involving the collection of qualitative data through interviews could have given a more comprehensive understanding about the elderly population.

Conclusion

Thus, the current study confirms the hypotheses that functional autonomy and psychological states do predict the quality of life in the elderly. Also, this study checks the psychological states of distress, depression, anxiety and somatization distinctively.

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Psychosocial Functioning and Emotional Well-being in Tobacco Smoking Older Adults with Chronic Obstructive Pulmonary Disease

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ABSTRACT

The aim of the present study was to explore the psychosocial functioning and emotional wellbeing in tobacco smoking older adults who were diagnosed with COPD. In this study, total number of 30 subjects diagnosed with COPD, where 15 patients who smoke tobacco and 15 non-smoking patients of both the genders with the age range of 50–70 were taken. Psychosocial functioning and emotional wellbeing were assessed by Psychological General Wellbeing Index and Health-related Quality of Life Questionnaire (SF-36). Result suggests changes in psychological, social and emotional functioning of the patients of COPD with tobacco smoking. Overall, it can be said that there is an impact of tobacco smoking on older adults with COPD.

Keywords: Chronic Obstructive Pulmonary Disease, Tobacco Smoking, Older Adults, Psychosocial Functioning, Emotional Wellbeing.

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease with some significant

extra-pulmonary effects which can have adverse impact to severity of patients. Its pulmonary component is characterized by airflow limitations which are irreversible. The functional ability of the patient as well as quality of life gets complicated by psychological complaints or even a concurrent mental disorder. The physical illness itself probably contributed to the occurrence and severity of the psychological complaints. The prevalence of COPD increases with age, with more increased risk for the age over 65 years compared with patients less than 45 years. COPD affects twice as many males as females. It has been seen that females with smoking habits in developing countries are at more risk of COPD than non-smoker females. The prevalence of COPD also varied according to the classifications made by GOLD. It has been seen that 25 per cent cases are at GOLD II criteria.

Study of Barrecheguren *et al.*, (2015) among 1003 patients with COPD, 61 per cent reported to have moderate to severe dyspnea and 41 per cent reported to be hospitalized. The most prevalent co-morbid diagnosis was hypertension (55%), hypercholesterolemia (52%), depression (37%), and osteoporosis (28%). According to WHO, COPD is the fourth leading cause of death in the world, with approximately 2.75 million death of older adults per annum.

Chronic Obstructive Pulmonary Disease (COPD) is highly inter-related with health problem and can disturb various aspects of life of the patient, especially in geriatric population. The functional ability of the older adult patient of COPD as well as quality of life and social functioning are being compromised with psychological and emotional complaints or even a concurrent psychiatric disorder. The physical illness itself probably contributed to the occurrence and severity of the psychological complaints in older adults.

Psychological characteristics are generally ignored in medical and treatment guidelines. There is a growing evidence that psychological or emotional distresses have effect on the quality of life in patients with COPD. As psychological co-morbidities anxiety and depression have been included in to Global Initiative for Chronic Obstructive Lung Disease (GOLD) guideline criteria in 2015. It is also possible that other psychological variables, such as personality traits, may influence the progression of the illness, as well as treatment achievement and rehabilitation. There seems to be an existing impression among health

professionals that COPD patients are exhausting to work with, as well as they are being generally non adherent to treatment plans.

Cigarette smoking or exposure of harmful agents induces an inflammatory process in the pulmonary organs such as lungs and airways of bronchial tree which leads to airway disease and parenchyma destruction in different age groups and most of the impairments can be seen with the individuals with the age range over 55 years.

Loss of elasticity of alveolar attachments, or their destruction, is a hallmark of emphysema which is mostly caused by prolonged tobacco smoking and the inability of the lungs to empty airways results air trapping and hyper-inflammation which in later manifest as dyspnea on exertion. In last stage of COPD, hypoxemia develops which significantly impacts upon patients' physiological and psychological functions. The occurrence of COPD in never-smokers is not widely explored, despite the fact that the relative burden of COPD in never-smokers is visibly high in developing and developed countries, about 30 per cent of all COPD in the community.

As smoking is a serious lifestyle problem that needs to be addressed more adequately by the clinicians as well as governments. Smoking cessation, at any age, is the most effective way to reduce the risk of disease progression in COPD, through improvement of steroid responsiveness in asthma and chronic obstructive pulmonary disease, reduction in the risk for development of different types of cancer and cardiovascular diseases and improvement of overall physiological health and wellbeing. Studies of Mansvelder, *et al.*, (2006) show that Nicotine can modulate cognitive functioning dependent on cortico-subcortical circuitry via actions on nicotinic acetylcholinergic receptors, which are distributed throughout the brain including the prefrontal cortices, amygdalo-hippocampal formation, and also nucleus accumbens. Research studies indicate that there has been sufficient evidence of strong association between cigarette smoking as well as nicotine dependence and affective disorders among adults in the community. (Breslau, 1995). In an article of Mental Health Foundation it was mentioned that use of tobacco or nicotine at first can improve mood, concentration as well as it may decrease anger and stress, relaxes muscle and reduces appetite. But increased use of

tobacco leads to changes in brain functioning and it has a harmful impact on the person's mental health.

Indication of a behavioral pathway such that anxious avoidance or depression related motivational disturbances result in avoidance of many daily functional activities that leads to dyspnea, and a further decrease in patients' health status. Another behavioral pathway of co-morbid psychological symptoms is their negative impact on adherence to prescribed treatments, in particular smoking cessation or medication adherence, which is generally regarded as poor in COPD patients (Bourbeau and Bartlett, 2008). Overall, psychopathology and a worse course of COPD could be seen and reported.

The aim of this study is to explore the psychosocial functioning and emotional wellbeing of tobacco smoking older adults with Chronic Obstructive Pulmonary Disease (COPD).

Materials and Methods

Sample

For this study, 30 participants (15 patients, diagnosed with COPD who smoke tobacco and 15 COPD patients without smoking tobacco – male=3, female=13), age varying from 50 to 70 years of both the genders were selected by Purposive sampling technique. , where Inclusion criteria for the COPD patients with tobacco smoking (N=15) were; 1) within age range of 50–70 years, 2) diagnosed with mild to moderate COPD, 3) A minimum duration of 5 years or more after diagnosis, and (4) Minimum education level of 8th grade. (5) Smokes tobacco prior to the diagnosis of COPD. Patients with history of major psychiatric illness or mood disorders prior diagnosis of diabetes, any other major medical illness, or neurological disorder were excluded from the sample.

Inclusion criteria for COPD patients without tobacco smoking (n=15) were; (1) within age range of 50–70 years, (2) Diagnosed with mild to moderate COPD with the minimum duration of 5 years (3) minimum education level of 8th grade (4) with no history of any substance use. Any individual with history of psychiatric, medical or neurological disorders was excluded.

Data was collected from outpatient department of multispecialty hospitals, clinics and communities of Kolkata. Informed consent was taken from participants.

Tools Used

1. *Socio-demographic Datasheet*: Semi structured socio-demographic and clinical data sheet was used to obtain details regarding age, sex, education level, occupation, psychological/physical co-morbidities and duration of illness.
2. *Psychological Well-being Index*: The Psychological General Well-Being Index (PGWBI) consists of 22 self-administered items, rated on a 6-point scale, which assess the psychological and general well-being of respondents in six domains of health related quality of Life-anxiety, depression, positive well-being, self-control, general health, and vitality. It gives single measure of psychological well-being. internal consistency of the American PGWBI was high, with Cronbach's alpha values ranging between 0.90 and 0.94. The intra subjective reproducibility expressed by test-retest coefficients ranged around a median value of 0.80.
3. *Health Related Quality Of Life Questionnaire*: The Health Related Quality of Life is to assess perception of health in accordance to quality of life of the patient. Internal consistency reliability was 0.83 to 0.93 for the eight scales and 0.94 and 0.89, respectively, for the physical (PCS) and mental (MCS) component summary measures.

Statistical Analysis

In the present study all the scales were scored and quantitative analysis was done through descriptive statistics. Student t test was used to differentiate between the groups (COPD with and without tobacco smoking). Statistical treatment was conducted through IBM SPSS 25.

Results

In the present study has conducted to explore the psychosocial functioning and emotional wellbeing of tobacco smoking older adults with chronic obstructive pulmonary disease (COPD). In this study, comparison between COPD patients with and without tobacco

smoking has been done. The result indicated that, there is impact of tobacco smoking on psychosocial and emotional functioning of COPD patients. Results explored and understood the variables in case of COPD patients with and without tobacco smoking.

Table 1 (a)
Is indicating the socio-demographic details of the sample-

<i>Variables</i>	<i>Groups</i>	
	<i>COPD (With Tobacco Smoking) Mean \pm SD</i>	<i>COPD (Without tobacco Smoking) Mean \pm SD</i>
Age	63.2 \pm 5.01	58 \pm 7.38
Educational	14.10 \pm 0.88	14.73 \pm 1.90
Qualification (in years)		

Table 1 (b)
Is indicating other socio-demographic details of the sample-

<i>Variables</i>	<i>Sub Categories</i>	<i>COPD with Tobacco Smoking (frequency)</i>	<i>COPD without Tobacco Smoking (frequency)</i>
Gender	Male	15	3
	Female	0	12
Marital Status	Married	10	11
	Unmarried	5	3
	Widowed	0	1
Occupation	Business	5	0
	Service	6	6
	Homemaker	0	8
	Retired	4	1
Residence	Urban	14	14
	Semi-urban	1	1
	Rural	0	0
Socio-Economic Status	Upper Middle Class	14	10
	Middle Class	1	5
	Lower Middle Class	0	0
Family Type	Nuclear	7	8
	Joint	2	3
	Extended	7	4

Table 3 (a)
Is demonstrating the scores of Psychological General Wellbeing Index of the sample

Domain	Sub-domains	COPD With tobacco smoking Mean \pm SD	COPD without tobacco smoking Mean \pm SD	t-value	p-value
Psycho-Logical Well-Being Index	Anxiety	13.73 \pm 5.97	15.60 \pm 5.18	-0.91	0.36
	Depressive Symptoms	7.07 \pm 3.49	9.73 \pm 3.82	-1.99*	0.056
	Positive Wellbeing	9.93 \pm 2.91	9.47 \pm 3.27	0.413	0.683
	Self Control	9.33 \pm 2.99	7.33 \pm 3.71	1.62	0.116
	General Health	7.53 \pm 3.71	6.80 \pm 2.68	0.686	0.498
	Vitality	10.93 \pm 1.94	10.33 \pm 2.99	0.651	0.520

** = $p < 0.01$ level, * = $p < 0.05$ level

Table 3(b)
is indicating the overall composite score of Psychological General Wellbeing Index of patients with Chronic Obstructive Pulmonary Disease-

Domain	Composite Score	COPD patients	Impression
Psychological Well-being Index		58.9	Severe Distress (< 60)

Graph 1

Is the representation of the Psychological wellbeing index of COPD patients with and without tobacco smoking

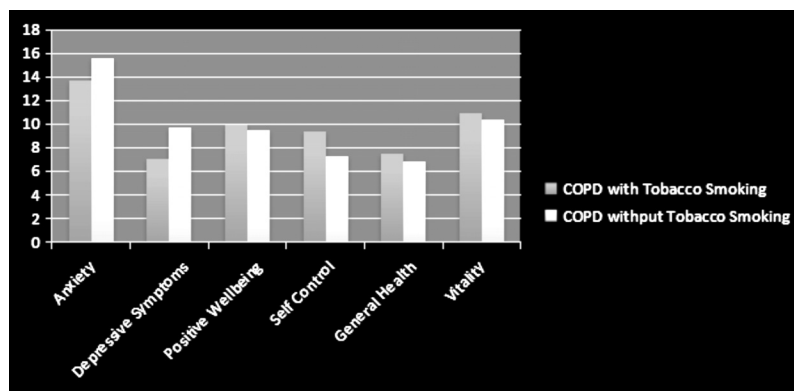


Table 3 (a) is showing that, there is significant difference in the subdomain of depressive symptoms of subjective psychological wellbeing. It has been seen that, in other subdomains, there is difference between two groups.

Table 3(b) is demonstrating that, it has been found that, in accordance with composite score of psychological general wellbeing index, patients with COPD categorized under severe distressed (< 60).

Table 4

Is indicating the scores of the variables of Health Related Quality Of Life (SF-36) of COPD patients with and without tobacco smoking.

Domain	Sub-domains	COPD With tobacco smoking Mean \pm SD	COPD without tobacco smoking Mean \pm SD	t-value	p-value
Health Related Quality of Life	Physical Functioning	36 \pm 24.29	34.33 \pm 30.46	0.166	0.870
	Role limitations due to physical health	86.67 \pm 28.13	83.33 \pm 36.18	0.282	0.78
	Role limitations due to emotional problems	48.89 \pm 50.18	65.00 \pm 47.99	-0.899	0.376
	Energy	52.60 \pm 16.38	45 \pm 15.92	1.288	0.208
	Emotional Well-being	55.63 \pm 16.05	49.87 \pm 21.05	0.844	0.406
	Social Functioning	54.33 \pm 26.56	59.17 \pm 26.50	-0.499	0.622
	Pain	53.67 \pm 26.990	38.67 \pm 29.42	1.455	0.157
	General Health	48 \pm 23.96	38.67 \pm 16.52	1.242	0.225
	Health Change	63.33 \pm 24.7	55 \pm 21.54	0.983	0.334

** = $p < 0.01$ level, * = $p < 0.05$ level

Graph 2

Is representing the variables of Health Related Quality Of Life (SF-36) of COPD patients with and without tobacco smoking.

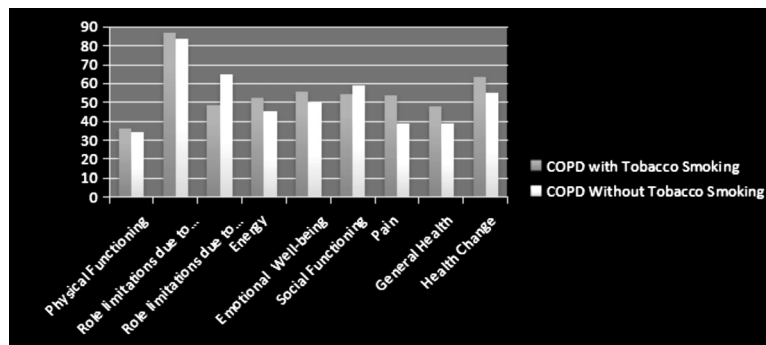


Table 4, is showing that, there is no significant difference between two groups in the variables of Health Related Quality Of Life (SF-36). But, it has been found that, in case of COPD patients with Tobacco smoking there is more detrimental impact than COPD patients without Tobacco smoking in the domains of role limitations due to physical health, Social functioning, pain and health change.

Discussion

The present study is a cross-sectional comparative study, because the study was conducted within a specific period of time and data were analyzed and interpreted within that period as it was a time bound study, which was conducted for one time. It is a comparative study because the purpose of the study was to compare between the groups in terms of the selected variables. The groups were selected and compared to discover different aspects of the variables. The control group was taken to balance the effect of independent variable.

Age range of 50 to 70 years was taken for the present study, and it has been stated that, age associated structural and functional changes in lungs may increase the patho-genetic susceptibility to COPD so, research findings suggested that mean age range of COPD patients in India is 63.7 ± 8.1 years (GOLD, 2020) considering the fact in the present study, this age range was taken. Older Adults are more prevalent to be diagnosed with chronic obstructive pulmonary disease. Table 1 (a) is demonstrating the socio-demographic details of the sample. The result indicated that, the mean age of the COPD patients with and without tobacco smoking is 63.2 and 58 respectively.

In case of COPD patients, as it is a chronic illness, chronicity of a disease condition is measured when it is more than 5 years of illness. A study conducted by Alexopoulos *et al.*, (2015), stated that, median of duration of COPD is 10 ± 5 years, so evaluating the fact, the duration of illness was taken minimum 5 years or more.

Comparison of Emotional Wellbeing between COPD patients with and without tobacco smoking:

Table 3(a) and Graph 1, describing the differentiation of psychological wellbeing among COPD patients with and without tobacco smoking. Significant difference has been found in the domain of depressive symptoms. Table 3(b) is demonstrating that, the overall

composite score of Psychological General Wellbeing Index is indicative of severe distress though it can be said that, patients with chronic obstructive pulmonary disease are having severe detrimental impact on emotional wellbeing.

In the study of Lou *et al.* (2014), it is stated that, current smokers with COPD are having higher risk of anxiety symptoms due to health risks than who have never smoked. In the present study, no differences have been found between smoker and non-smoker COPD patients, which indicates, COPD patients are prone to have more anxiety symptoms than healthy individuals (Atlantis *et al.* 2013) apart from their smoking habits. Hence smoking may be used as coping to deal with anxiety symptoms in COPD patients.

In the present study, in case of COPD patients who are smoking tobacco, depressive symptoms have been found to be less than non smokers. In an article of Mental Health Foundation it was mentioned that use of tobacco can improve mood, concentration as well as it may decrease anger and stress, relaxes muscle and reduces appetite (Lynch and Bonnie, 1994). Nicotine stimulates the release of the neurotransmitter dopamine in the brain. Dopamine is involved in triggering positive feelings and which is often found to be low in persons with depression, who may then use cigarettes as a way of temporarily increasing their dopamine supply. However, by smoking COPD patients may encourage artificial production of dopamine. Patients with COPD face losses in multiple areas of their lives which lead to experience reduced sexual activities, depending on others for personal care and anhedonia. So, tobacco smoking may provide psychological relief. (Parrott, 1999).

Present study findings suggesting that, in the domain of positive wellbeing, self control, general health and vitality, no significant difference has been found, but smoker COPD patients are having relatively better emotional wellbeing than non-smoker COPD patients. Overall impairment in psychological wellbeing in COPD patient has been found in the present study, additional effect of tobacco smoking may not have significant impact on their poor psychological health. In a study of Engström (1996), it was stated relationship between smoking status and emotional wellbeing of COPD patients, could not be established. Though it can be explained

as, the COPD patients' overall emotional wellbeing is impacted whereas those who smoke tobacco might have tendency to deny or cope through smoking tobacco.

Comparison of Psychosocial Functioning between COPD patients with and without tobacco smoking:

Table 4 and Graph 2, is illustrating the psychosocial functioning among COPD patients with and without tobacco smoking. In the present study, it has been found that comprehensively quality of life is worse in COPD patients. No significant differences could be seen due to smoking of tobacco among the groups. Overall findings are suggesting that in domains of health related quality of life, the perceptions of physical, emotional and social functioning is better in COPD patients with tobacco smoking than COPD patients without tobacco smoking. Present study findings suggesting that, tobacco smoking among COPD patients, is declining cognitive flexibility but whereas, psychological wellbeing and health-related quality of life are relatively better in COPD patients with tobacco smoking. Tobacco smoking may have some beneficial effects on the present sample in terms of emotional and social wellbeing but its detrimental effect on general physical health of patients with COPD is becoming a global public health crisis with smoking being recognized as its most important causative factor.

No difference in quality of life was seen between smokers, never smokers,. Smoking as such does not seem to influence quality of life. The differences seen in quality of life between cases and controls in the present study must therefore be explained by disease processes rather than differences in smoking habits. In a previous study , Prigatano *et al.*, (1984) found better quality of life in former smokers than in current smokers in spite of the fact that the current smokers had better pulmonary function and were younger. Impairment of QoL of NS-COPD is similar to S-COPD in an Indian cohort. (Londhe, 2013)

In respect to Apprehension of Disease Condition psychosocial functioning and emotional wellbeing in patients with COPD

Apprehension of chronic disease condition is mostly negative due to the long-term suffering and socio-economical burden. Hence, prolonged use of tobacco smoking and knowledge about the

consequences of smoking may enhance the acceptance of disease condition better than non-smokers. Sudden diagnosis of the disease condition may impact the overall emotional health and perception of health-related quality of life. Unknown causation and unexpected diagnosis may have increased the emotional distress than smoker COPD patients. Adapting to a disease condition plays a huge role in patients with chronic illnesses. (Uchmanowicz *et al.*, 2016) Acceptance of illness is one of the crucial phases that relates patients with their illness. It encourages the process of adaptation whereas, the process during which a man or a woman adapts to the new and challenging situation of living with the disease or disorder. The underlying disease condition has a significant adverse impact on patients' life and wellbeing because of its chronic nature, differentiated symptoms, and frequency of exacerbations. This impact was confirmed in the studies of Niedzielski *et al.*, (2007).

In respect to Age and tobacco smoking – the impact on psychosocial functioning and emotional wellbeing in patients with COPD:

In case of older adults, it is evident to have lower capacity to cope and adjust with different disease conditions emotionally. The mental health of older adults is associated with the increased risks of co-morbid medical disorders, increased risks of suicide, high mortality rate, decreased self care abilities and decreased physical, cognitive and social functioning. (Blazer, 2003)

The impact of tobacco smoking in accordance with older adults who are diagnosed with COPD for prolonged period of time seem to be more vulnerable to have less physical functioning and which is interlinked with their ability to manage emotional turmoil along with daily functioning.

In respect to Gender Differences psychosocial functioning and emotional wellbeing in patients with COPD

In the present study, findings suggested that, smoker COPD patients were found to be male, and most of the COPD patients, without tobacco smoking were found to be female. Non-smoker COPD patients were more commonly women who predominantly presented symptoms of Chronic bronchitis. (Fuller-Thomson *et al.*, 2016) Nonsmokers with COPD are more often women, indicating

that women are more susceptible to damage from air pollution or passive smoking (Kennedy *et al.*, 2007), Women's heightened biological vulnerability to chronic bronchitis is relevant to never-smokers exposed to passive smoke and other toxins of airbourns. Approximately 11 per cent and 7 per cent of patients with COPD cases can be attributed to exposure of smoke from environment at home and work, respectively (Eisner *et al.*, 2005). Vulnerabilities which are related to sexes (i.e. physiological differences between male and female) and gender (i.e. societal differences between women and men) may impact over never-smoking women's higher risk of COPD (Thompson, 2016). Women report greater symptoms of anxiety, more depressive symptoms and complain more about dyspnea (Dahlen, and Janson, 2002). Both the prevalence of COPD and the mortality owing to COPD among women is rising. Sex-related differences have been noticed and women report an overall lower quality of life compared with men, even when adjusted for pulmonary functions (JP de Torres *et al.*, 2006); they have a worse nutritional status and they have a higher frequency of exacerbation compared to men. Women may also react differently to drug treatment and pulmonary rehabilitation. Women are also reported to have less confidence in their functional ability to control symptoms of respiratory disease, and they have more daily limitations in physical functioning compared to men, despite having comparable COPD severity, dyspnea scores, and exacerbation rates. Results indicate that psychiatric disorders are at least three times higher in COPD patients compared to the general population, and nearly two times higher in women than in men. Women also have greater psychological distress, poorer perception of control of symptoms, and greater impairment in functional abilities. Greater efforts should be made to identify and treat psychiatric disorders in COPD patients, particularly in women. (Laurin *et al.*, 2007)

Implications of the present study are to understanding of Additional effect of tobacco smoking on cognitive functioning of COPD patients with and without tobacco smoking was discussed. Including detrimental effect of tobacco smoking on older adults with pulmonary functioning along with psychosocial and emotional functioning can also be seen in the COPD patients. In

psychotherapeutic measures, tobacco cessation due to health condition, along with deficiency in overall functioning of older adults could be focussed. Understanding of deficits in emotional wellbeing of the older adult patient with COPD and its interference with daily living of the patients could be implicated through the present study. Apprehension of disease condition among COPD patients with and without tobacco smoking and its effect on overall psychological functioning can also be seen.

Conclusion

COPD is a multi-component disease and the impact of tobacco smoking on older adults who are diagnosed with COPD is widespread in nature. So, it can be concluded that, its wide-ranging detrimental effects lead to global psychological decline, deficiency in emotional wellbeing as well as inadequate psychosocial functioning can also be seen.

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The Digital-Elderly: Conceptualizing Ageing in the Digital Era-2030-2100

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ABSTRACT

This paper conceptualises ageing of the digital-era young population into the digital-elderly population expected to emerge from 2030 AD. The term “digital-elderly” denotes the sixty and above-aged population, who had exposure to digital technologies in their early life stages and are enjoying digital life in their elderly hood. The paper projects approximately 7.4 million digital youth will become digital elderly by 2030 AD, 1.4 billion by 2040, 2 billion by 2050, 2.3 billion by 2060, and 3.1 billion by 2100 respectively. The Digital elderly might be a distinct demographic phenomenon having potential advantages over their predecessors of having active digital-engagement avenues. It is expected that digital engagement could be the determining factor of the quality of life of the digital elderly in the digital era. And digital disengagement might be a major concern at the advanced stages of the digital elderly hood due to bio-psycho-social and economic issues. The paper concludes that the upcoming digital-elderly population will transform the present social order of older adulthood by being a distinct socio-political entity in the upcoming constantly evolving information society.

Keywords: Ageing, Digital Era, Digital Youth, Digital-elderly, Digital Life, Digital-dependency, Digital-Engagement, and Digital-Disengagement.

The digital era can be viewed as the period of 21st-century technological advancement especially information and communication technologies (ICT) and their rampant influence in all walks of life. The digital era is characterized by the prominent role of technologies in shaping up and regulating the behaviours, performances, standards of societies, communities, organizations, and individuals (Liyanage, 2012). As per the recent estimates, there were 4.66 billion active internet users worldwide 59.5 per cent of the global population, and 92.6 per cent (4.32 billion) accessed the internet via mobile devices (STATISTA, 2021). At this juncture, this paper conceptualise the ageing of the *digital youth population* into the *digital-elderly population* through the lens of demographic as well as gerontological perspectives.

Digital Life

Slow diffusion of digital technologies took place in social life since 2000 AD. The decade 2010–2020 witnessed an abrupt increase in digital technology diffusion, especially information and communication technologies (ICTs) among the young population, and became an essential component of the modern culture. As of now, the world's younger (15–24 age group) population is the main user of digital technologies (ITU, 2011).

The emergence of internet-based-social networks have made intense changes and influence the way people interact with one another and with their governments (United Nations, 2021). The proliferation of wireless-broadband internet services, personal computers, and the introduction of large-scale smartphones are the key technologies that transformed social life into *digital life*. Digital life offers a *digital environment* in which social and personal parts of life are being mediated through digital technologies and impact cultural changes in society. The digital life reduces the human efforts and expense manifold by catalysing instant information dissemination and storage, social connectivity, communication, a versatile working environment, learning opportunities, automation, mapping, transportation, entertainment, news, banking, finance, governance, and so on.

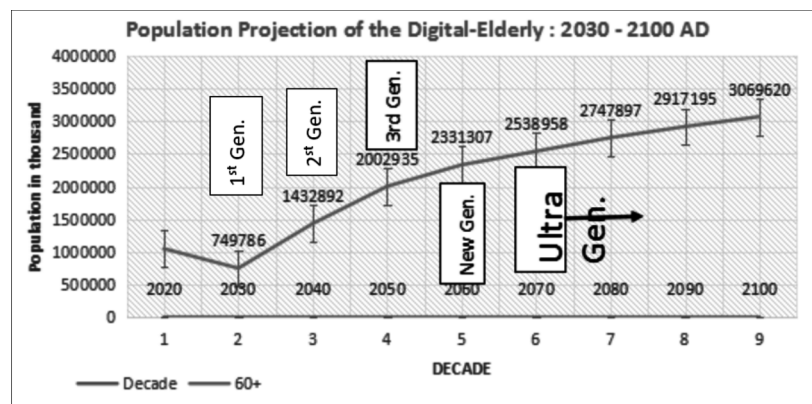
The Emergence of the *Digital-Elderly*

Ageing is a persistent decline in the age-specific fitness components of an organism due to internal physiological degeneration *Error! Reference source not found.* Nevertheless, when it comes to a human being, ageing is not only a physical decline but also psychosocial *Error! Reference source not found.* The criteria adopted to define the ageing of digital youth into digital-elderly are; *“that sixty-and above aged population who have had exposure to digital technologies in their middle ages, youth or childhood; it became an inseparable part of their day to day life later on, and are still enjoying digital-life as they have enjoyed it in their past or with a slight variation”.*

Population Projection of the *Digital-Elderly*

The population projection of the digital-elderly is made based on the United Nations World Population Prospects 2019 (UN, 2019). The data are extracted from the UN’s interactive website and analyzed to project the approximate *digital elderly* population between 2030 to 2100 AD. As per the projection, approximately 7.4 million digital youth will become *digital elderly* by 2030 AD, 1.4 billion by 2040 AD, 2 billion by 2050 AD, 2.3 billion by 2060 AD, and 3.1 billion by 2100 AD respectively (see Figure 1).

Figure 1
Projection of Digital-Elderly from 2030 to 2100 AD



Classification of the Digital-Elderly Generation

This paper considers the decade of 2000–2010 as the starting point of the digital era where the rate of digital diffusion was high and access to digital technologies has been enhanced. The initial users of digital technologies were the population born in the decade of 1960–1970. This decadal population reached their adulthood (in their *late thirties* or *early forties*) by 2000–2010, where they got exposed to digital technologies and started digital life since then. This decadal population will reach *digital elderly* hood by 2030 AD onwards with an approximate strength of 7 million. So they can be called *the first-generation digital-elderly (FGDE)*.

The same criteria are applied here to all subsequent decadal *digital elderly* populations. The population born in the decade of 1970–1980 will reach their *digital elderly* hood by 2030–2040; can be called *the second Generation Digital-elderly (SGDE)*, the population born in the decade of 1980–1990, and reaching their *digital elderly hood* by 2040–2050; can be called as the *third Generation Digital-elderly (TGDE)*, the population born in the decade of 1990–2000, reaching their *digital elderly hood* by the decade of 2050–2060; can be called as the *New Generation Digital-elderly (NGDE)*, and population born in the decade of 2000–2010 onwards, reaching *digital elderly* hood by the decade of 2070 onwards can be called as the *Ultra Digital-Elderly (UDG)* respectively. However, the existing digital divide might negatively affect the emerging *digital elderly* population, especially among the *first generation of digital elderly*. The digital divide is conceptualized as the uneven distribution of information and communication technologies (ICTs) in society (Eva, 2020). As of now, the digital divide constitutes not only an accessibility issue but also a gender issue. So the emergence of the *digital elderly* population will also be affected by the issues of the digital divide especially the *first generation digital elderly population*, causing the male *digital elderly* population to outnumber the female *digital elderly* population.

Digital Dependency and Order of Dependency

The term *digital dependency* suggests a condition of positive dependency of the *digital elderly* to digital technologies to actively engage in social and personal affairs or maintaining an active digital

life. The *order of dependency* suggests the intensity of digital dependency of each decadal *digital elderly* population concerning their digital exposure. Digital exposure implies the age at which digital elders are exposed to digital technologies and the length of digital life since then. Thus the order of dependency would increase from first-generation *digital elderly* to *Ultra-generation digital elderly*. (see Table 1). It is assumed that when the digital dependency increases the quality of digital life of the *digital elderly* also increases and vice versa.

Table 1
Classification of Digital-Elderly Based on the Decades of Birth and Digital Dependency

S.No.	Digital-elderly Order of Generation	Decade of Born	Year of becoming digital-elderly	World Digital-elderly Population	Order of Digital Dependency	Order of Care-Receiving Dependency
1.	First Generation	1960–1970	2020–2030	7.4 million	1 Low	5 High
2.	Second Generation	1970–1980	2,030–2,040	1.4 billion	2	4
3.	Third Generation	1980–1990	2,040–2,050	2 billion	3	3
4.	New I Generation	1990–2000	2,050–2,060	2.3 billion	4	2
5.	Ultra-Generation	2000–2010 Onwards	2,060–2,100	2.5–3.1 billion	5 High	1 Low

Order of Care-Receiving Dependency: The order of care-receiving dependency suggests the amount of external care required for the *digital elderly* when they move on to advanced stages of life. It is assumed that when the *digital elderly* enter into advanced stages of ageing digital disengagement process might begin. At this point, the *digital elderly* need external support to continue their digital life or to carry out their daily needs. It is expected that the caregiving dependency will be high at first-generation *digital elderly* and tend to decrease moving to higher-order generations. That is when the digital dependency is high the amount of care needed to be provided would be less.

The emergence of the digital-elderly would not only be a demographic shift but also a social and political shift from the

conventional ageing perspective. The *digital-elderly hood* would have a plethora of advantages over the *baby boomer* generation¹ in terms of bio-psycho-socio-economical and political domains. The Digital-elderly hood can be seen as a separate social identity as they are distinct in their way of life as compared to their predecessor due to the presence of digital capital. Digital Capital implies the *digital elderly's* collective bargaining power bestowed due to digital connectedness among them and with the societal power structure. The new social and political identity of the *digital elderly* will throw away the generation gap and ageism.

Prospects and Challenges of the *Digital-Elderly* Population

Older adulthood is generally visualized stereotypically as the time of decline, withdrawal from social activities, loneliness, forgetfulness and low ability to learn new information lowering the quality of life, etc. (Hummert, Shaner, Garstka, & Strahm, 1994). However, the *digital-elderly* would be blessed with the benefits of digital technologies to amend these stereotyped views to an extent. This will open up a *digital engagement* opportunity for the *digital elderly*. The digital-engagement perspective suggests the possible benefit offered by digital technologies to engage digital elders to continue their digital life. However, the advancing age may compel them to withdraw from digital life eventually due to the decline of biological, social, or economic resources and sophistication of digital life beyond the control of the *digital elderly*. The process of withdrawing from digital life due to inability or incompatibility to pursue digital life can be called *digital disengagement*.

The Digital-Engagement

The activity theory of gerontology states that “being active, maintaining social relationships as long as possible, and finding a substitute for activities are key for achieving satisfaction in later life”. Therefore the digital engagement perspective seeks to visualize the use of digital technologies as an engagement medium either as a substitute or as a normal part of the digital life of the emerging *digital elderly population*. As digital life can offer opportunities for the *digital elderly* to engage with social and personal life the *digital elderly* can actively engage in a wider area of the social and personal realm. Digital

engagement is, therefore, focusing on opportunities offered by digital life to promote active ageing among the digital-elderly population even in the most advanced life stages. Active ageing is the process of optimizing opportunities for health, participation, and security to enhance the quality of life as people age (WHO, 2002).

Digital engagement would increase independence and confidence among the *digital elderly*. Social networking, video-calling, instant messaging would be the most sort medium in the digital-elderly hood to reduce social distance. The possibility of virtual connectedness would offer stability to keep up social relations beyond physical barriers. Digital engagement would be a better source to reduce overcome psychosocial problems such as loneliness, depression, suicidal ideation (Kennedy & Gary, 1996), anxiety, drug addiction (Moore, Karno, & Grella, 2009), reduction in sociability (Singh & Misra, 2009), etc. commonly seen among the current older adult population or prevalence of these problems will be less among the *digital elderly* population.

Digital life could be a great relief for the digital elders to satisfy their health needs. The major users of digital health (telemedicine) would be the *digital elderly*, as it enables *digital elderly* directly to physicians, and paramedical staff when required without the help of others. Smartphone-assisted health monitoring, health alert, appointment fixing, and telemedicine facilities could be another avenue for the *digital elderly* to get regular health care services without many hurdles.

Digital engagement could be a major relief for the physically weak, bedridden, or care-receiving *digital elderly* to be connected to the outer world through digital technologies. Digital engagement offers an avenue for digital caregiving. Digital caregiving opens a mutually supportive active system around the *digital-elderly* and their caregivers to enable real-time monitoring, communication, and timely intervention. The proliferation of *smart homes* can be expected in the *digital elderly* era. Therefore it is predictable that digital engagement could have the capacity to increase social networks and social capital. Digital life would be a predictor of social support, life satisfaction, and quality of life of the *digital elderly*.

The Digital – Disengagement

Though the *digital elderly* have advantages over their predecessor, they are prone to *digital disengagement*. *Digital disengagement* is the condition of being withdrawn from digital life due to either age-related health decline, psychosocial-economic challenges, technological incompatibility issues, or a combination of all these three components. The age-related health decline at the advanced ages of life might derail the normal way of digital life due to the inability to access the digital technologies as they wished to do.

Sensory-motor impairments (vision and hearing impairment), and degenerative diseases are expected to be the major agents of age-related digital disengagement. Hearing, vision, orthopedic, and speech disorders are the most common impairments present in the current elderly population. This health-related issue could reduce the ease of accessing digital technologies and user-friendliness. Chronic lifestyle diseases could be another potential agent to reduce the urge to use digital technologies in the advancing age of the *digital elderly*. All these health problems increase digital incompatibility to enjoy digital life among the digital-elderly. The digital incompatibility suggests the inability to enjoy digital life due to the incompatibility or user-unfriendliness of digital devices or due to physical decline (physical incompatibility) of the *digital elderly* to operate the digital devices without help. Digital incompatibility would be a leading cause of digital disengagement in the advanced stages of digital life.

The Possible Adverse Effects of Digital Life

The long-term use of digital gadgets could cause physical as well as mental fatigue to the digital-elderly. The prolonged use of digital gadgets may cause mild to severe health problems such as pain around the neck, finger, and wrists, back, leg, and muzzle, sight problems, and posture deformity, etc. These health problems may reduce the urge to continue digital life in the digital-elderly hood.

The economic decline is part and parcel of ageing due to limited access to vocational opportunities. The decline of income and increasing health expenses may compel the *digital-elderly* to withdraw from active digital life. This condition will increase the dependency on caregivers manifold.

The psychosocial problems associated with digital disengagement would be a composite of all factors mentioned above. The disengagement from digital life may invite mild to severe psychological stress among the digital-elderly due to digital exclusion. The *digital-exclusion* from significant others, loss of friends, relatives may multiply these issues manifold. Most likely, the problems may be anxiety, depression too, and other forms of mood disorders, and followed by defective coping strategies, like drug abuse and self-imposed isolations. However, providing adequate psychosocial and economic support can reduce the onset of these problems and bring them back to normalcy.

Discussion

The upcoming digital era is expected to offer an inclusive digital life for all age groups. The emergence of the *digital elderly* will pave way for reducing the digital divide, especially based on age and gender, and will open up intergenerational equity. The *digital elderly* population will be the most benefited age group as it would offer seamless opportunities to engage in wide domains of life with the help of digital life. It will create a new social and political order and identity in society for the *digital elderly*. The new social order and political identity will throw away ageism and stereotyped views on the elderly in society. It would bring an avenue for active ageing among the *digital elderly*.

Digital older adulthood offers a plethora of opportunities as well as challenges to the digital-elderly and society. The feeling of being connected with society even in the closing period of life could be a better source of self-confidence and keeping quality of life going for the *digital elderly* population. Digital disengagement would be the most challenging part of the digital-elderly hood causing problems not only to the digital-elderly but also to the caregivers. Addressing digital disengagement will be a puzzling task for the caregivers and government. So it would need a combined effort of both the *digital elderly* and society. Maintaining good physical and psychological health and energy to update with new trends in digital life would be a decisive factor for continuing digital life in the late *digital elderly* hood along with policy-level support to minimize the digital divide.

The digital-elderly era is expected to offer *good times* not only to the digital-elderly but also to the society as well. It will reflect mainly in the governance where active involvement of people's participation is possible through digital technologies. This will pave the way for the *digital elderly* to speak up for themselves and get their voice heard. Framing *digital elderly-friendly* policies and programs will be a crucial area of interest of the government machinery for maintaining an active digital life of the *digital elderly*. The policy and programs must include ensuring access to *digital elderly-friendly* technologies at an affordable price, legal measures to protect rights, measures to reduce inequalities and the digital divide, etc.

Conclusion

The theoretical paper introduces a new term – “*digital elderly*” to the gerontological literature. The emergence of digital-elderly is expected to bring a paradigm shift in the dynamics of the ageing population worldwide. It will open up opportunities for social development and social equity. The evolving trend of digital life might be tricky for the digital elderly to cope up with. But introducing cheap *digital elderly-friendly* technologies could help the digital elderly to continue their digital life without interruption and could increase accessibility to digital technologies manifold. The emerging *digital elderly* population therefore will be an interesting area for multidisciplinary research to bring out evidence to address their opportunities and challenges further.

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Note

1. People born from 1946 to 1964, during the post–World War II baby boom.

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Age-Friendly City – Exploratory Framework and Initiatives*

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ABSTRACT

The present paper analyses the phenomenon of 'Age-Friendly City' for competitively better technological support, with the fairly superior training and healthier environment for the aged population. The 'Age-friendly city' concept is a response against the care crisis, traditional care mechanism, and social exclusion of elderly people. Jaipur, the capital city of Rajasthan has been identified for present research which is also recognized under the smart city project. The ground for selecting Jaipur city for the present study considers the facts presented in 'Jaipur Master Development Plan 2025' which is not showing a major concern for 'Age-friendly' development in Jaipur city. This study covers all concerns to develop an exploratory framework and guidelines that have been designed to address the shifting needs of the elderly.

Key Words: Care crisis, e-counselling, Age-friendly City, 'Required' and 'Desired' components, Social Inclusion, civic participation, gerontologist, geriatrics.

WHO report The Global Network for 'Age-friendly Cities' and Communities: Looking back over the last decade, looking forward to the next (2018) defined 'Age-Friendly city' as "a basis for developing guidelines to make front-line primary health care services more

'Age-friendly' i.e. more accessible and responsive to the specific needs of older persons." World Health Organization has now turned its attention to the environmental and social factors that contribute to active ageing in urban settings. WHO (2007) identified the indicators of 'Age-Friendly Cities' as "outdoor spaces and buildings, transportation, housing, social participation, respect and social inclusion, civic participation and employment, communication and information, community and health services." Smith, *et al.*, (2013) conceptualized age-friendliness in terms of "the broad range of domains that have been identified, including the physical environment, housing, social environment, opportunities for participation, informal and formal community supports and health services, transportation options and communication & information." While discussing the need of transforming Jaipur into an 'Age-Friendly City' Rao, Monica (2021) identified key components for 'Age-Friendly City' as 'Required' and 'Desired'. Where 'Required' addresses to essential and must-have aspects and category 'Desired' components covers desirable and good to have aspects while planning development for 'Age-Friendly City'."

Objectives of the Study

- (a) To know about global initiatives specifically used in the process of Urbanization towards 'Age-friendly cities' at the local level.
- (b) To understand the role of urban development authorities and urban planners regarding facilities extended to older persons during disasters and pandemics.
- (c) To highlight the measures and guidelines to decide a Framework for 'Age-Friendly City'.

The impact of urbanization affects the experiences of ageing at different levels.

Further, understanding the enormous range of causes affecting the social aspects of ageing during the process of urbanization was the main objective of the present study.

The approach of this research includes a systematic review of the literature with conceptual development. Identifying and linking the key aspects of an 'Age-friendly city' for future urban planning was the key concern. The present study also emphasized on empirical evidence

based on responses from professionals who had a better understanding of the aspects of elderly care along with the process of urban planning.

Method

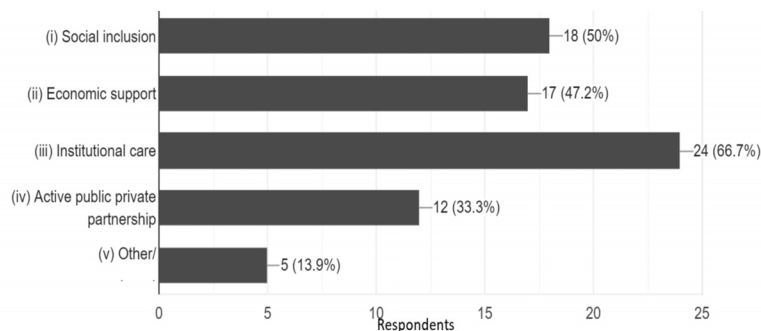
The present study highlights previous researches and in-depth interviews from professionals to identify relevant prerequisite initiatives for an exploratory framework of an 'Age-friendly city'. Based on focused group discussion and online questionnaire; sixty professionals were selected from twelve specific categories. Five professionals belonging from each area i.e. Administrators, Academicians, Policymakers, Urban Planners, Gerontologists, Economists, Political Scientists, Architects, Social Activists, Law Professionals, psychologists, Geriatrics, Media Experts were approached. To articulate innovative elderly care initiatives, an online questionnaire was mailed to respondents.

Based on the responses received during interviews researcher has allowed the professionals to participate as a key facilitator for guiding and helping the research and prepare a future map for framework by covering questions on aspects of 'Age-friendly city'.

Findings

Present research highlights age-friendly environments and recommends building innovative housing models, internationally recognized infrastructural designs, and increasing awareness for self

Figure 1
Areas of consideration by the policymakers for the framework of 'Age-Friendly city'

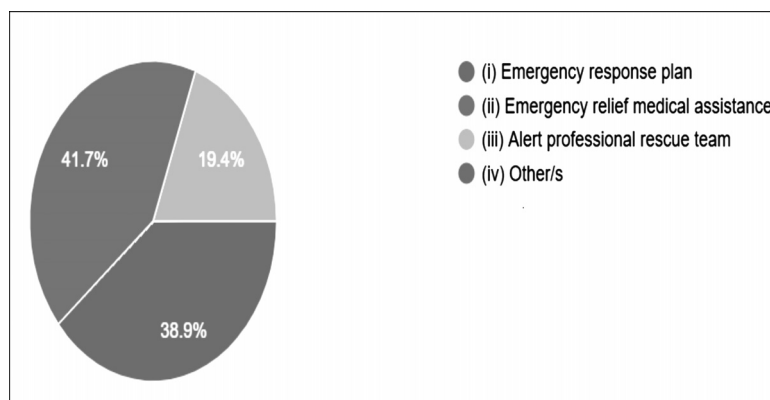


and community elderly care. Here, the role of its committed younger citizens was also found crucial who can work with the older population to create an 'Age-friendly' environment. Hence, the present research also highlighted the significant areas of consideration for policymakers to make Jaipur an 'Age-Friendly City' as shown in Figure 1.

Figure 1 emphasizes the key considerations for policymakers to address 'Age-Friendly Cities'. Above 66 per cent of respondents considered and correlated that the present scenario should be supported by Institutional care along with a socially inclusive policy framework. This is very apparent from the above Figure 1 that social inclusion and economic support system are also very essential in the process of policy formation for elderly persons.

Luciano, et al., (2020) raised the issue that "An ageing population raises the question of providing adequate housing that enables older people to age in place without losing autonomy and independence. Except for the issue of accessibility, no framework exists that specifically outlines a standard to achieve and, as a result, intervention on existing or on new buildings may be inconsistent without leading to the desired rise in living standards." Whereas in the present study role of authority during disasters and pandemics has been demonstrated in Figure 2.

Figure 2
Role of Urban Development Authorities in Providing Facilities to Elderly during Disasters/Pandemic



As shown in Figure 2 it is evident that the majority above 41 per cent of the responses indicate emergency relief medical assistance must be the key facility made available. Geriatricians advocated that it was very crucial during the pandemic. Psychologists have recommended that an alert professional rescue team was a must during any disaster or pandemic. Administrators and law professionals emphasized and strongly recommended an emergency response plan which was crucial during the pandemic period as it has been witnessed during the entire COVID-19.

Elizabeth, *et al.*, (2008) focused on criteria to frame Age-Friendly urban planning in their edited book and gave an overview about how “Manchester has made a concerted effort to frame “age-friendly” from an equality and “rights to the city” perspective. Ageing efforts typically have focused on health and services, with the elder as a patient or customer, while Manchester views older adults as citizens first, with inherent rights. This includes the right to appropriate urban space; the right to participate in decision-making in the production of urban space; and the right to shape strategies for urban planning. Similarly, WHO’s “adding life to years” is a positive message, similar to Manchester’s Positive Images of Ageing.”

Gangadharan, K.R., (2020) had engrossed several issues such as “What matters to us when we start a new initiative? The role of government, administrative authorities, and social activists is crucial during a pandemic situation.” He also gave an example of COVID-19 and the issues regarding elderly care and specifically stressed prominent health care needs. Further, Gangadharan showed his unease by saying that ‘when there is no health care there is an abuse of elderly’ and how we make people work in this area is a real challenge during a pandemic. Nevertheless, some priorities have to be decided in this direction as shown in Table 1.

Table 1
Priority concerns for designing a framework of Age-friendly Jaipur city

<i>Concerns</i>	<i>Agree upon Statement (%)</i>	<i>Rank Order</i>
Institutional care	66.67	1
Social Inclusion	50	2

Cont'd...

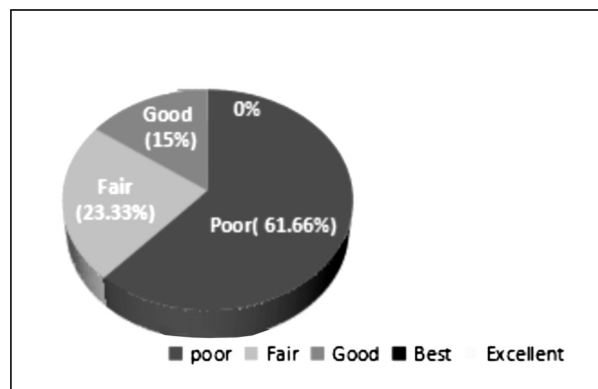
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Economic Support	46.67	3
Active Public-Private Partnership	36.67	4
Others	8.33	5

Table 1 highlights the key aspects for policymakers to consider in priority while making a framework for an 'Age-Friendly Jaipur city'. While observing the rankings given by respondents, the provision of Institutional care for the elderly needs utmost attention by policymakers. Whereas, enhancing measures for social inclusion and economic support 50 per cent and 46.67 per cent respectively should be supported by having much focus on a socially and economically inclusive policy framework. This is also apparent from the above Table 1 that the Active Public-Private Partnership support system is also very essential in the process of policy formation for elderly persons.

Advancements in infrastructure that may be appropriate in India for addressing the elderly issues were not available as it was anticipated. Further, the status of Age-Friendly Cities in India has been found dissatisfactory in the present study which is also shown below in Figure 3.

Figure 3
Present Status of an 'Age-Friendly Cities' in India



To find out the consideration from practitioners and professionals involved in elderly care regarding their ranking to present 'age-friendly city' status. It was shocking to know that none of them were ranked as best or excellent. 61.66 per cent identified the present situation as poor whereas only 15 per cent were quoting with good status. Their irritation regarding the careless approach towards implementing laws regarding this complex problem has been widely witnessed. The blame game and shifting responsibility by family, state, and society do not give us relief in the time of care giving crisis.

Menec, V., *et al.*, (2015) highlighted expert's perspectives on age-friendly status among rural and remote families. "The presence of strong social ties and sense of place were found to be amongst their strengths, whereas poor infrastructure, widely dispersed population, large geographic demography emphasised aging as a result of out-migration were amongst their challenges. Urban centres, on the other hand, may need more time in the early stages but, by building on existing infrastructures and processes, may be able to address larger projects more easily".

Existing laws attention towards: 'Age-Friendly' Society

The present research has also tried to sketch the overall status of law implementation to address elderly issues which are not satisfactory. Out of the total responses, 55.6 per cent of professionals disagreed upon the effective role of law implementation to address elderly issues. The majority of them were demanding a separate ministry and team of trained social workers and counsellors to monitor and provide swift help to the elderly. Although, 27.8 per cent of respondents were convinced with the implementation of existing laws and their surveillance methods. Whereas 8.3 per cent of respondents found no interest in responding but reported their helplessness in being adequately aware of the elderly caretaker and caregivers.

Initiatives regarding 'Age-Friendly City':

City planners are more concerned about society for all ages, gender, and sections. Since aging is a universal phenomenon and needs consideration as a separate entity. Hence, strategic situation analysis and customising all sorts of requirements of a senior citizen is the need

of the hour. Extreme hurdles are faced in framing and implementing policy for the heterogeneous process of ageing in the context of the socio-economic and physiological background of the elderly. Babak *et al.*, (2014) investigated the “relationship between happiness status and age variable in Italy. The study indicated that the well-being of the elderly has a significant relationship between happiness and socio-demographic characteristics such as age, educational level, and income status. This study strongly requires promoting happiness to increase the quality of life with the physical, mental, and social health of the elderly.”

Figure 4
Eight domains of liveability for cities



Source: Rafi, Sameen & Saif, Dr. (2020). Age-Friendly Communities: Creating a Conducive Environment for the Elderly in India, Journal of Geriatric Medicine.

Rafi, Sameen, and Saif, Shyna (2020) have presented eight domains of liveability for cities. Age-Friendly Seattle focuses on how we can better serve the needs of older people.

The general view briefly in this research shows mixed responses towards the present situation but a largely collective voice is witnessed for an urgent need of a framework for age-friendly city concept to address the elderly issues on the ground.

Table 2
Initiatives for 'Age-Friendly' Jaipur City

<i>Voluntary(Unpaid) and Non-Voluntary (Paid) care system</i>	<i>E- counselling</i>	<i>Institutional care</i>	<i>Alert Automation</i>
Care Centre – by medical, religious, educational and political institutions	Awareness and Encouraging active ageing environment	Active public-private partnership	Wireless Medical Sensors
E-health facilities for elderly at home	Capacity building	Device for self-help	E-health facilities at home
Social support and community care system. (formal group, informal support, mail/photo share/ WhatsApp/ Fb, etc.)	Techno friendly Training	Agent-based smart home	Remote monitoring
Active aging programme for Social, Physical, Mental economic wellbeing, and happiness.	Access to basic amenities / modern infrastructure,	Development of virtual infrastructure	Following and recording the status of elderly living alone by police or state agency
Prompt mobile counselling and health facility.	Good urban Governance by providing Remote monitoring	Advisory service for elderly	Emergency response plan
Special Security cell for elderly and with elderly	Online and Physical training for Digital Learning from module	Involvement in decision making by Thinktank groups and learning with life experiences	Emergency relief medical assistance
Social Inclusion	Financial support	Respect of Autonomy	Alert professional rescue team

Although a majority of the aspects regarding the groundwork for preparing a framework for an 'age-friendly city' was done through an online questionnaire in this research, professionals had their specific individual views regarding this aspect. Hence, efforts were made to collect their point of view at length with the help of a separate focused interview with few professionals by asking open-ended questions. During focus interviews, professionals have shown their strong agreement and disagreement on several other aspects considering exclusive circumstances of India in general and counting Jaipur city as a specific case.

Framework for an 'Age-Friendly City

In general, it was observed that there has been a growing mandate for agenda formation for preparing a framework for 'Age-Friendly City' (Jaipur) which will certainly maximize the quality of life of the elderly in the city. It also indicates that there is no disagreement on the efforts needed for digitalized and techno-friendly infrastructure. Hence, suggestions regarding designing an 'Age-Friendly city' (urban space) to cope up with the problems faced by the elderly under smart city mission and urban development are enlisted below to frame a policy document in this regard:

Following are the measures and guidelines to decide a Framework for 'Age-Friendly City'

1. Exclusive public space: Compact space around the city for elderly people will help them to maintain Quality of life.
2. Community-based regular awareness camps and family counseling centre: 'Age-friendly city' should have adequate counselling centres. Family members should be made aware of their responsibilities towards the elderly of their families to avoid any physical, psychological, emotional abuse. Elder-youth interaction needs to be increased.
3. Separate Ministry: Separate Ministry to deal with elderly issues is very necessary at present time, due to the rapid demographic shift in India.
4. Exclusive Geriatric and Naturopathy Centers: The establishment of dedicated geriatric care and Naturopathy centres in the city with subsidized health packages for the elderly is essential.
5. Age-Friendly recreational clubs: More elderly clubs, daycare homes should be set up with adequate facilities.
6. Trained volunteers and counselors: Establishing assistance centers for the aged is a crucial need in today's time. The option of voluntary service by the elderly can be included for their better inclusion in society. Volunteer care by the younger generation is backfired in many cases because we are not having trained caretakers.

7. Safe and sensitive smart housing: Provision of 'Age-friendly' public transportation, 'Age-friendly' shopping and public spaces, provision of private vehicle service on call, medical assistance on call, technical support to manage new instruments is essential for providing safe and sensitive smart housing.
8. Inclusive Policy for elderly: Social inclusion and policy inclusion can pave the way to a better smart 'Age-friendly city'.
9. Age-Friendly smart infrastructural: Better e-health facilities and smart infrastructural developments can facilitate mobility and their better participation as active citizens of cities.
10. Analysis of social demography of elderly by urban planners: Demography of age in a particular city in a social context should be considered while framing 'Age-friendly city' to cope up with all problems and needs.
11. Green Channel Counters and Availability of Opportunities: To sort out issues in government and private offices 'Green Channel Counters' is a best practice complimented by a toll-free Helpline number / Call Centre.
12. Smart monitoring of policies for the elderly: It must be based on the direct interface of all ages. Elderly people require attention and care in all spheres of their life i.e. physical, nutritional, health, social, emotional, and some of them may need financial support. Thus, there is a need to design a special monitoring policy for the elderly under which all dimensions can be included to create such an 'Age-friendly city'.
13. Centre and Online platform for Hidden talents of Elderly: Elderly people are the treasure trove of skill and knowledge for the society, who can nurture the society by their experiences and can be greater support for the younger generation.
14. Public-Private Partnership: The incorporation of the elderly in development planning by public and private developers of urban space is very important.
15. Specific Legal provisions and policies: Institutional mechanism to ensure social security of elderly, specific legal provisions for elderly from unorganized sector and weaker sections is very

essential. Also, sector-specific policy to transform the elderly population into productive human capital is inevitable.

16. Good Governance and NGOs support: Productive, Sustainable policy Framework, wellbeing, livability, and good governance are a must with NGOs catering specific social services for the elderly.
17. Social Welfare of elderly: Living arrangements, financial support, Social security, and healthcare are the primary areas to be addressed by state authorities.

Digitized training for all ages and support services for the elderly: While framing digitalized support services for the aged people, a humanistic approach should be considered with the 'Age-Friendly city' environment. Judicious adoption of technology and the Creation of a holistic virtual and technology-based environment may raise the bar of isolation for all ages. Training for all ages is required to understand the needs and believes of all ages and can be a medium of mutual support and learning of technology.

Conclusion

In conclusion, it is suggested that awareness camps at the community, family, and state level should be organized periodically to create an anti-discriminatory environment for the elderly, by the elderly and with the elderly to confirm initiatives for monitoring mental health to combat depression, dementia, etc. United they should raise their voice if the government is not taking care. The elderly are not a unified group they are a diversified group that is also a different issue to ponder upon. Continuous use of one's skill and knowledge are the best ingredients for an 'Age-friendly society'. Although, active and positive ageing is the key for being younger and energetic, yet 'Age-friendly city' policies and social setups are inevitable steps to overcome the challenges of later life. Above all, change in societal mindset and integrity is required in achieving this goal.

- * [This paper is an outcome of the author's minor research project (unpublished) title "Framework of for an 'Age-Friendly City' (A Study on Initiatives, Realities, and Prospects of 'Age-Friendly City'- Jaipur)" and is part of the larger research project by the University Grants Commission (UGC), under Special Assistance Programme, DRS III "Cities and Citizens: Initiatives, Realities, and Prospects", Department of Sociology, University of Rajasthan, Jaipur]

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Prevalence of Health-Related Disability of Urban and Rural Elderly People in Patna

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ABSTRACT

In the present study, an attempt was made to investigate the nutritional status of 300 elderly people (172 male and 128 female), age group of 60 years and above, residing in rural areas (N=150) and urban areas (N=150) from the Patna district (Bihar). Data on anthropometric measurements including weight and height were recorded using standard equipment and techniques. Information related to subjects was collected using an interview schedule. The study reveals that the percentage of malnutrition was higher in rural in comparison to the urban area but malnutrition was more pronounced in women than men. When the data were compared with the normal blood pressure, it was found that systolic data was higher and diastolic was lower than the normal blood pressure. It was found that more than half of the elderly men and women reported various physical ailments. The incidence of various health problems was less among urban elderly women as compared to rural women.

Keywords: Nutritional status, diseases, BMI, blood pressures.

Ageing is a developmental process and part of the cycle beginning at conception and ending with death. Old age is defined as the age of retirement for it is at this time that the combined effect of ageing,

social changes, and diseases are likely to cause a breakdown in health. An increase in longevity and decline in fertility have contributed to people living much longer today than ever before during the last 50 years. Among numerous environmental factors that modulate ageing, nutrition plays a significant role. Nutrition is found to be a key factor for successful ageing (Arulmani and John, 2004).

Malnutrition in the elderly is a multifunctional problem involving various factors. Many factors particularly socioeconomic factors are related to the living conditions. Other factors related to food and personal habits of the elderly influence their dietary intake hence nutritional status. Malnutrition is associated with an increased predisposition to illness, morbidity, and mortality. This may change the quality of life (Omram and Hotley, 2000). Nutritional assessment of the elderly plays a significant role in identifying those who are "nutritional risk".

The elderly population is increasing day by day with the development of science and medicine. Therefore the assessment of nutritional status is an important component of the geriatric evaluation. The nutritional assessment also becomes crucial in this age segment because progressive undernutrition occurs often without being diagnosed. Its prevention requires the identification of the nutritional problems in the elderly (undernutrition, micronutrient deficiency, and obesity) through nutrition surveys and implementation of nutritional intervention.

Almost 50 per cent of the elderly suffer from chronic diseases with the prevalence of diseases increasing with rising age from 39 per cent in 60–64 years to 55 per cent in those older than 70 years (NSSO, 1991). Cardiovascular diseases followed by respiratory diseases are the leading causes of death among the elderly in India (Guha R., 1994). Hearing and visual impairments are two of the common causes of morbidity in the aged population (Shah B., 1997 & Rao A, 1990). A National survey noted that 5 per cent of the elderly have difficulty in physical mobility with women (7%) experiencing more difficulty than men (4%). Varying degrees of neuro-psychiatric morbidity have been reported, the median range of psychiatric disorders being one out of three elders, with depression being the commonest disorder among the elderly people (Varghese & Patel, 2004).

Aims & Objectives

1. To measure the nutritional status of geriatric people through height, weight & BMI
2. To assess the blood pressure of the elderly people
To know about the illness of elderly people.

Materials and Methods

A total of 300 elderly people (aged 60 years and above) were selected using stratified random sampling methods equally from rural as well as urban areas. Five villages from one Block of Patna and five wards from the Municipal area of Patna were randomly selected, and of the total 172 (57.3%) were males and 128 (42.7%) were females. A well-structured and validated questionnaire / Schedule was used to collect the information on the general profile, anthropometric status, blood pressure, and medical illness of elderly people. The respondents were interviewed at their residence. Height in cm and weight in kg was measured with the help of a measuring tape and weighing machine respectively. A Digital heart rate monitor was used to measure Blood pressure. All the descriptive statistics were done using mean, Standard deviation, and percentage. BMI was estimated using the following equation –

$$\text{BMI} =$$

Table 1
Prevalence of undernutrition among rural and urban elderly people

<i>Degree of undernutrition (BMI)</i>	<i>Urban</i>		<i>Rural</i>		<i>Total</i>	
	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>	<i>No.</i>	<i>Percentage</i>
< 20 (Underweight)	22	14.67	30	20.0	52	17.33
20–24.9 (Normal)	71	47.33	64	42.67	135	45.00
25–29.9 (Overweight)	43	28.67	47	31.33	90	30.00
> 30 (Obesity)	14	9.33	9	6.00	23	7.67
Total	150	100.0	150	100	300	100.0

A perusal of table 1 indicates that 47.33 per cent of urban elderly were normal and more than half i.e. 52.67 per cent have several types

of malnutrition. About 29 per cent of urban elderly suffered from overweight followed by underweight (14.67%) and obesity (9.33%).

In the case of rural elderly 57.33 per cent were malnourished while 42.67 per cent of total rural elderly were normal. 31.33 per cent of rural elderly suffered from overweight followed by underweight (20%) and obesity (6%). Thus, it may be inferred that percentage of malnourished elderly was higher in rural as compared to urban areas.

Table 2
Blood pressure of elderly male according to age

<i>Age group</i>	<i>Urban</i>		<i>Rural</i>	
	<i>Systolic</i>	<i>Diastolic</i>	<i>Systolic</i>	<i>Diastolic</i>
60–65 years	127.9	81.3	128.4	84
66–75 years	138.3	87.6	135.5	84.6
76–85 years	141.3	89.1	124.1	94.7
Above 85 years	120	80	134.5	88.0

Table 2 ‘A’
Blood pressure of elderly female according to age

<i>Age group</i>	<i>Urban</i>		<i>Rural</i>	
	<i>Systolic</i>	<i>Diastolic</i>	<i>Systolic</i>	<i>Diastolic</i>
60–65 years	132.3	82.6	124.6	78.1
66–75 years	138.4	87.2	133.5	87.1
76–85 years	125.0	80.0	149.5	81.5
Above 85 years	145.0	95.0	139.0	77.0

It is clear from Table 2 that the mean value for systolic blood pressures (BP) of elderly males in urban areas was higher than the normal systolic B.P. (i.e. 120) at all ages from 60 years to 85 years. However, the value at 85 above age was equivalent to the normal systolic value. Similarly rural elderly experienced higher systolic value as compared to the normal systolic value at all ages from 60 years to more than 85 years. The value of diastolic B.P. when compared to its normal value (80), among the urban as well as rural elderly males revealed similar trends as in the case of systolic B.P.

Table 2 also revealed that the value of systolic B.P. for the urban elderly males increased with age from 60 years to 85 years and

suddenly declined after 85 years of age. The systolic value experienced ups and downs with rising age among rural elderly males. The diastolic B.P. value for the rural elderly men experienced similar trends of change in values as in the case of urban elderly men.

Table 2 "A" depicts the B.P. of elderly females by age group and rural-urban residence. When compared with the normal systolic value (120), the mean value of systolic B.P. for urban elderly women was higher than the normal value for all age groups both in urban and rural areas respectively. Similarly, the diastolic B.P. value for urban elderly women was higher than the normal value (80) between 60–75 years, equal between 76–85 years and again higher after the age of 85 years respectively. Among rural elderly women, the trend of diastolic value was lower than the normal value in early ages (i.e. 60–65 years) and higher ages (i.e. >85 years) and higher than a normal value between middle ages of 66 to 85 years respectively.

The analysis revealed that there was no significant difference in B.P. among rural and urban elderly men as well as women. Similarly, the age group of the elderly was not significantly associated with their B.P. However, the systolic and diastolic values were observed to be higher than their respective normal values in general for all elderly persons.

Table 3
Percentage distribution of elderly people by the nature of ailments

<i>Nature of ailments</i>	<i>Urban</i>				<i>Rural</i>			
	<i>Male</i>		<i>Female</i>		<i>Male</i>		<i>Female</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Back pain	22	27.5	27	38.6	30	32.6	33	56.9
Knee pain	47	58.8	54	77.1	52	56.5	38	65.5
Body pain	32	40.0	43	61.4	38	41.3	32	55.2
Headache	22	27.5	24	34.3	33	35.9	37	63.8
Paralysis	4	5.0	2	2.9	16	17.4	7	12.1
Chest pain	15	18.8	14	20.0	23	25.0	13	22.4
Piles	18	22.5	9	12.9	18	19.6	15	25.9
Asthma	6	7.5	8	11.4	12	13.0	14	24.1
Digestion	25	31.3	27	38.6	24	26.1	29	50.0

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Cold, cough	21	26.3	16	22.9	24	26.1	20	34.5
Leg swelling	12	15.0	23	32.9	21	22.8	22	37.9
Teeth problem	22	27.5	27	38.6	30	32.6	33	56.9
Weakness	47	58.8	54	77.1	52	56.5	38	65.5
No ailments	32	40.0	43	61.4	38	41.3	32	55.2

To ascertain the health status of the elderly, information was collected regarding the nature of ailments. Table 3 revealed that in urban areas back pain, knee pain, body pain, headache, digestion problem, leg swelling, teeth problems were more commonly mentioned by females and most of the urban elderly women reported suffering from general weakness.

A large number of urban female elderly (38.6%) had back pain, 77.1 per cent had knee pain, 61.4 per cent had body pain, digestion problem was found in 38.6 per cent, leg swelling was observed in 32.9 per cent elderly urban females, Teeth problem in 38.6 per cent, 77.1 per cent urban elderly female had a weakness. While in the case of urban elderly males paralysis, Piles and Cold, cough constituted 5 per cent, 22.5 per cent, and 26.3 per cent respectively. Further, among rural elderly people, a large number of elderly males suffered from Paralysis and Chest pain with 17.4 per cent and 25 per cent respectively. On the other hand, rural elderly females complained of back pain, knee pain, body pain, headache, Piles, asthma, digestion, leg swelling, teeth problem and weakness with 56.9 per cent, 65.5 per cent, 55.2 per cent, 63.8 per cent, about 26 per cent, 24.1 per cent, 50 per cent, about 38 per cent, 57 per cent, and 65.5 per cent respectively. It was found that about 60 per cent of the rural elderly men and 45 per cent of elderly rural women reported various physical problems.

Thus it may be inferred that maximum ailments such as Back pain, knee pain, body pain, headache, Piles, asthma, digestion, leg swelling, teeth problem, and weakness were more pronounced in elderly females in rural areas. Thus it is clear that the incidence of various health problems is less among urban elderly women compared to rural women. The better health standard of urban elderly could be the result of their awareness of health care, improved lifestyle, high

literacy level, food habits, better medical facilities, better hygienic conditions, availability of safe drinking water, and unadulterated food.

It was observed in the study that with increasing age the percentage of the respondents having no ailments decreased and compared to the male, the female respondents have more ailments. With increasing age, older persons usually have series of ailments. Due to these ailments, they lose their strength, authority, and social active participation in indoor and outdoor activities which subsequently makes the aged burdensome on the family and the society. In the study, it was observed that the majority of the elderly were suffering from one or more ailments both in urban and rural areas.

Conclusion

The study reveals that the percentage of malnutrition was higher in rural in comparison to the urban area but malnutrition was more pronounced in women than men. It was also observed that systolic BP was higher in urban elderly in comparison to rural. In this study, it is clear that the incidence of various health problems was less among urban elderly women as compared to rural women. The majority of the elderly were suffering from one or more ailments and in this context, the male respondents are little higher than the female respondents in both urban and rural areas.

Recommendations

Elderly people should be encouraged to include iron and micro-nutrients rich foods (fruits and green leafy vegetables) in their daily dietaries. Government, NGOs, community, families, medical and social service agencies need to put greater emphasis on providing health care, societal support, and nutrition services to the elderly people to enhance their health and well-being.

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Older Women's Experiences in the Labour-Market in Rural Uttar Pradesh

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ABSTRACT

This research work investigates the important concerns of 168 elderly women, age varying from 60 years and above, who were contributing to the labour market (139 were working in the agricultural sector and 29 were working in the rural non-farm sector) and to determine their health status. Data was collected from two sources: by survey method and from the secondary sources (National Sample Survey Organisation 71st Round (2014), and Census of India (1961–2011, to capture the causalities which can enforce older women to contribute to the labour market. Statistically, bivariate and binary logistic regression models were employed as methods of analyses. The results demonstrated that out-migration of young adults, unavailability of caregivers, poverty, and decline of the traditional support system were major ingredients that forced elderly women to participate in the farm and rural-nonfarm sectors. These findings were further explored that absence of spousal support, institutional benefits and residential care were reported as the key obstacles and which requires policy comprehensions to reduce gender-based disparities in both institutional and residential spheres.

Key Words: Elderly Women, Poverty, Prejudice, Vulnerabilities, and Widow.

In the Indian context, though there has been a shift from the agricultural sector to industry and services, yet agriculture remains the backbone of the economy. To acknowledge the tendencies of women's contribution to the agriculture and rural non-farm sector, it is alarming and even distressful when 60 or 70 years old women are participating in the labour market to execute their basic needs. In addition, property rights, lower education, loneliness, financial exclusion, and socio-cultural backwardness among older women are the key occurrences that aggravate the causality to participate in the market and household economy. In light of this, gender-based disparities and discriminatory attitudes may also affect the quality of surviving in old age. Widening rural-urban disparities, conversion of the joint family structure into the nuclear family, and insufficient spousal support have created an unsupportive environment and it recognised left-behind older rural women as abandoned (Jacka, 2014). For older workers, increasing incidence of higher age dependency are linked negatively with labour productivity growth (Choudhry, *et al.*, 2016) and lack of necessary human and social capital resources are posing new challenges to the policymakers (Taylor, *et al.*, 2010). A large part of the argument about older women indicates that the differences due to family conflicts, mobility patterns of young adults, financial vulnerabilities, and lack of social security benefits can leave older women isolated or disturbed. Over and above these outcomes, older women are the victim of multiple vulnerabilities and surviving in the shadow of stereotyped mindsets where people have offered them certain rights with limitations. Further enclosure suggests that the lack of a spouse can often make life more difficult for an elderly person (Knodel and Ofstedal, 2003). Consequently, prohibitive costs, minimum wages for similar nature of work, and lack of palliative assessment describe their insecurities in so many ways.

Method

Sample

One of the key objectives of this study was to determine the health status of older women especially those who were working in either farm or rural non-farm sectors. In light of this, the present research work was retrospective of both primary and secondary

sources of data. In addition, secondary data was collected from the Census of India (1961–2011) and National Sample Survey Organisation 71st Round (2014). For primary investigation, a field survey was conducted in the fifteen villages that were covered by three blocks of the Bulandshahr district of Uttar Pradesh (India).

For sampling purposes, after house-listing, nearly 60 households having elderly members were randomly selected from each village, and thereafter, a total of 520 elderly persons (390 working and 130 non-working) of both the sexes were selected from every second household (that is, from 30 households) were chosen for the study.

Since this paper presents the Older Women's Experiences in the Labour-Market the findings of 235 elderly women (168 working and 67 non-working), age varying from 60 years and above, were taken into consideration.

These elderly women were interviewed individually by using a structured interview schedule. At the time of interviewing their household conditions, socio-economic and health status were also examined.

The statistical analysis of this paper comprises of two phases. In the first phase, demographic and socio-economic statuses of older women were examined using bivariate analysis (Hosmer Jr, *et al.*, 2013). In the second phase, a binary logistic regression model (Retherford and Choe, 2011) was employed to examine the health status among elderly women who were participating in the labour market in the study area.

Explanation of Variables Considered for Binary Logistic Regression Analysis:

The dependent variable was dichotomized and coded 1 for yes (if older women have experienced any health complications due to participation in either farm or rural non-farm sectors) and 0 for otherwise. Age of the respondent was coded as 60–69 years/69–79 years/80 years and above, marital status of older women as currently married/others, living arrangement as living with children and other/with spouse/single, religion as Muslim/Hindu, caste as general caste/scheduled caste/other, education of older women as illiterate/literate and household size of older women as 0–4 members/5–8 members/more than 8 members. All the statistical analyses of this

study were done by using SPSS version 21.0 and Microsoft excel Program.

Findings

In contrast to the bivariate results, as per the Census of India (2011), around 68.9 per cent of India's population lives in rural areas, and agriculture remains the backbone of the rural economy. Globally, the feminization of ageing is one of the pivotal aspects that stings older women's lives in several ways.

Table 1
Percentage Share of Elderly Population in Total Population in Uttar Pradesh 1961–2011

<i>Census Year</i>	<i>Place of Residence</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
1961	Total	6.2	6.3	6.3
	Rural	6.2	6.5	6.4
	Urban	5.5	5.3	5.1
1971	Total	6.4	7.0	6.5
	Rural	6.9	7.2	6.7
	Urban	5.6	5.6	5.3
1981	Total	6.7	7.1	6.6
	Rural	7.0	7.4	6.9
	Urban	5.8	5.5	5.3
1991	Total	7.0	7.2	6.5
	Rural	7.4	7.7	6.8
	Urban	5.8	5.6	5.2
2001	Total	7.0	7.1	7.0
	Rural	7.3	7.4	7.2
	Urban	5.9	5.7	6.1
2011	Total	7.7	7.7	7.8
	Rural	8.0	8.0	8.0
	Urban	6.7	6.6	6.8

Sources: Author's calculations based on Census of India, 1961–2011.

From the result displayed in Table 1, it is seen that about 1.4 per cent of increment was observed in the male elderly population in 1961–2011 while this proportion was around 1.5 per cent for older women. Similarly, the concentration of the elderly population was found in the rural areas while the contribution of urban areas cannot be unnoticed during the period cited above. This scenario indicates that the feminization of ageing experienced in India as is throughout

the world and older women cannot be ignored any longer. Consequently, the nature of the gendered perspective describes the economic vulnerabilities, widowhood, and patriarchy beliefs that can make their survival conditions more complex.

Table 2
Workforce Participation Rate (WPRs) of Elderly Population by Sex and Place of Residence: 2001–2011

Place of Residence		2001			2011		
		Total	Male	Female	Total	Male	Female
India	Total	40.3	60.3	20.9	41.6	60.4	23.4
	Rural	45.0	65.6	24.9	47.1	66.4	28.4
	Urban	26.2	44.1	9.0	25.4	48.6	13.0
Uttar Pradesh	Total	46.5	71.1	18.8	47.4	70.8	22.0
	Rural	49.6	74.5	21.2	49.8	73.3	24.2
	Urban	31.9	54.6	7.7	37.6	60.4	12.9
Bulandshahr District	Total	50.3	72.2	28.2	44.1	69.9	19.3
	Rural	53.6	74.5	32.4	46.4	72.4	21.8
	Urban	36.2	62.3	10.4	35.2	60.9	9.6

Source: Author's calculations based on Census of India, 2001–2011.

Data in Table 2 presents the workforce participation rate (WPRs) of the elderly by sex and place of residence from 2001 onwards. It is evident from Table 2, the rural-urban differentials show higher work participation rates among the elderly in rural areas than in urban areas. In this respect, sex-wise work participation rate (WPRs) indicates that the proportion of elderly women in labour activities is much lower compared to their male counterparts. The notion of work and employment, especially for women, is complex (Srivastava and Srivastava, 2010). It is evident from appendix (2) in the age group of 60–69 nearly 5.0 per cent of older women were participating as main workers this proportion was increased by about 6.3 per cent in 2011. This is equally true in the age group of 70 or plus, where almost 0.6 per cent increment was observed among older workers in the period cited above. It is universally acknowledged that there is a positive association between literacy and occupational structure. Likewise, findings divulged in appendix 1, there were perceptible increments in the proportion of illiterate elderly workers for both sexes between 2001

and 2011. Thus, it is mainly felt that due to financial backwardness, the unripe education system and absence of social exposures have been heavily linked to their weak education coverage and financial dependency.

Table 3
Proportion of Older Women by Age and Working Status in the Bulandshahr District: 2014

<i>Age-group</i>	<i>Worked in the Agriculture Sector</i>	<i>Worked in the Rural Non-Farm Sector</i>	<i>Not Working</i>
60-69	115 (62.2)	29 (15.7)	41 (22.2)
69-79	24 (68.6)	0 (0.0)	11 (31.4)
80+	0 (0.0)	0 (0.0)	15 (100.0)
Total	139 (59.1)	29 (12.3)	67 (28.5)

Source: Author's calculations based on a field survey conducted from January to April 2014. Bracketed Figures Denote Percentages to their Respective Totals.

The present research work was based on a survey of nearly 390 elderly workers who were involved in both agricultural and rural non-farm sectors in the Bulandshahr district of Uttar Pradesh. It is evident from Table 3 that about 59.1 per cent of older women participated in agricultural operations while only 12.3 per cent were involved in the rural non-farm sector. It is important to note that, about 28.5 per cent of older women were not involved in any economic or productive activities in the study area. In addition, the older workers equally share the loads of deformities that inflame their socio-cultural, healthy, and pecuniary predicaments.

Table 4
Distribution of Older Women by Reasons of Work and Work Environment in Bulandshahr District: 2014

<i>Reasons of Work</i>	<i>Work Environment</i>		<i>Total</i>
	<i>Work in Agriculture Sector</i>	<i>Worked in Rural-Non Farm Sector</i>	
A large Number of Elderly living in the below poverty line	71 (84.5)	13 (15.5)	84 (50.0)

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Lack of implementation of pension schemes and other government programmes	6 (75.0)	2 (25.0)	8 (4.8)
Unavailability of caregivers	44 (84.6)	8 (15.4)	52 (31.0)
With no savings	7 (77.8)	2 (22.2)	9 (5.4)
Out-migration of adult children	9 (69.2)	4 (30.8)	13 (7.7)
Family stress	2 (100.0)	0 (0.0)	2 (1.2)
Total	139 (82.7)	29 (17.3)	168 (100.0)

Source: Calculations based on Field Survey Conducted from January to April 2014.

Note: Bracketed Figures Denote Percentages to their Respective Totals.

Data in Table 4 describes the possible grounds which were encouraging older women to participate in both agriculture and rural non-farm sectors. In context, around 50.0 per cent of older women are involved in the labour market due to extreme poverty while nearly 4.8 per cent are engaged due to the unavailability of the institutional support system which is highly precious among older adults. These findings further indicate that nearly 31.0 per cent of older women are working because no one was available for care and provide them support and security in old age. From Table 4 it is also seen that out-migration of young adults affects the quality of life and decision to participate in farm and rural non-farm jobs. This may be attributed to the fact that higher incidences of poverty, trends of unemployment, access to quality education are the key forces that deploy youth in the metropolitan areas.

Table 5
Distribution of Older Women by Nature of Diseases and Work Environment in Bulandshahr District: 2014

Nature of Diseases	Work Environment		Total
	Work in Agriculture Sector	Worked in Rural-Non Farm Sector	
Bronchial Asthama	5 (55.6)	4 (44.4)	9 (5.4)
Cataract	14 (87.5)	2 (12.5)	16 (9.5)
Disability	5 (71.4)	2 (28.6)	7 (4.2)
Disorders of Joints and Bones	39 (92.9)	3 (7.1)	42 (25.0)
Gynecological Disorders	5 (83.3)	1 (16.7)	6 (3.6)

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Heart Diseases	7 (77.8)	2 (22.2)	9 (5.4)
Hypertension	14 (77.8)	4 (22.2)	18 (10.7)
Neurological Disorders	1 (100.0)	0 (0.0)	1 (0.6)
Respiratory	16 (80.0)	4 (20.0)	20 (11.9)
Tuberculosis	1 (50.0)	1 (50.0)	2 (1.2)
Whooping Cough	4 (100.0)	0 (0.0)	4 (2.4)
Other Diagnosed Ailments	28 (82.4)	6 (17.6)	34 (20.2)
Total	139 (82.7)	29 (17.3)	168 (100.0)

Source: Calculations based on Field Survey Conducted from January to April 2014.

Note: Bracketed Figures Denote Percentages to their Respective Totals.

In old age, health is considered to be a vital element that may affect the overall quality of life and determines the capacity to perform their activities of daily living. As mentioned in the previous sections, the majority of women covenant with multiple health disorders with advancing age (Roberto, *et al.*, 2005). In this study, it is worth emphasizing that, the majority of older women were suffering from both chronic and non-chronic ailments while contributing to the agricultural and rural non-farm sector. The results in Table 5 portray that nearly 25.0 per cent of older women face disruption due to disorders of Joints and Bones followed by 10.7 per cent from hypertension, 11.9 per cent from respiratory, and about 9.5 per cent were diagnosed with cataracts that heavily associated with Indoor Air Pollution (IAP). “Self-reports of health problems are one of the various possible measures of self-perceived health status and are often considered to be a useful indicator of more objective health indices” (Kabir, *et al.*, 2003).

Table 6
Distribution of Older Adults by Whether Covered by Any Scheme for Health Expenditure Support: 2014

<i>Whether Covered by Any Scheme for Health Expenditure Support</i>	<i>India</i>		<i>Uttar Pradesh</i>	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
Government-funded insurance scheme (RSBY, Arogyasri, CGHS, ESIS, etc.)	50.2	49.8	48.4	51.6
Employer-supported health protection (other than govt.)	52.3	47.7	50.0	50.0

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Cot'd...

Arranged by household with insurance companies	55.6	44.4	66.7	33.3
Others	49.4	50.6	41.7	58.3
Not covered	50.1	49.9	52.1	47.9
Total	50.3	49.7	52.0	48.0

Source: Calculations based on NSSO 71st Round, 2014.

In the Indian context, there is substantial evidence that exhibits the idea of a healthy state accompanying the infinitesimal allocation of health budget which determines the quality of life among older adults in the later years. From the results presented in Table 6, it is seen that there has been a marginal decline in the proportion of older women who were covered by any particular health initiative. It is also evident in Table 6 that, the magnitudes of government-funded insurance schemes indicate that at the national level about 49.8 per cent of older women were diagnosed under suitable health coverage while nearly 1.8 per cent increment was observed in Uttar Pradesh during the period cited above. It is interesting to note that about 44.4 per cent of older women were benefited from insurance companies while this proportion went down about 33.3 per cent to the older women who were residing in Uttar Pradesh. It is a well-accredited fact that the majority of older women were living alone, struggling with economic vulnerabilities and gaunt healthcare financing, and unavailability of healthcare services.

Table 7
Logistic Regression Estimates: Adjusted Value of Elderly Women by Background Characteristics in Bulandshahr District: 2014

Covariates		Significance Level	Exp (B)
Age	60–69 [®]	.978	
	69–79	.833	1.204
	80+	1.000	20,87,26,284.3
Marital Status	Currently Married [®]		
	Others	.633	1.505
Living Arrangement	With Children and others [®]	.407	

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	With Spouse	.330	1.875
	Single	.298	3.280
Religion	Hindu®		
	Muslim	.999	.000
Caste	General Caste®	.049***	
	Other	.999	29,28,38,145.8
	SC	.014***	5.612
Education	Literate®		
	Illiterate	.937	1.063
Households Size	0-4 Members ®	.622	
	5-8 Members	.467	1.984
	More than 8 Members	.330	2.989
	Constant	.823	1.299
Statistics	N	168	
	-2 Log-Likelihood Ratio	96.884	
	Cox & Snell R Square	0.76	
	Nagelkerke R Square	.157	
	Chi-Square	.844	

Significance Level: *** Significance at 1 per cent Level, ** Significance at 5 per cent Level, * Significance at 10 per cent Level.

Source: Calculations based on Field Survey Conducted from January to April 2014.

In India, mordant settings of society designate that, women are still constituted as a secondary contributor while they have spent their entire life to taking care of both residential and non-residential responsibilities. Table 7 presents the logistic regression estimates (odds ratios) of older women who participated in the labour market. The results show that, after controlling all relevant socioeconomic predictor, caste is one of the important indicators which has heavily influenced the occupational compositions and hierarchical structure of society. The probability of suffering any health disorders or illnesses increases in older women who were belonging to the scheduled caste community. In context, older women have 5.612 times more chance to become victims of poor health or illnesses after contributing to the labour market. Marital status has also played a significant role in determining the condition of the elderly. In this model, compared to currently married elderly the other category has more probability of falling ill.

Likewise, living with a spouse has a strong positive impact on the health condition of older people. In this model, controlling all other factors older women without a spouse have 1.875 times more chance to be in poorer health due to work. Similarly, the odds ratio increase to 3.280 times more when the elderly are found living alone. In the context of the above findings, it is allied that, the magnitude of the association between poverty and participation in agricultural activities is substantially higher (Pattnaik *et al.*, 2018). As noted above, agriculture is the sector where the majority of operations require heavy loads of labour involvement and colossal financial investment that makes women's contribution invisible or negligible. Overall, the results suggest that it needs to be understood how far economic independence and social insecurities are linked to the health and employability of the elderly, especially for older women. Consequently, there is a growing need for interventions to ensure the health of this vulnerable group and to create a policy to meet the care and needs of the elderly population.

Discussion

Participation of older women in labour market is the most effective and caustic outcome that is deeply associated with the quality of life in old-age. However, agriculture is considered as the main spot for women's work in developing countries (Arun, 2012) and is more mixed (Sanghi, *et al.*, 2015). It has been further argued by (Siqwana-Ndulo, 2007) that women in poor countries have always worked in the agriculture sector, either food producers or as farm labour. In the Indian context, increasing incidence of crashing the joint family structure, out-migration of productive age cohorts to cities, and higher occurrences of the singlehood in later life make older women more vulnerable and force them to participate in the labour market. In addition, the work condition of older people is significantly related to their health conditions (Ogawa, *et al.*, 2005). The gendered dimension of workforce participation indicates that the feminisation of Indian agriculture has been emphasised by many (Vepa, 2005) and women play a distinctive role in the rural economy (Chattopadhyay, 1982). More importantly, feminisation in the agrarian and rural economy may be understood as a distress-driven phenomenon (Mathew, 2012). The findings of this study suggest that caregiving is one of the crucial

determinants in old age that influences the degree of psychological and emotional trauma, especially for older women. This paper attempts to understand the depletion of socio-cultural value, the higher mobility of economically active age cohort for seeking jobs, better education, and replacing of an existing joint family system by the nuclear family system have been areas of serious concerns among older women in India and Bulandshahr district is no exception to this situation. In this study, the majority of older women belong to small farmer's families where they work as hired labourers. In many families, the absence of productive youth, the death of spouse, and unavailability of the concrete support system have forced the older women to contribute to the labour market and it was continued till their physical capacity allows them.

Added to this, after the death of spouse women have less probability to claim a share in the property. In the Indian context, Sharma, (1982) has significantly described that land is largely registered in the name of male members of the family. The findings of this study further indicate that the economic position of a household also had a significant effect on the probability of poor health and circumstances which allows older women to participate in the labour market. The gendered perspective of contribution in the labour market indicates that constraints on mobility reduce their bargaining strength in terms of choice of work and wage in rural areas (Kak, 1994). It has also been highlighted in the findings that economic insecurity, in adequate health care services, feeble institutional support system, and absence of caregivers are the essential pre-requisites for older women in the study area. Because of the above discussion, it can be concerning that women in Indian society are victims of contemptuous attitude which often reflects their pitiable condition and in old-age it is a cause of multiple exclusions. Recognizing this fact, the patriarchal mindset is oppressing older women's contribution in both farm and rural non-farm sectors in several ways.

Way Forward and Policy Learning's

To conclude, the notion of women empowerment is developed to provide a concrete assessment of women-centric dialogues. Empirical insights from this study suggest that income insecurity, void familial

relations, and heavy out-migration of youth to cities are the most prominent causes of vulnerability among the older women in the study area. Furthermore, this study clearly shows that majority of older women have suffered from serious multiple health disorders especially due to heavy workload. Evidently, in old age, there is a strong nexus between economic stringency and health condition, especially in the rural areas where institutional support system is still immature, healthcare services are limited and residential care and its associated attributes may divert the path for their active involvements. However, findings suggest that experiences of contribution in the labour market dilute their health structure especially to older adults who are engaged in the informal sector where the age of retirement and post-retirement benefits are almost negligible. Lastly, the absence of pension schemes and unawareness of legal procedures make older women penniless in so many ways.

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Factors Influencing the Work Participation of the Elderly Persons in Tamil Nadu: Evidence from BKPAI, 2011

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ABSTRACT

An attempt was made, in this paper, to study the work participation of the elderly persons and the factors influencing the same, making use of the data from BKPAI, 2011 for Tamil Nadu state. The work participation rate (WPR) of the elderly persons in Tamil Nadu worked out as 20.4 per cent. Results based on logistic regression analysis revealed that the odds of WPR of the elderly persons are found to be significantly (at different levels) higher among those who are stated as economically not dependent and partially dependent, who perceived their health as 'fair' and 'good/very good/excellent', who are having 1 and 2 or more no. of sons and living alone/with spouse than their respectively counterparts. Conversely, the likelihood of elderly-participation in economic activities observed to be strikingly decreasing with an increase in their age (groups), years of schooling (categories) and wealth index (quintiles) of the households ($p < 0.001$ or $p < 0.05$ in most cases). The tendency to work is pertinently lower (sig at 0.01 or 0.05 level) among females and also among widowed/never

married/divorced/separated as against their male and currently married counterparts.

Key Words: Factors Influencing, Work Participation Rate, Elderly, BKPAI Data.

Elderly persons, 60 years and above, are supposed to take rest and enjoy their life from their money earned and savings made out of their hard labour during their adult/working ages. However, in Indian context, most of them are not that lucky enough to do so since a large majority of them are engaged in agricultural activities and avenues related to informal sector in which the income would be meagre for their day-to-day necessities rather than saving for the future (for their livelihood in old age). Further, among those engaged in formal employment, majority are working in private sector and even among those engaged in public (Govt.) sector employment, the pension and other retirement benefits are just moderate and low. Besides these, a large majority of those working during their adult ages belong to poor to moderate economic conditions and thereby, may not be able to save money as they are supposed to meet the immediate needs of their own as well as of children and others depending upon them. In addition to all these, the social security benefits from the State/Central Governments is meagre and mostly not sufficient to lead a decent life.

Above all, due to the final stage of demographic transition and with an increasing life expectancy, on the one side, the actual number of persons aged 60 and above is somewhat larger at present and going to increase in near future and on the other side, such elderly persons are likely to live longer than expected. Added to the above circumstances, though children are expected to take care of the minimum needs of their parents/grandparents, as they too to a large extent are living in poor socio-economic conditions and thereby, may not be able to do so. Moreover, majority of these children used to migrate to nearby towns/cities and sometimes even to other countries mostly for employment and thereby, largely settle there itself. In such cases, the younger ones mostly may not be able to support their elderly family members as they have to fulfil the demands and necessities of their immediate dependents (wife and children). All these situations, naturally force the elderly persons to continue to work after their retirement (58–60 years) and at times even take up some work or

income generating activity at or after 60 years of age (Devi, 1992; Audinarayana, 2001, 2016).

Earlier Research on WPR of Elderly and its Correlates/ Determinants

In Indian context, some of the researchers made an attempt to examine the factors that influence the WPR of the elderly persons mostly with data related to different rounds of the National Sample Survey Organisation (NSSO). While analysing the 60th round data, Pandey (2009) noted that the labour force participation (LFP) rate was 34 per cent in the total sample, whereas it was much higher among males (53.0%) as compared to females (14.8%). Results based on the full model maximum likelihood method suggested that among the total sample elderly, LFP coefficient had increased with their current health status – poor to excellent/very good – as well as age squared. Conversely, LFP was found to be decreased significantly with an increase in age and size of the household and also at a moderate extent in the case of number of children. Further, LFP was found to be significantly higher among those who were physically mobile, currently married, Scheduled Castes/Tribes and residing in rural areas than their respective counterparts. On the other hand, such LFP coefficient was noted as significantly lower among those elderly who were educated up to middle school or secondary as well as higher secondary or above (dummies) and belonged to households of better standard of living. Most of these results were consistent among male and female elderly, except for social group (coefficient was higher for females, but insignificant for males); and also for marital status and location (coefficients were much higher and significant for males than females). Selvaraj *et al.* (2011) scrutinized the NSSO data for the years 1983–84 and 2004–2005 and observed that, overall in the year 2004–05, 38.0 per cent of the total elderly population was active in the labour market as against 42.0 in 1983–84. In both the rounds, the corresponding rates were lower among females as against males, decreased with an increase in their age and with an increase in their households' monthly per capita expenditure (MPCE), whereas such rates were higher in rural areas than in urban areas.

Making use of NSSO 60th round (2009–2010) data, Reddy (2013) analysed the determinants of elderly' participation in labour force and observed that the labour force participation rate (LFPR in %) was higher for men compared to women (56.5 *vs.* 18.2). Results based on probit (regression) estimates revealed that the probability of participating in labour force for both males and females had decreased significantly with an increase in their age. Likewise, such rates were observed to be lower among those who belonged to urban areas, studied higher secondary school & above and belonged to higher (3 & 4) quintiles of MPCE than their respective counterparts. On the other hand, the coefficients of LFP were significantly higher among males, living alone and living with spouse, belonged to Scheduled Castes (SCs), Scheduled Tribes (STs) and Other Backward Castes (OBCs) as compared to their respective counterparts. Reddy (2014) also analysed the NSSO's 68th round employment and unemployment survey (2011–12) and noted that the LFPR was higher for men compared to women (57.0 *vs.* 17.4). Results based on probit (regression) estimates on LFP of elderly highlighted that the probability of participating in labour force decreased significantly with an increase in their age as well as with log of monthly per capita income. Further, similar rates were noted as lower among those who studied higher secondary school and undergraduate & above and also among widowed and unmarried as compared to their respective counterparts. Conversely, the coefficients of LFP were significantly higher among males, living alone and living with spouse only, belonged to rural areas, SCs, STs and OBCs as well as Muslims as compared to their respective counterparts. By and large, findings from both these studies demonstrated that elderly from poorer socio-economic background were more likely to be in the labour force compared to the well off sections/counterparts.

Dhar (2015) analysed the work force participation rates (WFPR) of the elderly (60 years and above) in India based on the NSSO 55th (1999–2000) and 66th (2009–2010) rounds and found that the WFPR of elderly had declined from 36 per cent to 32 per cent during the study period. An analysis of determinants of WFPRs among elderly highlighted that, irrespective of the two rounds of data, rural-urban residence and males & females, WFPR declined significantly with their age and household family size. While in rural areas, WFP increased

with household expenditure levels, in urban areas, elderly persons from affluent families were less likely to re-enter the labour market. Among aged male workers, WFP initially increased, but subsequently declined (with education) – an inverse U-shaped curve was observed – whereas in the case of elderly female workers, a negative relationship between WFP and education was observed. However, in urban areas, aged women with more than 12 years of education were more likely to work in both the rounds. By and large, Hindu Upper castes had higher WFP than aged members from other socio-religious groups with the following exceptions: female SCs and STs (in both rural and urban areas and in both rounds). Further, in the case of NSSO 60th round data (2004), Dhar observed that, controlling for the other background characteristics stated earlier, physical health indicators of the respondents – captured through mobility and chronic ailments (positive and negative signs, respectively) – were turned out as significant determinants of WFP. It was also observed that economically independent aged persons withdrawn themselves from the labour force, irrespective of their place of residence and gender. Further, it was observed that elderly persons who were residing with their spouses (with or without other relatives) were more likely to work in general compared to those who had other living arrangements under study.

Two empirical studies carried out in Tamil Nadu have analysed the magnitude as well as the determinants of WPR of the elderly persons. The first one (Audinarayana, 2001) carried out in 1997–98 in three districts of Tamil Nadu ($n=750$) found that the WPR among the elderly was 36.0. The logistic regression analysis highlighted that WPR was significantly lower among females as compared to males. The WPRs of total, males and females decreased with an increase in their age and monthly income from other sources. Conversely, in all these sub-samples, such rates were found to be significantly higher among those who had middle school education and also among those who reported their health status as good than their counterparts. Among the total and female elderly, similar rates were reported as lower among those who were living with their married children than those who were living alone/with spouse. Another empirical study in Coimbatore city, Tamil Nadu ($n=596$) done in 2010 (Audinarayana, 2016) showed that the WPR among the elderly was 42.4 per cent. The

logistic regression analysis on WPR among the total elderly suggested that the likelihood of participating in economic activities was significantly lower among the females, belonged to the age groups of 65–69, 70–74 and 75+ years, Backward Castes and Forward Castes, living with spouse, married children and with others and suffering with any disability than their respective counterparts. On the other hand, such tendency was higher among those who belonged to the households of moderate average monthly family income and who were having 1, 2 and 3 or more daughters than their counterparts. Though the likelihood of participating in work noted as higher among those who were better educated and rated as healthy, and also such probability was lower among widowed/divorced/separated than their counterparts, the results didn't turn out as significant. Similar results were also noted among women and men elderly, but turned out as statistically significant in 6 and 4 out of 9 variables among women and men, respectively. Keeping in view of the aforesaid earlier research, this paper intends to focus on the following objectives.

Objectives

1. To understand the extent and patterns work participation rate of elderly persons in Tamil Nadu,
2. To comprehend the differentials, if any, exists in the magnitude of work participation across their selected background characteristics in Tamil Nadu, and
3. To find out the major determinants of work participation of elderly persons in Tamil Nadu.

Data and Methods

Data for this study is drawn from the *Building Knowledge on Population Ageing in India* (BKPAI) survey carried out in 2011 across 7 states of India (UNFPA, 2012). In the case of Tamil Nadu state, the information about elderly persons' work participation and background characteristics is available for a sample of 1,444 persons, who have been covered from 1,243 households. For the selection the sample, at the first stage, 40 Rural and 40 Urban primary sampling units (PSUs) have been selected based the probability proportional to population size (PPS) method and then from each PSU – which have

300 households – 16 households, which have elderly (60+ years of age) persons are selected making use of systematic random sampling.

Description of the Variables

Independent Variables: The independent variables considered for this paper include elderly persons' place of residence, gender, age group, caste, years of schooling, marital status, economic dependency, number of living son(s), possession of assets and wealth index of the households, living arrangements, self-reported health status, cognitive disability and chronic morbidity status. The details of these variables are mostly self explanatory, except in the case of wealth index of the households (see Table 1). In the BKPAI survey, *wealth index of households* has been computed based on 30 assets and housing characteristics. For this purpose, each household asset is assigned a weight (factor score) generated through principal components analysis, and the resulting asset scores are standardized in relation to a normal distribution with a mean of zero and standard deviation of one. Each household is then assigned a score for each asset, and the scores were summed for each household; individuals are ranked according to the score of the household in which they reside. The sample is then divided into quintiles, i.e. five groups with an equal number of individuals (approximately 20%) for the sample as whole, but not exactly the same at the state level, which are termed as 'Lowest' (Poorest), 'Second', 'Middle' and 'Fourth' and 'Highest' (Richest).

Table 1
*Extent/Patterns of Work Participation of Elderly in
Tamil Nadu, BKPAI, 2011*

<i>Extent / Patterns of Work Participation of Elderly</i>	<i>Per Cent</i>	<i>Frequency</i>
1. Extent of Work Participation		
No	20.4	294
Yes	79.6	1,150
Total	100	1,444
2. Patterns of Work in which Engaged		
Agricultural Labourers	69.7	205

Cont'd...

Cont'd...

Non-agricultural Labourers	3.4	10
Sales / Service / Trade	24.5	72
Professional / Technical / Managerial and Clerical Related	2.4	7
Total	100	294

Dependent Variable: The dependent variable considered here is economic participation of the elderly, i.e. 'whether the elderly person is working in one or the other income generating activity at the time of survey or not' (for details see Table 2).

Table 2
Extent/Patterns of Work Participation of Elderly Per Cent Frequency

Background Characteristics	WPR of Elderly		Total		χ^2 - Value; Sig. Level
	%	Fre	N	%	
1. Place of Residence					
Rural	26.2	194	741	51.3	31.803
Urban	14.2	100	703	48.7	0.001
2. Gender					
Males	26.4	177	670	46.4	28.289
Females	15.1	117	774	53.6	0.001
3. Age Group (in Yrs.)					
60-64	24.3	172	707	49	
65-69	23.1	81	351	24.3	
70-74	13.2	26	204	14.1	32.862
75 +	7.2	14	182	12.6	0.001
4. Years of Schooling					
No Education	24.4	168	688	47.6	
0-5 Years	23.8	50	210	14.5	
6-10 Years	12.6	35	277	19.2	23.070
11 + Years	15.2	41	269	18.6	0.001
5. Caste					
SC / ST	26.5	68	257	17.8	7.172
Non-SC/ST	19	226	1187	82.2	0.01
6. Marital Status					
Currently Married	26.8	211	787	54.5	44.386
Wi / NM / Di / Sep.	12.6	83	657	45.5	0.001
7. Economic Dependency					

Cont'd...

Cont'd...

Fully Dependent	11.6	139	1,195	82.8	325.601
Not / Partially Dependent	62.2	155	249	17.2	0.001
8. Possession of Assets					
No Assets	22	96	436	30.2	1.059
Have 1 more Asset(s)	19.6	198	1008	69.8	NS
9. Wealth Index					
Lowest	26.8	103	384	26.6	
Second	24.9	106	425	29.4	
Middle	16.9	58	331	22.9	39.762
Fourth + Highest (Rich)	9.5	29	304	21.1	0.001
10. Number of Living Son(s)					
0	14.6	54	369	25.6	
1	20.1	116	577	40	24.882
2 +	24.9	124	498	34.4	0.001
11. Living Arrangements					
With Children	14.6	48	329	22.8	
Alone/With Spouse	20.4	140	685	47.4	11.742
Children Co-residing	24.7	106	430	29.8	0.001
12. Self-Reported Health Status					
Poor	13	13	100	6.9	
Fair	23.9	137	573	39.7	9.131
Good/Very Good/Excellent	18.7	771	771	53.4	0.01
13. Cognitive Ability					
2 Words (including 'No')	22	33	150	10.4	
3-5 Words	24.8	188	758	52.5	24.493
6-10 Words	13.6	73	536	37.1	0.000
14. Chronic Morbidity Status					
No Chronic Morbidity	20	172	861	59.6	
Any 1 Chronic Morbidity	26.4	107	405	28.1	24.882
Any 2+ Chronic Morbidities	8.4	15	178	12.3	0.000
Total	20.4	294	1444	100	

With regard to the analysis, firstly, the background characteristics as well as the extent/patterns of work participation of elderly persons are computed through frequency tables. The associations between the selected background characteristics and work participation of the elderly are examined adopting the cross-tabular analysis with Chi-square test of significance. Finally, the binary logistic regression analysis is implemented to find out major factors that are influencing the tendency to work (at or after 60 years of age). All these analyses are carried out with IBM SPSS software (Version 20.0).

Results

Work Participation of the Elderly Persons

In the sample elderly persons (Table 1), overall, 20.4 per cent are economically active (at the time of survey) and the rest are not engaged in any income generating activity. Of those working persons (294), as high as 70 per cent are reported to be agricultural labourers, whereas about one-fifth of them are engaged in sales/services and trade related works. While about 10 of them are non-agricultural labourers and 7 persons only said to be in the category of 'professional/technical/managerial & clerks'. These figures will give the impression that most of the elderly persons are working in low profile works in which the continuation of work after 58–60 years of age would be easy, besides such avenues are mostly independent of their choice to participate with no education or little education and/or poverty conditions that may force them to participate to earn some income for livelihood either for them or for those dependent upon them (spouse and/or mostly unmarried children).

Background Characteristics of the Elderly Persons

Among the sample elderly person in Tamil Nadu (Col. 5, Table 2), one can see that a little over half of them (51%) are residing in rural areas and the remaining in urban areas. About 54 per cent of them are females and a little less than half and one-fourth of them are in the age groups of 60–64 and 65–69 years, respectively. 48 per cent of them have no education (illiterates), whereas slightly less than one-fifth each of them have had 6–10 years of schooling and 11 & above years of schooling. About 18 per cent of them belonged to Scheduled Caste/Tribes and 45.5 per cent of them are widowed/never married/divorced/separated. As high as 83 per cent of the sample elderly are economically (fully) dependent, 70 per cent of them have one or more assets like land or house/flat or plot on their name and a simple majority of them (29% and 27%, respectively) belonged to households of second & first quintiles (poorer & poorest) of wealth index. While about two-fifths and a little over one-third of the elderly are having one and two or more living son(s) at the time of survey, slightly less than half of them (47%) are living alone/with spouse and in the case of 30 per cent of children are co-residing with elderly (being

younger and dependent). More than half of the elderly persons (53%) reported their general health status as good/very good/excellent, have moderate cognitive ability – recalling of 3–5 words out of 10 words within 2 minutes (52.5%), whereas 28 per cent and 12 per cent of them, respectively are stated to be suffering from any one and two or more chronic morbidities. All these information support the fact that socio-economically elderly persons are relatively poor, whereas they are just above average on health conditions.

Differentials in the Work Participation Rate of the Elderly Persons across their Selected Background Characteristics

Information provided in Table 2, shows that the work participation rate (WPR, in %) of the elderly persons varies across their (selected) background characteristics mostly on the expected lines. From panel 1, it can be seen that while the WPR of the elderly is noted as higher among those who are living in rural areas as against in urban areas (26.2 *vs.* 14.2), similar rate is much lower (panel 2) among female elderly than males (15.1 *vs.* 26.4). Data from panel 3 and 4, suggests that the WPR of the sample elderly demonstrated a declining trend with advancing age (24.3 for those who are in the age group of 60–64 to 7.2 among those who are in the age group of 75 years & above) as well as with an increase in years of schooling (24.2 for those who are with no education to 15.2 for those who have 11 & above years of schooling). WPR is found to be higher (panels 5–6) among those who belonged to SC/ST communities as against non-SC/ST communities (26.5 *vs.* 19.0) and also among those who are currently married as compared to those who are widowed/never married/divorced/separated (26.8 *vs.* 12.6).

WPR of elderly persons also varies to a large extent with economic related indicators. For example, the WPR of elderly is pertinently higher (panel 7) among those who are stated to be economically not dependent/partially dependent as against to those who felt as fully (economically) dependent on others (62.2 *vs.* 11.6), whereas such rate is lower (panel 9) among those who are in possession of one or the other assets like land, plot and/or house/flat as against no such asset possession (19.6 *vs.* 22.0). Likewise, the WPR appears to be decreasing (panel 9) with an increase in the wealth index of households (26.8 for

those who belonged to households of lowest (poorer) quintile compared to 9.5 for those who belonged to households of fourth/highest (rich) quintiles). Further, from panel 10 and 11, it is conspicuous to note that the WPRs are higher among those who are having 1 and 2 living son(s) as against those who didn't have a son (24.9 and 20.1 *vs.* 14.6) and also among those in whose case children are residing with them and who are living alone/with spouse as compared to those living with children (24.7 and 20.4 *vs.* 14.6). WPR of the elderly persons also appears to be differed across the selected indicators of health. While the WPR of elderly is relatively higher (panel 12) among those who reported their health as 'fair' and 'good/very good/excellent' as against 'poor' (23.9 and 18.7 *vs.* 13.0), such rate is much lower (panels 13 and 14) among those who are stated to be good in their cognitive ability (able to recall 6–10 words out of 10 words within 2 minutes) and suffering from 2 and more chronic morbidities than those who are poor in their cognitive ability and not suffering from any chronic morbidity (13.6 and 8.4 *vs.* 22.0 and 20.0). The Chi-square test results in all these regards turned out as highly significant ($p < 0.001$), except in the case of possession of assets or not.

Results Based on Logistic Regression Analysis

Results based on the logistic regression analysis highlight that, controlling for all the other explanatory factors included in the model, the odds of work participation (WP) of the elderly persons are found to be strikingly higher among those who are stated to be economically 'not dependent/partially dependent' (OR = 14.26; $p < 0.001$) and also among those who perceived their health as 'fair' and 'good/very good/excellent' (OR = 2.501 and 2.484; $p < 0.05$ for both) than their counterparts. Likewise, such odds are also noted as higher among those in whose case 'children are co-residing with elderly' as well as in the case of those 'living alone/with spouse living' (OR = 1.882 and 1.726, $p < 0.01$ and $p < 0.05$, respectively) and also among those who are having 1 and 2 or more number of living sons (OR = 1.653 and 1.580; $p < 0.05$ and $p < 0.10$, respectively) than their respective counterparts. Among the other results, the noteworthy ones are the likelihood of engaged in economic activities (WP) by the elderly observed to be pertinently decreasing with an increase in their age groups (OR = 0.659, 0.318 and 0.149; $p < 0.05$, 0.001 and $p < 0.001$,

respectively) and years of schooling (categories) (OR=0.605, 0.557 and 0.373; $p < 0.05$, 0.05 and $p < 0.001$, respectively). On the other hand, WP of elderly is also found to be lower only among those who belonged to households of rich (fourth & highest) wealth quintiles (OR=0.467; $p < 0.05$), but similar rate is somewhat higher among those who belonged to middle and second (poorer) quintiles as against lowest (poorest) quintile households and the t-test results in these regard are not turned out as statistically significant in both these cases. As expected, the tendency to participate in income generating works is conspicuously lower among the elderly who are females (OR=0.438) as well as widowed/never married/divorced/separated (OR=0.518) as against those who are males and currently married ($p < 0.001$ in both the cases).

Likewise, the probability of engaged in work after 60 years of age noted to be conspicuously lower among those who are suffering from 2 or more chronic morbidities as well as among those whose cognitive ability is good (OR=0.227 and 0.512; $p < 0.001$ and $p < 0.05$, respectively) than their respective counterparts who are not suffering from such ill health problems. Though the probability of work participation of the elderly is observed as higher among those who belonged to SC/ST communities as against non-SC/ST communities, the t-test results didn't emerge as significant (even at 10% level). On the other hand, it is conspicuous to note that, contradictory to the result of bivariate analysis, the WPR of the elderly is little higher among those residing in urban areas as against those who are in rural areas, but the t-test results turned out as outright insignificant.

Conclusions and Discussion

The BKPAI data for Tamil Nadu showed that around one-fifth of the elderly persons are participating in one or the other economic activities at the age 60 and above. Such participation rate noted as pertinently higher among those who are stated to be economically independent/partially dependent. This finding is on line with the one observed by Dhar (2015) for 60th round data of National Sample Survey. As expected, healthy persons as against those with poor health and members belonging to SC/ST communities compared to non-SC/ST communities, by and large, participated to a large extent in

economic activities. Work participation rate of the elderly is noted to be higher among those who have one and two or more son(s) as well as among those who are living alone or with spouse and children are co-residing (mostly being younger and/or dependent on elderly) than those who do not have a son and living with children. On the other hand, it is conspicuous to note that the extent of work participation among the elderly persons is lower among females, widowed/never married/divorced/separated and suffering from 2 or more chronic morbidities than their respective counterparts. Further, it obvious to note that such work participation has been noted as declining with an increase in the age, educational status and cognitive ability (able to read more and more words out of 10 within 2 minutes) of the elderly persons. Economic indicators like possession of one or the other asset(s) and residing in households of highest wealth index (rich) have exhibited detrimental effects on the work participation of the elderly persons. Most of these findings are analogous with the previous findings cited under section 'earlier research'.

At policy front, there is a need to generate job opportunities/avenues suitable to the elderly persons to work, mostly self-employment, part-time and regular jobs depending upon the setting they live and ability to work. Such provision may be beneficial to the elderly to earn income mostly to meet their livelihood/day-to-day necessities and at times even to take care of their children/dependents. Age at retirement may be increased in a phased manner wherever possible, without affecting the employment opportunities for younger ones. Old age pension also may be increased to a reasonable level to those who are unable to work due to ill health and disability. Strategies may be evolved to provide more tax rebates or incentives to children/persons who are taking care of the elderly persons so as to discourage the elderly to work during old age.

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