PREVALENCE OF ORTHOSTATIC HYPOTENSION AMONG COMMUNITY-DWELLING ELDERLY AGED 60 AND ABOVE IN THIRUVANANTHAPURAM DISTRICT

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DECLARATION

I hereby declare that this dissertation titled “Prevalence of orthostatic hypotension among community-dwelling elderly aged 60 and above in Thiruvananthapuram district” is the bonafide record of my original research. It has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

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CERTIFICATE

Certified that the dissertation titled "Prevalence of Orthostatic Hypotension among community-dwelling elderly aged 60 and above in Thiruvananthapuram district" is a record of the research work undertaken by AKHIL S in partial fulfilment of the requirements for the award of the degree of "Master of Public Health" under my guidance and supervision.

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GLOSSARY OF ABBREVIATIONS

WHO	World Health Organization
LMIC	Lower Middle Income Countries
AAN	American Academy of Neurology
OH	Orthostatic Hypotension
OI	Orthostatic Intolerance
BP	Blood Pressure
SBP	Systolic Blood Pressure
DBP	Diastolic Blood Pressure
OHT	Orthostatic hypertension
CVD	Cardio Vascular Diseases
COH	Consensus Orthostatic Hypotension
FOH	Fedorowski Orthostatic Hypotension
HUTT	Head-up tilt testing
ABPM	Ambulatory BP monitoring
HBPM	Home BP monitoring
ARIC	Atherosclerosis Risk in Communities
JNC	Joint National Committee
IEC	Institutional Ethics Committee
GPAQ	Global Physical Activity Questionnaire
RIN	Respondent identification number
METs	Metabolic Equivalents
COPD	Chronic Obstructive Pulmonary Disease
CKD	Chronic Kidney Disease
ADLs	Activities of Daily Living
BMI	Body Mass Index
SES	Socio Economic Status
BPL	Below Poverty Line
OR	Odds Ratio
COR	Crude Odds Ratio
AOR	Adjusted Odds Ratio

ABSTRACT

Background

Globally and in India, elderly population is on the rise, injuries due to fall are associated with increased mortality and morbidity in the elderly. Kerala is ageing faster than the rest of India because of its advanced stage of epidemiological and demographic transition. Challenges associated with the rising older population, an increase in health care expenditure and significant impact on the life quality of older people can be a cause of concern for health authorities. OH is a neuro-cardiovascular instability affecting one in every five of the elderly living in the community. Studies estimating the prevalence of OH and association of OH with frailty and fall are lacking among community dwelling elderly, especially in India.

Methodology

A cross-sectional study was conducted among 240 community dwelling elderly (60 years and above) living in urban and rural wards of Thiruvananthapuram, Kerala. The participants were randomly selected by multi stage sampling equally from rural and urban wards of Thiruvananthapuram district. Multiple logistic regression analysis was conducted to assess the independent association of OH and number of co-morbidity. Odds ratios and their 95 percent confidence intervals were used to measure the strength of association.

Result

The prevalence of OH, OHT, Frailty in our study 9.6 percent, 12.1 percent and 29.2 percent, respectively. OI among all study participants was 19.6 percent, and among participants with OH was 19.1 percent. Total number of comorbidities, diabetes mellitus and cognitive impairment were factors associated with OH (OR = 1.5 (1.08–2.09), 3.54 (1.10–11.34) and 4.71 (1.41–15.75)) respectively) after adjusting for age, gender and frailty. Orthostatic hypotension was not associated with frailty, but gender specific analysis showed men with frailty was likely to have OH at the first minute (OR=5.92 (1.73–20.28)). OH at first minute showed association with fall in the last year (OR=1.97 (1.05–3.72). OI was found to be associated with frailty and fall in the last year (OR= 7.65 (3.81–15.38) and (OR=4.29 (2.19–8.44).

Conclusion

Increase in the number of co-morbidity may be an independent risk factor for OH. Our study found that one in every ten older adults is likely to have OH or OHT. Three in every ten older adults will be frail and four in every ten elderly has fallen in the previous year. Frailty may be a risk factor for orthostatic hypotension at the 1st minute. OH and OHT are readily diagnosable and remediable condition associated with negative outcomes. Hence, People with comorbidities and people who have cognitive impairment should be actively checked for OH and OHT.

CHAPTER – 1

INTRODUCTION

Background

WHO defines *Healthy Ageing* "as the process of developing and maintaining the functional ability that enables wellbeing in older age" (World Health Organization, 2005). There is no single definition for old age, the construction by which each culture makes sense of old age is different in each society and it varies from place to place. Mostly it is chronological time and in some cases, it's the loss of roles or a physical decline or roughly retirement age, in essence, old age begins at a point when active contribution is no longer possible (Gormon, 1999). The chronological age of 65 years is the definition of elderly in most of the developed countries but for India it is 60 years (World Health Organization, 2007).

Ageing is a preordained biological process which is inevitable. Nonetheless, the phenomenon of ageing, an inexorable cause of demographic transition now coupled with the epidemiological transition is becoming a major concern, because of the varied implications of the problems arising, especially for developing countries.

Ageing -Global scenario

By 2050, the global population of people aged 60 or older is expected to reach 2.1 billion compared to 2015 (Figure 1A). Interestingly, projections suggest that more than 80 percent of the older people in the world will live in Low and Middle-Income Countries by the year 2050. On the contrary, the older population itself is ageing. The "oldest-old", or people above 80 years of age, have been increasing steadily, and have nearly tripled from 54 million in 1990 and to 143 million in 2019. It is projected to triple again between 2019 and 2050 to reach 426 million (United Nations, 2019).

Ageing -Indian scenario

In India, elderly population has increased from 76 million in the year 2001 to 104 million in 2011 (Chandramouli and General, 2011) and is expected to rise drastically over the coming years (Rajan, 2006) to 301 million in the year 2050 (Figure 1B).

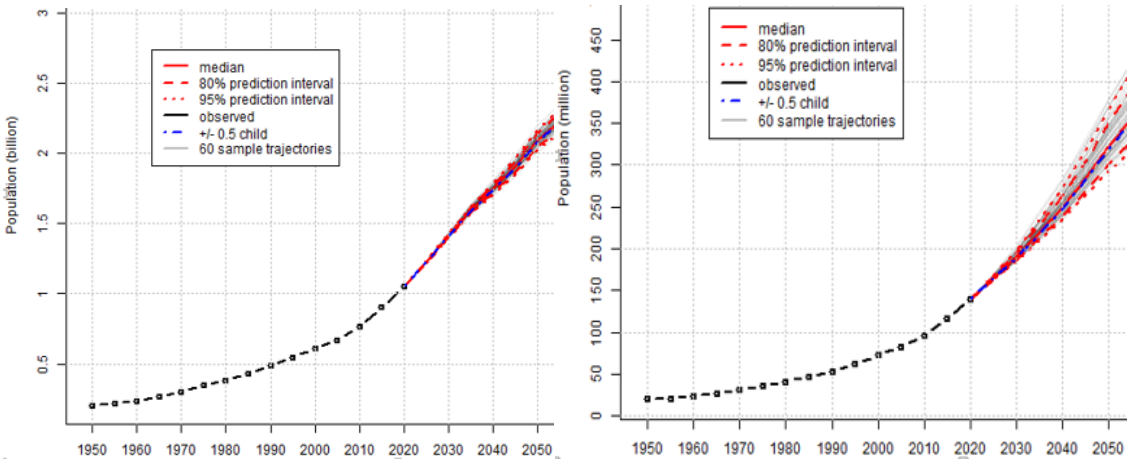


Figure 1 Projected rise in elderly population (Age 60+) (A) World-wide and in (B) India
Source: (DESA, 2019 (https://population.un.org/wpp/Graphs/Probabilistic/POP/60plus/356))

Ageing - Kerala scenario

Kerala is ageing faster than the rest of India. It has the largest proportion of the elderly population in India, 12.6 percent in 2011 (Chandramouli and General, 2011), which is anticipated to increase to about 37 percent by 2051 (Rajan, 2006, Figure 2). In 1961, persons aged 60 or over were 5.1 percent lower than the national figure of 5.6 percent. But since 1970, elderly population rose and by 2001, Kerala's figures were at 9.8 percent compared to the national figure of 7.5 percent (Rajan, 2006). This was largely due to the economic wellbeing and development of a better health care system (Kumar, 1993). Currently, 42 lakh people of Kerala are aged 60 or above, of which 13 percent are above 80 years. Women outnumber men among the 60 plus and among them, the majority are widows.

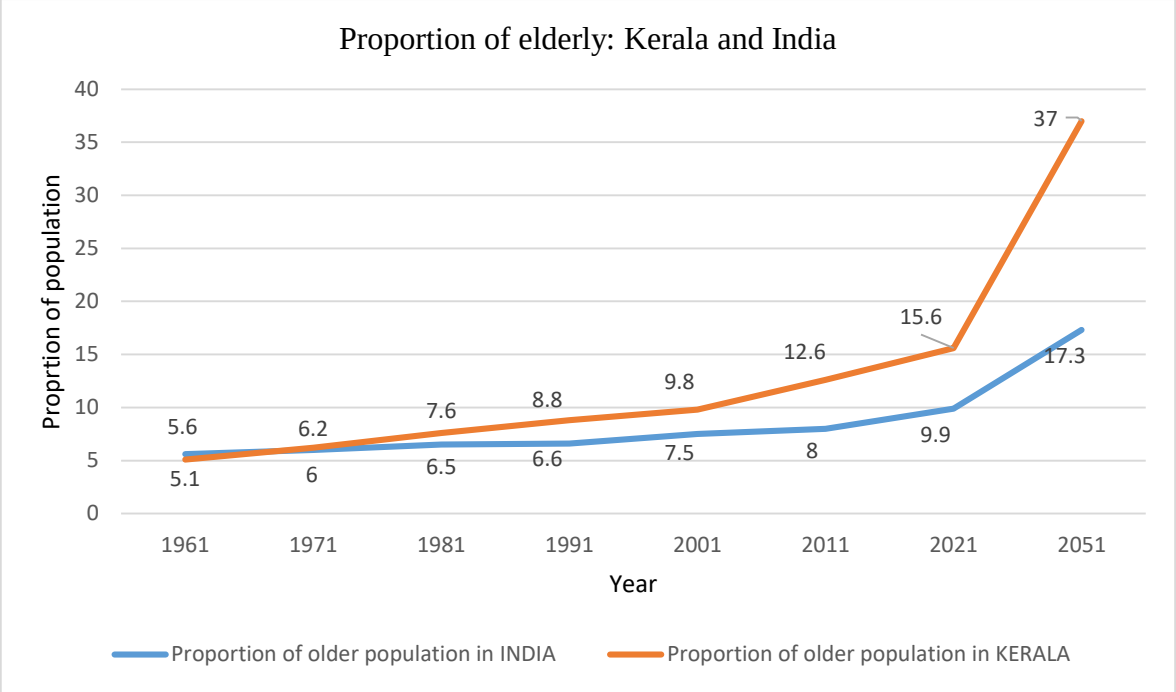


Figure 2 Projected rise in the proportion of elderly in Kerala compared to India

Source: (Johnson and Rajan, 2006; Rajan, 2006; Rajan et al., 2003)

Ageing population and challenges

India is now facing an epidemiological transition where injuries and non-communicable diseases are the driving forces behind the increased mortality among the elderly. Injuries claim the lives of one-fifth of the elderly every year. Fall is the second leading cause of inadvertent deaths because of injury among the elderly, and more than half of the fall-related deaths globally are among elderly people. Injuries often lead to disabilities, long-term confinement to bed or even death. Such conditions encumber health systems and limit their efforts unless better cost-effective interventions are a prospect.

The proportion of the elderly is rising steadily in Kerala and the projected figures are alarming because Kerala is already at an advanced stage of epidemiological transition characterized by low mortality and high morbidity (Kumar, 1993). The 60th round of NSS found that about 64 per thousand of elderly in rural areas and 55 per thousand in urban areas suffer from one or more disabilities (Central Statistics Office, 2011). Kerala is

expected to face the challenges associated with the rising older population much before the other states of India (Peters et al. 2003) and consequently, there will be an increase in health care expenditure and significant impact on the life quality of older people as experienced in the west (Hartholt et al., 2011; Poon and Braun, 2005). This can be a cause of concern for health authorities, solely due to the fear of prospective augmented burden by the adding population, especially in our resource constraint settings. Living longer comes at a cost on an individual's health, as with age, we become more vulnerable to age-related diseases and morbidity associated with them.

One such morbid condition is Orthostatic Hypotension (OH) previously known as postural hypotension. OH can be defined in hemodynamic terms (based on blood pressure (BP) changes with or without consideration of heart rate changes), clinical terms, based on symptoms of orthostatic intolerance (OI) or mixed terms.

The OH is a neuro-cardiovascular instability; which clinicians have often implicated in the aetiology of fall in older people (Shaw et al., 2019). One among every five community-dwelling elderly and one among every four elderly in long-term care, are affected by OH (Saedon et al., 2020). OH is a predictor of syncope, stroke (Rose et al., 2000), cardiovascular diseases (CVD) (Fedorowski et al., 2010; Rose et al., 2010), and early mortality (Masaki et al., 1998). One that defies our understanding is the relationship between OH and fall. A fall in elderly leads to grievous injuries or death and may lead to a significant reduction in the quality of life in elderly by limiting their functioning's in the form of temporary or permanent disability (World Health Organization, 2011). A systematic review by Heinrich et al. indicates that 0.85–1.5 percent of all healthcare-related expenditures are dedicated exclusively to the magnitudes of falls (Heinrich et al., 2010). Hence, identifying the risk factors that lead to falls is an important aspect of geriatric healthcare delivery (Bousquet et al., 2017). A recent systematic review by Mol et al.

suggests that OH is strongly associated with falls in older adults, pointing to the clinical relevance of OH and potential use of OH treatment to reduce falls (Mol et al., 2019). Frailty is considered as a syndrome characterised by dysregulation of multiple biological systems, accumulation of deficits, vulnerability to stressors and adverse outcomes. Studies have shown an association of Frailty with lower systolic blood pressure (SBP) and diastolic blood pressure (DBP). A trend towards a relationship between OH and frailty was largely explained by age (O'Connell et al., 2015).

REVIEW OF LITERATURE

The contents of this section result from the literature review, done through a broad search on PubMed, Google Scholar, Government of India, World Health Organisation, United Nations websites and other related documents cited in the text.

ORTHOSTATIC HYPOTENSION (OH)/ POSTURAL HYPOTENSION

The OH can be defined depending on the time of onset of symptoms into classical, initial and delayed (progressive) and can be of neurogenic and non-neurogenic origin(European Society of Cardiology et al., 2009).

Classical/Consensus OH (COH) - is defined as "a decrease in SBP by at least 20 mmHg or a decrease in DBP by at least 10 mmHg within 3 minutes after changing from supine to a standing position, ideally measured with a continuous BP device" (The Consensus Committee of the American Autonomic Society and the American Academy of Neurology, 1996). An updated consensus statement revised the SBP cut-off to 30 mmHg in patients with supine hypertension (Freeman et al., 2011).

Initial OH (IOH) - is defined as a transient blood pressure decrease, within 15 seconds after standing, of more than 40 mmHg in SBP and/or more than 20 mmHg in DBP, with symptoms of cerebral hypoperfusion (Wieling et al., 2007).

Delayed (or progressive) OH - is defined as a decrease in SBP beyond three minutes of assuming an erect posture (Gibbons and Freeman, 2015).

Non-Neurogenic causes of OH include hypovolemia, cardiac pump failure, and venous pooling. (Palma and Kaufmann, 2020) while neurogenic causes of OH which are more severe and have a worse prognosis (Goldstein and Sharabi, 2009) primarily include malfunction of the autonomic nervous system such as multiple system atrophy, Parkinson's

disease, pure autonomic failure, Lewy body dementia, Dopamine β-hydroxylase deficiency, Familial Dysautonomy/ Riley-day syndrome, and non-diabetic autonomic neuropathy (Berger and Kimpinski, 2014). Secondary neurogenic causes can include peripheral neuropathies such as diabetes mellitus, amyloidosis, alcoholic polyneuropathy, Guillain-Barre syndrome, B12 / folate deficiency, Paraneoplastic syndrome, Human immunodeficiency virus (Freeman et al., 2018).

Fedorowski OH (FOH) - In an attempt to increase the clinical accuracy of the COH definition, an adjustment to the definition of COH was proposed by Fedorowski et al. They defined FOH as a 30 mmHg cut-off in SBP drop in subjects with baseline supine SBP ≥ 160 mmHg, and a cut-off of 15 mmHg in subjects with SBP < 120 mmHg (with the DBP criterion remaining as in the original COH definition). (Fedorowski et al., 2010).

Mechanism and Pathophysiology-OH is a decrease in BP upon standing that reveals impaired hemodynamic homeostasis. An active postural change triggers a baroreceptor-mediated response, which leads to an increase in heart rate, myocardial contractility, and peripheral vascular resistance in response to the shifting of a considerable amount of blood (300-800 ml) to the venous system below the diaphragm, mainly in the splanchnic venous system to the pelvis leading to decreased venous inflow and cardiac output volume, resulting in hypoperfusion and a drop in BP (Medow et al., 2008; Thijs et al., 2010). The BP normally stabilises within one minute (Ricci et al., 2015). If a person stays in the standing position, the extravasation of the plasma into the sub-diaphragmatic space occurs, which reduces the amount of circulating volume by about 15 percent, and cardiac minute volume by over 20 percent and lowers BP (Fedorowski and Melander, 2013). When baroreceptor-mediated autonomic responses are absent or inadequate to maintain BP upon standing or if the blood volume is insufficient to support a ventricular filling, brain

hypoperfusion and OH can occur (Feldstein and Weder, 2012). The aetiology of OH is multifactorial; the decrease of baroreceptor sensitivity, pure autonomic failure, the use of different medications, hypovolemic disorders, and bed rest, all can be considered as causes of OH (Feldstein and Weder, 2012; Luukinen et al., 1999; Medow et al., 2008; Weiss et al., 2006; Woolcott et al., 2009). Among elderly, the normal age-related impairment of the baroreflex sensitivity, the higher prevalence of comorbidities, and the use of different medications are the prime reasons for the higher prevalence of OH (Feldstein and Weder, 2012; Ricci et al., 2015).

Epidemiology- OH is the second most common disorder of BP after essential hypertension, in community-dwelling elderly above the age of 60 years. Prevalence of OH increases with advancing age (Freeman et al., 2011; Hiitola et al., 2009), with the population (Eigenbrodt et al., 2000; Hiitola et al., 2009) and changes with sex (Kamaruzzaman et al., 2009; Masaki et al., 1998). The prevalence of OH was found to be considerably higher (over 50%) in patients attending geriatric clinics (Poon and Braun, 2005), admitted to acute hospitals (Vloet et al., 2005) and residing in nursing homes (Iwanczyk et al., 2006). The OH related studies among community dwellers are scarce from LMIC. The variation in the prevalence of OH across different elderly populations and among community-dwelling elderly among developed countries are shown in Table 1and 2, respectively.

Table 1 Study Population Based Prevalence of OH

Population	OH Prevalence (%)
Community dwellers	**5- 34**
Nursing home residents	**18- 50**
Hospitalized patients	**8-67**

Table 2 Prevalence of OH in Community-living individuals from developed countries

Year	First author	**Co**untry	Sample size	Mean Age	OH definition	OH prevalence %
1992	Rutan	USA	4931	64.3	At 3min	16.2
1995	Raiha	Finland	318	73.7	At 3min	28
1996	Wu	Taiwan	728	51	At 1 min	16.3
1998	Masaki	USA	3522	71-93	At 3min	6.9
2000	Eigenbrodt	USA	11707	53.8	At 1/3/5 min	4.6
2004	Luukinen	Finland	792	76	At 1/ 3min	30
2004	C Shin	South Korea	8908	40-69	At 0/2 min	13.8
2006	Rose	USA	13152	54	Within 2min	5.1
2006	Mattace-Raso	Netherlands	3362	>55	Within 3min	21.5
2008	Verwoert	Netherlands	5064	68.1	At 1/2/3 min	17.8
2008	Wu	Taiwan	1638	≥70	At 1/3min	15.9
2008	Yap	Singapore	2294	65.5	At 3min	16.6
2009	Hiitola	Finland	653	81	At 1/ 3min	34
2009	S.Kamaruzzaman	UK	3,775	60-80	Within 3min	28
2011	Fedorowski	Sweden	32,669	45.6	Within 3min	6.1
2011	Gangavati	USA	722	78	At 1/ 3min	6
2012	Jones	USA	12363	54	Within 2min	5
2012	Rockwood	Canada	1347	83.3	Within 3min	17.7
2013	Regan	Ireland	3144	69.3	Within 1 min	7.63
2013	Agarwal	USA	12071	45-64	At 2 min	5
2014	Casiglia	Italy	1016	71.7	At 1/ 3min	16.5
2014	Alagiakrishnan	USA	3510	74	At 3min/OI	25.2
2014	Elmstahl	Sweden	1480	68	At1/3/5/10	18
2014	Frewen	Ireland	5936	61.9	At 1 min	6.1
2015	O'Connell	Ireland	5692	63	At 3min	6.1
2016	Curreri	Italy	1408	71.4	At 1/ 3min	18.3
2016	Wolters	Netherlands	6204	68.5	At 1/2/3 min	18.6
2017	H.L. Ong	Singapore	2266	>60	At 2 min	7.8
2018	Ko	USA	1736	71.7	At 2 min	14.8

Clinical features

The OH can be asymptomatic or symptomatic. Symptoms occur when a postural change happens from a lying or sitting posture to an upright position. Dizziness and a feeling of weakness are the usually reported symptoms. However, symptoms can often be nonspecific such as exhaustion, generalized weakness, nausea and headache. Due to retinal ischemia in the occipital lobe, blurred vision may occur, resulting in ischemia trapezius of neck muscles- the coat-hanger sign; neck pain, pain in sub-occipital and shoulder area usually follows, after standing for a long time. In older people, it leads to visual disturbances and makes them predominantly prone to fall (Lanier et al., 2011). The clinical picture has no particular predictive value since older patients take multiple medications which may cause similar side effects, and in the elderly, often comorbidities are present whose symptoms often overlap with the symptoms of OH. All symptoms occur at standing and may be worsened by prolonged standing, exhaustion, and elevated environmental temperature. (Freeman, 2008). Symptoms of cerebral hypoperfusion like light-headedness, dizziness, or syncope which follow OH and the amount of decrease in BP is related to whether the patient experiences orthostatic complaints (Ricci et al., 2015).

Measuring orthostatic hypotension

For determination of OH, four methods are recommended: bedside orthostatic test, head-up tilt testing (HUTT), ambulatory BP monitoring (ABPM) and home BP monitoring (HBPM).

The bedside orthostatic test is the method of choice for diagnosing OH, easy to perform and inexpensive. Active standing up (lying to standing) is the gold standard, it can be performed in sitting to standing and lying to sitting position (Naschitz and Rosner, 2007; Ricci et al., 2015). HUTT is a non-invasive tool for diagnosing syncope or orthostatic

intolerance by swiftly moving the patient from a flat to an upright position (Teodorovich and Swissa, 2016). Twenty-four-hour ABPM is widely used, diagnosis OH based on diurnal variation of systolic and diastolic BP (Parati et al., 2014). HBPM an easy, feasible and inexpensive method is a common recommendation for BP in a sitting position (Cremer et al., 2019). Many elderly patients often cannot stand for several minutes; therefore, sitting orthostatic BP measurements have to be a substitute (Hartog et al., 2015). Although less precise than beat to beat BP, automated sphygmomanometers are commonly used for measuring OH for the ease of their use in daily practice (Caine et al., 1998).

Clinical implications

OH is a predictor of syncope, stroke, CVD, and early mortality in the elderly and has been linked to increased mortality, CVD, cognitive impairment, fall and hospitalizations.

OH and Falling–Syncope is a reason for fall, and OH is common in patients with syncope. The prevalence of OH in the elderly is high (Masaki et al., 1998). Most studies show that OH is a risk factor for fall in older people (Ooi et al., 2000). Although a systematic review by Ganz et al. had shown that OH does not predict fall (Ganz et al., 2007) but recent systematic reviews have shown a positive association of OH with fall (Mol et al., 2019, 2018). OH has been found as a vital risk factor in causing fall in older adults with hypertension (Gangavati et al., 2011). The risk of fall is a complex and multifactorial phenomenon and OH is *e pluribus unum* of risk factors believed to contribute to an increased risk of falling in the elderly. (Shaw et al., 2019; Shaw and Claydon, 2014).

OH and mortality- The OH was identified as an independent predictor of all-cause mortality in the Honolulu Heart Program (Masaki et al., 1998; Schatz, 2002). A study revealed the diastolic OH at 1 minute and systolic OH at 3 minutes after orthostasis as predictors of vascular death (Luukinen et al., 1999). Coherently, OH was confirmed as an independent risk factor for all-cause mortality by the ARIC study and the Malmö Preventive Project and

OH has also been identified as a risk factor for death among elderly attending hospital (Rose, 2010; Verwoert et al., 2008; Xin et al., 2016; Masaki et al., 1998). It has been found that older patients with DM and having OH have a higher risk of vascular death in comparison to those without OH (Luukinen et al., 2004).

OH and cardiovascular disease - The OH has been described as a marker of the decreased cardiovascular reserve (Shannon et al., 2002) and as a condition for increased cardiovascular risk in a number of studies (Fedorowski et al., 2010; Rose, 2010; Verwoert et al., 2008). Hypertension and antihypertensive medication have been mentioned as causal factors for OH in elderly patients (Mattace-Raso et al., 2006, 2007). The ARIC study confirmed OH as an independent risk factor for ischaemic stroke (Rose et al., 2000).

OH and Cognition- A Finnish community-based study ruled out the association of OH with cognitive deterioration (Viramo et al., 1999), similar to a report from China by Yap et al., however among the hypotensive subgroup, OH increased the odds of cognitive impairment (Yap et al., 2008). OH has been suggested as a marker for disease progression and cognitive decline in patients within Parkinson's disease (Allcock et al., 2006).

OH and Polypharmacy - OH has been related with BP treatment and specific classes of anti-hypertension agents, such as α-1-blockers, diuretics, and β-blockers (Milazzo et al., 2012). Nifedipine, a calcium channel blockers is especially known for its action of increasing sodium excretion at night, which causes morning OH (Feldstein and Weder, 2012). Beta-blockers could potentially interfere with several aspects of the compensatory arterial baroreflex arc, although the mechanism by which beta-blockers causes' impaired BP stabilisation is not clear (Valbusa et al., 2012).

Orthostatic Intolerance (OI) - OH possibly causes symptoms of OI like dizziness, light-headedness, visual disturbances and/or loss or near-loss of consciousness (Craig, 1994; Sahni et al., 2005). OI symptoms may associate with the lowest symptoms of base BP on

orthostasis, with the rate of change in BP and the magnitude of BP drop (Naschitz and Rosner, 2007). Seventh Report of American Joint National Committee (JNC) on Prevention, Detection, Evaluation and Treatment of High BP suggested including all symptoms which occur during the drop in BP which doesn't come under the stringent definition of OH as articulations of probable OH (Chobanian et al., 2003). Despite marked BP changes in patients with dementia, OI may not be reported (Passant et al., 1996); however, it can also happen sometimes with cognitively intact patients (Arbogast et al., 2009). Clinical complaints of OI may be caused by conditions other than OH, such as vestibular dysfunction (Aoki et al., 2008) or psychosomatic disorders (Nozawa et al., 1998).

ORTHOSTATIC HYPERTENSION (OHT)

OHT refers to a significant BP elevation in the vertical position compared to a supine or sitting position, which suggests an abnormal regulation of BP during postural changes (Streeten et al., 1985). Like OH, OHT also occurs more frequently in the elderly (Veronese et al., 2015). Majority of the studies have defined OHT as an increase in SBP of 20 mmHg after the postural change as a cut-off point since there is no official definition for OHT. The PARTAGE (Predictive Values of BP and Arterial Stiffness in Institutionalized Very Aged Population) study revealed that escalation in SBP during standing position occurs frequently and is associated with higher cardiovascular morbidity and mortality in an old frail population, independently of sitting BP levels and major comorbidities (Agnoletti Davide et al., 2016). OHT is an emerging risk factor for organ damage and cardiovascular disease (Kario, 2013, 2009). Hence, OH and OHT may be related to cerebrovascular infarction and with measurable neurocognitive deficits independent of the presence of essential hypertension. Baroreflex failure can also contribute to OHT (Kario, 2013).

FRAILTY

Definition - Clinicians identify frailty in older adults as an entity with different manifestations, with no single symptom being sufficient or essential in its presentation because of its syndromic nature (Rockwood, 2005). Gobbens et al. proposed a theoretical definition of frailty "A dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables and which increases the risk of adverse outcomes" (Gobbens et al., 2010).

Epidemiology - Frailty is an emerging geriatric syndrome set to reach epidemic proportions over the next few decades due to the rapid ageing of the global population (McCullers, 2008). Like OH, its prevalence increases with age, depends on the population and the definition used. The French Three-City study found the prevalence of frailty to be 7 percent in community-dwelling adults aged 65 or more (Avila-Funes et al., 2008) using Fried's criteria. Prevalence of frailty was 8.5 percent among women and 4.1 percent among men in the Hertfordshire Cohort Study of UK (Syddall et al., 2010). Prevalence of frailty was estimated to be 10.3 percent in the Spanish urban old (Moreira and Lourenço, 2013). Prevalence of frailty was found to be 22.7 percent in community-dwelling elderly aged 65 or more in Canada by the National Population Health Survey of Canada, using a frailty index approach (Song et al., 2010). In India, the prevalence of frailty was found to be 11.4 percent as per Fried's frailty model and 26.1 percent when multidimensional frailty model as per the 10/66 population-based cohort Study (AT et al., 2015).

Frailty measurement tools

Many frailty measurement tools have been developed in clinical practice and research, as listed in Table 3.

Table 3 FRAILTY MEASUREMENT TOOLS

Year	**Author**	**Measure name**	**Measure components**	**Validation sample**
1991	Winograd et al.	Rapid screening tool	Clinical geriatric assessment	Male In patients aged ≥ 65
1992	Weiner et al.	Functional reach test	Maximal safe standing forward reach (yardstick method)	Community dwelling aged ≥ 65
1994	Owens et al.	Short screening questionnaire	Cognition, Mobility, Nutrition, Medications, Hospitalisation	Older inpatients
1996	Rockwood et al.	Multifactorial definition of frailty	Gender, Marital status, Absence of a caregiver, Cognitive impairment or dementia, Functional impairment, Diabetes mellitus, Stroke, Parkinson's disease	Institutional and community-dwelling older adults
1997	Brody et al.	Health Status Form	Age, ADL, disability	Older inpatients
1998	Carlson et al.	Functional homeostasis	Changes in the Functional Independence Measure (FIM)	Older inpatients
1999	Rockwood et al.	Brief clinical instrument	Walking assistance, ADL, Continence, Cognition	Community-dwelling aged ≥ 65
2004	Schuurmans et al.	Groningen Frailty Indicator	Mobility, Physical fitness, Vision, Hearing, Nutrition, Morbidity, Cognition, Psychosocial	Community-dwelling aged ≥ 65
2004	Matthews et al.	Strawbridge questionnaire	>1 functional difficulty: physical, cognitive, sensory, nutritive	Community-dwelling outpatients
2004	Studenski et al.	Clinical Global impression of Change in Physical Frailty	Appearance, Healthcare utilisation, Medical complexity, Muscle Strength, Balance, Nutrition, Stamina, Neuromotor performance, Mobility, Perceived health, ADL, Emotional status, Social status	Geriatric patients
2005	Rockwood et al.	CSHA Clinical Frailty Scale (7-point)	Clinical judgement	Community-dwelling aged ≥ 65
2006	Rolfson et al.	Edmonton Frail Scale	Cognition, General health, Functional Independence, Social support, Medication use, Nutrition, Mood, Continence, Functional performance	Outpatients aged ≥ 65
2008	Ravaglia et al.	Self-reported frailty score	Age, Gender, Physical activity, Comorbidity, Sensory deficits, calf circumference, IADL, Gait Health, pessimism	Community-dwelling aged ≥ 65
2010	Shinkai et al.	Kaigo-Yobo Checklist	Questionnaire	Community-dwelling aged ≥ 70
2010	Lucicesare et al.	Self-rated health deficits index	Questionnaire	Community-dwelling aged ≥ 65
2010	Gobbens et al.	Tilburg Frailty Indicator	Self-report: Physical, Psychological and Social components	Community-dwelling aged ≥ 75
2015	Jyotheeswaran et al.	COPE (Caring for Older People) for non-specialised health workers	Impairments in nutrition, mobility, vision, hearing, continence, cognition, mood and behaviour. Dependence:	Community-dwelling mean age 73.6 years (SD 7.6)

(I)ADL: (independent) activities of daily living

Fried's phenotypic approach

Linda Fried and her colleagues' operationalization of frailty have attracted considerable scientific interest across the globe (Avila-Funes et al., 2008; Romero-Ortuno et al., 2010). It requires the measurement of the five variables-weight loss, exhaustion, hand grip strength, gait speed and physical activity. Fried defined frailty in terms of three sets, each of which is defined by the sum of the number of individual criteria present (0: non-frail; 1 or 2: pre-frail; and 3, 4 or 5: frail). Individual criteria are measured on continuous scales and retrospectively dichotomised according to the lowest twentieth percentile rule (Fried et al., 2001).

Clinical significance of frailty

Fall is rightly said as the totem of frailty (Nowak and Hubbard, 2009), and frailty is a very strong independent predictor of fall and fall-related fractures (Ensrud et al., 2007; Speciale et al., 2004; Kenny et al., 2006). Frailty is becoming the best paradigm to predict fall and adverse fall-related outcomes in older people, as frailty not only encase the physical, cognitive (Kang et al., 2009) and psychological (Kressig et al., 2001) causes of fall, but also the increased vulnerability to adverse outcomes. Frailty has been concomitant with increased risk of cognitive impairment and dementia, and a swift rate of cognitive decline (Avila-Funes et al., 2009; Buchman et al., 2007). Frailty is also associated with higher levels of health anxiety and other psychiatric (including depressive) symptoms (Ensrud et al., 2009). Frailty pointedly escalates the risk of death (Song et al., 2010; Fried et al., 2001; Mitnitski et al., 2005). Summarily, similar to OH, Frailty is associated with risk of fall, increased morbidity, disability, excess utilisation of health and social care services (e.g. hospitalisations, institutionalisations), and increased risk of mortality (Ensrud et al., 2009; Nowak and Hubbard, 2009; Boyd et al., 2005).

GAPS IN RESEARCH

Research articles were identified in PubMed using MeSH terms "Orthostatic Hypotension", "Postural Hypotension", “Hypotension, Postural” "Aged", "Elderly", "Frail Elderly", "Frail", "Frail Elder", "Functionally Impaired Elderly", "Frail Oder Adults".

Prevalence of OH: Gaps in Research

OH has been extensively studied in the developed countries and numerous associations and adverse events have been reported but there is a scarcity in literature from developing countries such as India. My literature search revealed three studies related to OH prevalence from India, but not on community-dwelling elderly subjects. A study done in Karnataka, on 80 healthy volunteers aged 30 to 50 years and 80 healthy subjects above 60 years of age who attended free camps revealed the prevalence of OH as 1.25 percent (Baliga and Prabhu, 2010). Another study, done in Kerala, found the incidence of delayed OH in patients above the age of 18 in a hospital as 29.4 percent (Roy et al., 2017). A study done on 200 elderly patients who visited a hospital outpatient department in Andhra Pradesh revealed the prevalence of OH at 12.5 percent (Guntupalli, 2018).

RATIONALE

OH is a predictor of syncope, stroke, CVD, and early mortality in the elderly and has been linked to cognitive impairment, fall, hospitalizations and polypharmacy. A Recent Systematic Review and Meta-Analysis established that OH is ubiquitous, affecting one in five community-dwelling elderly and one in four elderly in continuing care (Saedon et al., 2020). Frailty and OH have similar adverse epidemiological associations (Table 4), also frail people have a substantially increased risk of fall, disability, long-term care, and death (Rockwood, 2005).

Table 4 Epidemiological similarities between orthostatic hypotension and frailty

	OH	**FRAILTY**
Availability of various definitions	✓	✓
Prevalence in community-dwelling older people	5-34%	5-27%
Prevalence increases with age and comorbidities	✓	✓
Associations with cardiovascular and cerebrovascular disease	✓	✓
Psychosocial associations	✓	✓
Association with fall	✓	✓
Increased mortality risk	✓	✓

Detection of OH could reduce the chance of inappropriate selection of the drug classes for elderly patients, therefore it assumes paramount importance under a public health perspective since costs of OH can increase the health care expenditure and ominously impact the life quality of older people (Hartholt et al., 2011; Poon and Braun, 2005). A clinical implication is that if hemodynamic OH and/or symptomatic Orthostatic Intolerance is, respectively, a sign and a symptom of frailty in older people, then they could be useful as frailty screening tools to identify those at risk and may benefit from further geriatric assessment and/or interventions.

Kerala is in an advanced stage of the demographic transition and is not equipped to face this phenomenon of ageing (Kerala State Planning Board, 2019). The emergent nuclear family system, a high level of emigration among the youth and very poor arrangements for taking care of the old makes matter worse, leaving the old to fend for themselves. So it's very crucial for an elderly to be independent to the extent possible. Any ailment or adversities associated with a significant reduction in the quality of life in elderly, either by limiting their functioning or in the form of a temporary or permanent disability should be dealt constructively.

Identifying OH is pivotal as it is associated with factors related to morbidity and mortality in elderly. Since OH and frailty share many epidemiological similarities and considering the fact that no relevant community-based study was done to determine the prevalence from India, the present study was envisaged. Following were the major and minor objectives of the study.

OBJECTIVES

A. Major objectives:
    i. To estimate the prevalence of OH among the community-dwelling elderly population aged 60 and above living in Thiruvananthapuram district.
B. Minor objectives:
    i. To find the association between OH and frailty in the community-dwelling elderly population aged 60 and above living in Thiruvananthapuram district.
    ii. To examine the correlates of OH among the community-dwelling elderly population aged 60 and above living in Thiruvananthapuram district.

CHAPTER - 2

METHODOLOGY

Study design

The design of choice for the study was a cross-sectional survey considering the outcome of interest was prevalence of orthostatic hypotension in community-dwelling elderly subjects and the time constraints to complete the study.

Study setting

The study was conducted in Thiruvananthapuram district because of the investigator's ease and limited resources; the study was limited to 20 wards randomly selected from grama panchayat wards (rural) and corporation wards (urban) of the same.

Sampling frame

The study was conducted among the individuals of both sexes, aged 60 years and above, residents of Thiruvananthapuram district for the past five years.

Sample size

The sample size was calculated with the help of Open Epi Version 3.01 software (Dean et al., 2013). Literature review of studies done in community-based studies revealed that globally the prevalence of OH varied from 5% to 34%. No relevant community-based studies to determine the prevalence of OH were reported from India. So sample size was calculated using the lowest and the highest prevalence of OH globally. For the lowest prevalence of OH (5%), alpha error of 5%, absolute precision as 4%, design effect (2) sample size was estimated to be **229**. For the highest prevalence of OH (34%), alpha error of 5%, absolute precision as 8.5%, design effect (2) sample size was estimated to be **239**. So considering the second scenario, the sample size was rounded off to **240**.

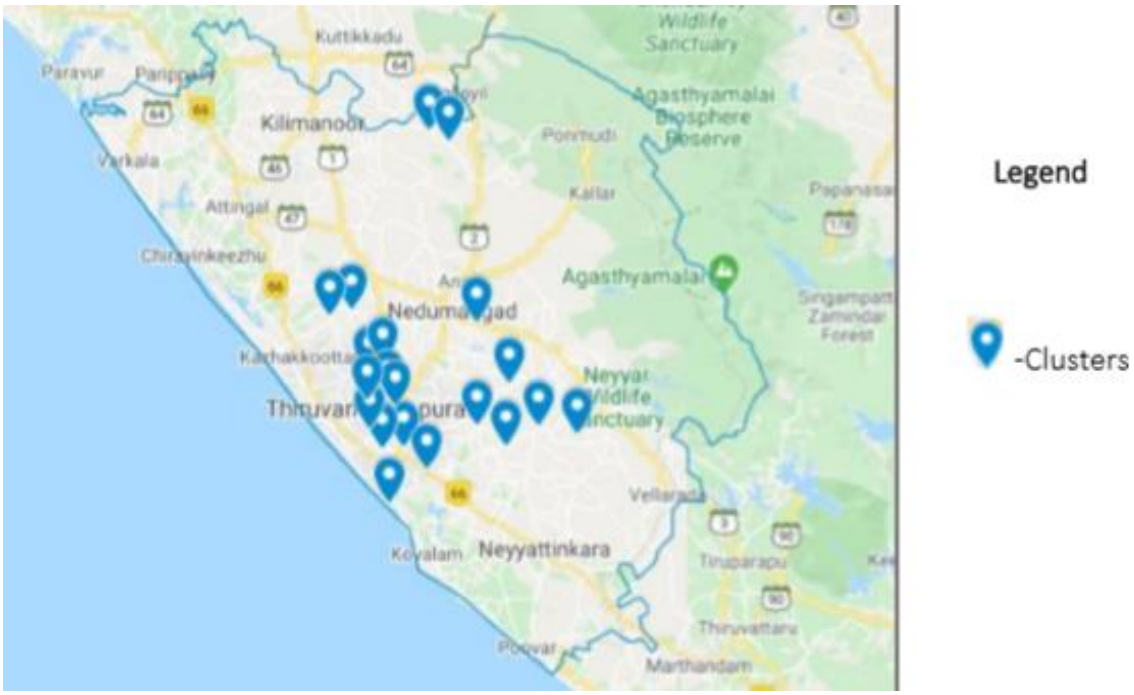
Sample selection

This study used a multistage cluster sampling. The cross-sectional survey was conducted in 20 clusters (wards) with 12 participants from each cluster as defined in the study setting. Ten wards were randomly selected from the 100 wards in Thiruvananthapuram City Corporation and 10 wards were selected from 73 Grama panchayats of Thiruvananthapuram district (2 randomly selected wards each from 5 Grama panchayats) using lottery method as shown in Table 5 and figure 3. The interviewer identified a place corresponding to the geographical centre of the cluster (like a school, shop or temple or any buildings) and a pen rotation method was followed. Every third household was taken from the direction which the pen showed. Screening was done to identify the eligible participants in that household. If a participant from the selected household was not willing or not available at the time of interview, then that household was substituted by the next 3rd household until 12 participants from an individual cluster were obtained. KISH grid was used to select the participant from a household in case more than one elderly person was living in the household. The non-response rate was zero since the non-responsive households were replaced randomly.

Table 5 Wards selected for the present study

S.No	Selected Wards In Corporation	S.No	Selected Wards In Grama Panchayats
1	Ulloor	11	Kattakada-Killi
2	Edavacode	12	Kattakada-Chandramangalam
3	Mannathala	13	Pangode-Mylamoodu
4	Thycaud	14	Pangode-Bharathanoor
5	Muttada	15	Pothencode-Ayiroorpara
6	Pappanamcode	16	Pothencode-Kattaikonam
7	Poonthura	17	Malayinkeezhu-Anthiyoorkonam
8	Sreekanteswaram	18	Malayinkeezhu-Thachottukavu
9	Kannanmoola	19	Vellanadu-Uriyacode
10	Kuravankonam	20	Vellanadu-Konganam

Figure 3 Thiruvanthapuram district map-clusters selected for the present study



Subject selection

Following were the selection criteria for the study participants.

Inclusion criteria

Elderly subjects, sixty years or above, living in the selected geographical area of Thiruvananthapuram district, in their homes for a period of 5 years or more were included. Other criteria for inclusion were people who could stand without any help and were willing to provide voluntary informed consent by responding independently.

Exclusion criteria

Older persons who did not speak Malayalam or English or did not consent or did not comprehend and respond to the questionnaire due to any neuropsychological problems were excluded from the study due to ethical reasons. Those who were bedridden or wheelchair-bound were also excluded. People with debilitating illnesses like cancer, or those who were terminally ill, were excluded from the study.

Data collection tools

Data collection was done from December 6th 2019 to February 27th, 2020 by the principal investigator (PI) after obtaining institutional Ethics Committee (IEC) approval.

A pretested structured interview schedule was used to collect data. The interview was conducted in Malayalam or English. The interview schedule was designed to collect socio-demographic information, tobacco use, alcohol use, dietary pattern, physical activity, medical history, anthropometric measurements and handgrip strength and gait speed test (Annexure I Page 75).

Information was collected directly from the participants using standard techniques according to WHO STEPS manual (World Health Organization, 2005). Global Physical Activity Questionnaire (GPAQ) version 2 (Herrmann et al., 2013) was used for measuring physical activity. The brief version of Community screening interview for dementia (CSI-D) was used for Cognitive assessment (AT et al., 2015a, and 2015b). The OH symptoms were assessed by the Orthostatic Hypotension Questionnaire (Kaufmann et al., 2012). For accessing the risk of falling, a validated fall risk self-assessment checklist by CDC (centres for disease control and prevention) was used (Rubenstein et al., 2011). For assessing poor endurance and energy, Center for Epidemiologic Studies Depression Scale (CES-D), was used (AT et al., 2015). A single item question from the Geriatric Mental State Examination was used to assess self-reported weight loss (AT et al., 2015). Gait speed test, a 10 m walk test, was used to assess slow walking speed. (AT et al., 2015).

Instruments for physical measurements were calibrated before starting the study.

Height measurement was done using a standalone stadiometer (SECA 213).

Weight was measured using a battery-operated electronic weighing scale (SECA 803).

Blood Pressure was measured using a digital sphygmomanometer (OMRON HEM 907).

Handgrip strength was measured using handgrip dynamometer (EH 101 CAMRY).

Procedures

Blood pressure measurement - Three readings of BP in supine (lying down) on alternate hands five minutes apart and three readings on standing position one minute apart on the left hand were taken using a digital sphygmomanometer. For analysis, the average of three readings in the supine position was taken.

Height measurement - Height was measured after placing the standalone stadiometer on a flat and firm surface. The subject was asked to remove their footwear if any and step onto the scale with one foot on each side of the stadiometer. Height was recorded in centimetres.

Weight measurement - The weight of the subject was measured after placing the scale on a flat and firm surface. The subject was asked to remove their footwear if any and step onto the scale with one foot on each side of the scale. The subject was then asked to stand still, facing forward, placing arms on the side until asked to step off. The investigator recorded the weight in kilograms.

Handgrip strength measurement - Dynamometer width was optimally adjusted for each participant. Participants were asked to press the dynamometer after standing upright with arms to the side, not against their body (Gu et al., 2019). Three readings were taken for each hand five minutes apart and for analysis, the average of the readings was considered.

Gait speed measurement - The participant was timed walking 5 metres (indicated by a piece of string), turning and returning to the starting point; with the time taken to turn taken into account, a cut off of more than 15 s to complete the test was considered to reflect limited mobility (<1.2 m per second) (AT et al., 2015).

Data entry and storage

Data entry was done in Microsoft Excel 2013 and later exported to SPSS version 25. Collected hard data (completed forms) was stored securely under the PI's custody and PI bears the sole responsibility for keeping the data secure and for any breach of confidentiality. The soft data generated from hard data did not have any personal identifying information and all study participants were coded by a unique respondent identification number (RIN). The soft data was stored in an encrypted format (AES 128-bit advanced encryption) in a password-protected computer.

Data analysis

Data were analysed using a licensed version of statistical software SPSS, version 25 and using R version 3.6.1. For all the statistical tests, a p-value of < 0.05 was considered for statistical significance. For checking normality, Shapiro-Wilk test was performed. Frequencies and proportions were calculated for categorical variables and means with standard deviations were calculated for continuous variables.

Prevalence of OH was established by calculating the frequency of participants meeting the criteria for OH (as per the consensus definition, 1996) among the total participants of the study. Similarly, Prevalence of frailty was established by calculating the frequency of participants meeting the criteria for frailty among the total participants of the study. Frequencies were calculated for the prevalence of fall, risk of fall and fear of fall. Prevalence of OHT was determined by calculating the frequency of participants meeting the criteria for OHT (as per the definition) among the total participants of the study.

In Bivariate analysis, comparisons of categorical variables were carried out using Pearson chi-square tests. Comparisons of continuous variables were done using independent sample t-tests (normally distributed) and Mann Whitney U test (not normally distributed).

Binomial logistic regression was used to find the Odds Ratio and the measure of association was presented as odds ratio with 95% confidence interval and p-value. For adjustment of possible confounding factors, multivariate analysis using Enter Method for modelling was used.

Ethical consideration

The present study was reviewed by the Institutional Ethics Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala and clearance was given to conduct the study (SCT/IEC/1446/NOVEMBER-2019). The participants had the freedom to refuse participation at the outset or during any stage. There was no anticipated risk for subjects by participating in this study.

Information sheet and consent forms were provided to the selected participant prior to the interview. The interview was conducted after obtaining the written informed consent from the study participant. Privacy was ensured during the interview to the extent possible and confidentiality of all the information was maintained. The participant was given breaks in between answering the questionnaire and taking physical measurements to prevent exhaustion.

All information related will be kept confidential and at no stage participant's identity will be revealed. Access to RIN was restricted to PI only. Participant confidentiality will be safeguarded during and after the study. All the copies of filled interview schedules and consent forms will be kept under the custody of the PI. All completed interview schedules, consent forms would be destroyed upon completion of five years from the date of acceptance of the thesis in keeping with regulatory requirements. The participants detected with OH were advised to consult the physician at the nearest Primary Health Center in the

area of their residence. They were also being provided with a leaflet to inform them on how to prevent falls due to OH.

Operational definitions of variables

Older person: An individual who had completed 60 years and above at the time of data collection.

Consensus Orthostatic Hypotension (COH) measurements include OH_1, OH_2, and OH_3.

OH_1: reduction of SBP of at least 20 mm Hg or DBP of at least 10 mm Hg within the first minute of standing.

OH_2: reduction of SBP of at least 20 mm Hg or DBP of at least 10 mm Hg within 2 minutes of standing.

Orthostatic hypotension (OH) /OH_3: reduction of SBP of at least 20 mm Hg or DBP of at least 10 mm Hg within 3 minutes of standing was used as the measure of OH in our study.

Fedorowski OH (FOH): reduction of SBP of at least 30 mmHg within 3 minutes of standing in subjects with baseline supine SBP ≥ 160 mmHg, and 15 mmHg in subjects with SBP < 120 mmHg, DBP criterion same as original COH definition (Fedorowski et al., 2010).

Revised Consensus OH (2011 AAN criteria): reduction of SBP of at least 30 mmHg within 3 minutes of standing in subjects with baseline supine SBP ≥ 160 mmHg, DBP criterion same as original COH definition (Freeman et al., 2011).

Orthostatic hypertension (OHT): is diagnosed by a rise in SBPof 20 mmHg or DBP of at least 10 mm Hg within 3 minutes of standing.

Orthostatic intolerance: reported as feeling dizziness, light-headedness or feeling faint.

Fall: is defined as “an event which results in a person coming to rest inadvertently on the ground or floor or other lower-level” (WHO 2007) All types of falls are included, whether they result from physiological reasons or environmental reasons.

Hypertension: SBP ≥ 150 mmHg and/or DBP ≥ 90 mmHg and/or on anti-hypertensive medications. SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg for individuals with diabetes and Chronic Kidney Disease. (Hernandez-Vila, 2015; James et al., 2014)

Body Mass Index (BMI): Weight (kg)/Height in m^2.

Frailty: participants were considered as frail if they fulfil three or more of the five frailty indicators (Exhaustion, Weakness, Slowness, Weight loss, Low physical activity) of the Modified Fried frailty phenotype (Fried et al., 2001; AT et al., 2015)

Exhaustion-regrouped into as exhausted or not exhausted

Weakness-isometric handgrip strength was measured on both hands three times five minutes apart and the average for each hand was taken for the calculation. The participant was advised to stand straight on a plain surface with arms to both sides before taking the measurement. The analysis was done after dichotomising this, according to the lowest twenty-five percent rule.

Slowness was regrouped into as slow or not slow

Weight loss was regrouped into yes if weight loss was greater than 4.5 kg in the past year.

Physical activity: was estimated in three domains, namely work, transport and recreation. Total time spent in physical activity during a typical week, the number of days and intensity of the physical activity was taken in to account for calculating METs (Metabolic Equivalents) which was used to express the intensity of physical activity. MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of one

kcal/kg/hour. Physical activity was calculated as per WHO GPAQ analysis guide, for work and recreation, Moderate MET value was 4 and Vigorous MET value was 8 and for Transport, Cycling and Walking MET value was 4 (World Health Organization, 2009).

Classification of Variables in the study

Outcome variable/ Dependent variables

The main outcome variable of interest in this study was Orthostatic Hypotension.

Other outcome variables of interest are Frailty, OHT, FOH and fall.

Exposure variable/ Independent variables

Socio-demographic indicators

Age was regrouped into 60-69, 70-79 and 80 above.

Sex of participants was divided into male and female.

Marital status was regrouped into currently married or not married.

Socio-economic indicators

Education was regrouped into primary education and without primary education.

Occupation regrouped into currently working or not working.

Socioeconomic status: the colour of the ration card was considered as a proxy. It was regrouped into above BPL and below BPL.

Behavioural indicators

Smoking tobacco status- regrouped into the current, ever or never users.

Smokeless tobacco usage status- regrouped into the current, ever or never users.

Alcohol usage status- regrouped into the current, ever or never users.

Additional salt users-regrouped as yes, if reported use of additional salt or use of salted fish or use of pickles or use of pappad in the diet.

The physical activity below 600 MET-minutes a week was grouped as physically not active and above 600 MET-minutes a week was grouped as physically active.

History of comorbidities, hospitalization and treatment

Activities of daily living: participant being able to do all ADLs (eating, bathing, dressing, toileting and mobility) were regrouped as yes and others as no.

Hospitalization status was regrouped into whether hospitalized in the past year or not.

Number of comorbidities was regrouped into 3 categories (0, 1-3, >3)

History of comorbidities- if the participant had a diagnosis of diabetes mellitus, stroke, hypertension, myocardial infarction, other heart diseases, COPD, CKD, Arthritis, hyperlipidaemia, urinary incontinence, cataract or visual difficulty or blindness, deafness.

The number of medicines used was regrouped into 3 categories (0, 1-2, >2).

Cognitive, orthostatic symptoms, risk of falling assessment

The total cognitive score was regrouped into cognition impaired or not impaired.

Orthostatic symptoms were grouped into as present or absent.

Risk of falling score was grouped into –with a risk of falling and without risk of falling

Anthropometric indicators

Height of the participant in cm

Weight of the participant in Kg

BMI was regrouped into overweight as BMI $\geq$ 25 kg/m^2 (WHO, 2004).

SBP reading at baseline supine position and readings at 1st minute, 2nd minute, and 3rd minute of standing are continuous.

DBP reading at baseline supine position and readings at 1st minute, 2nd minute, and 3rd minute of standing are continuous.

Pulse Rate reading at baseline supine position and readings at 1st minute, 2nd minute, and 3rd minute of standing are continuous.

Frailty indicators

Hand Grip Strength of the participant was regrouped into as weak and not weak by keeping the 25th percentile as the cut-off.

Weight loss in the past year regrouped into yes or no.

Slowness- regrouped as slow and not slow.

Exhaustion- regrouped into exhausted or not exhausted.

Expected outcomes

Possible expected outcomes were the Prevalence of Orthostatic Hypotension, Frailty, OHT and fall.

CHAPTER - 3

RESULTS

This chapter describes the results of data analysis, formulated based on the study objectives. In the first section, a general description of the study participants, socio-demographic, socio-economic, behavioural and anthropometric characteristics are described. This is followed by Univariate and multivariate analyses with OH as the dependent variable.

SOCIO DEMOGRAPHIC PROFILE

The socio-demographic characteristics of the study participants are provided in Table 6. The study included 240 participants equally from urban and rural areas of Thiruvananthapuram district, with a higher proportion of females (59.2%). Participant's age ranged from 60 to 89 years with a Mean and SD of 68.85 ± 7.09 years. The age distribution among male and female study participants can be seen in Figure 4. Nearly half (56.7%) of the study participants were below 70 years of age and only 9.6 percent of the participants were above 80. Majority of participants had at least a primary education (60%), but 21.8 percent of the females and 12.2 percent of males had no formal education and college-educated in males were 14.3 percent whereas only 1.4 percent of the females were college-educated. Almost half of the participants were widowed (42%) but strikingly 60 percent of the females were widowed in comparison to 16.3 percent of males. One fourth (23.5%) of the males were employed in either part-time or a full-time job while only one-sixth (15.5 percent) of the females had a job. The BPL cardholders accounted for 52.8 percent of females and 40.8 percent of males. Nearly one-tenth of females (8.5%) were found to be living in extreme poverty (beneficiaries of Antyodaya anna yojana). More than one third (35.8%) of the participants were hospitalized at least once in the past year.

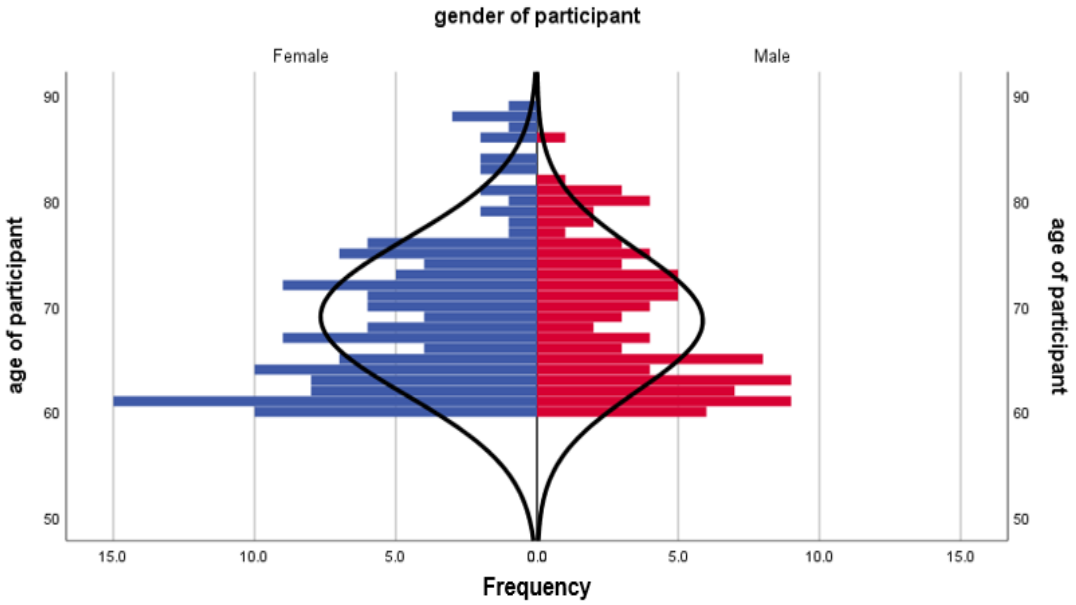
Importantly, one-fifth of the females (19%) and males (17.3%) were not able to do all activities of daily living and needed care.

Table 6 GENDER-WISE SOCIO-DEMOGRAPHIC PROFILE OF PARTICIPANTS (N=240)

Variables	Categories	Female (n=142)	Male (n=98)	N=240 (%)
Place of residence	Rural	69	51	120 (50)
	Urban	73	47	120 (50)
Age group Mean=68.85 SD=7.09	60-69	81	55	136 (56.7)
	70-79	47	34	81 (33.7)
	> 80	14	9	23 (9.6)
Level of education	No formal education	31	12	43 (17.9)
	Some, but did not complete primary	25	12	37 (15.4)
	Completed primary education	48	36	84 (35)
	Completed secondary(metric)	36	24	60 (25)
	Completed tertiary(college)	2	14	16 (6.7)
Marital status	Never married	3	0	3 (1.3)
	Married/ co-habituating	52	81	133 (55.4)
	Widowed	85	16	101 (42)
	Divorced/separated	2	1	3 (1.3)
Employment status	Paid full-time work	6	11	17 (7.1)
	Paid part-time work	16	12	28 (11.7)
	Retired pensioner	16	14	30 (12.5)
	Retired non-pensioner	1	17	18 (7.5)
	Housewife or househusband full time	45	0	45 (18.8)
	Unemployed, able to work	13	12	25 (10.4)
	Unemployed, unable to work	45	32	77 (32)
Socio economic status	Very poor	12	2	14 (5.8)
	Below poverty line	63	38	101 (42.1)
	Above poverty line	67	58	125 (52.1)
Number of Hospitalisation	No hospitalizations	88	66	154 (64.1)
	1-2 hospitalizations	32	19	51 (21.3)

made in the past year	2 hospitalizations	22	13	35 (14.6)
Living status	Living alone	3	0	3 (1.3)
	Not living alone	139	98	237 (98.7)
Activities of daily living (ADL's)	Can complete all ADL's	115	81	196 (81.7)
	Cannot complete all ADL's	27	17	44 (18.3)
People needing care	Always	7	7	14 (5.8)
	Sometimes	20	10	30 (12.5)
	Never	115	81	196 (81.7)

Figure 4: Population Pyramid: Frequency age of participant by gender of participant



LIFESTYLE PROFILE OF STUDY PARTICIPANTS

Table 7 provides information about lifestyle factors of the study population. Majority of the study participants (~80%) were non-users of both smokeless and smoked tobacco products. None of the female participants ever smoked tobacco. Similarly, majority of the participants reported never consuming alcohol (~80%), although nearly half of the males (45%) consumed alcohol (current and previously). More than one third (38.8%) of the participants self-reported being sedentary, percent of females who were sedentary (40.8%)

was slightly higher in comparison with the males (35.7%). Nearly a third of the participants (27.9%) reported taking excess salt in their diet.

Table 7 LIFESTYLE FACTORS OF THE STUDY POPULATION (N=240)

VARIABLES	CATEGORIES	Female (n=142)	Male (n=98)	N=240 (%)
Smoking status	Present smokers	0	9	9 (3.8)
	Previous smokers	0	40	40 (16.7)
	Non-smokers	142	49	191 (79.6)
Smokeless tobacco	Present users	8	17	25 (10.4)
	Previous users	12	9	21 (8.8)
	Non-users	122	72	194 (80.8)
Alcohol	Present users	0	38	38 (15.8)
	Previous users	1	6	7 (2.9)
	Non-users	141	54	195 (81.3)
Physical activity	Sedentary	58	35	93 (38.8)
	Active (>600MET)	84	63	147 (61.2)
Additional Salt users	Yes	39	28	67 (27.9)
	No	103	70	173 (72.1)

ANTHROPOMETRIC PROFILE OF STUDY PARTICIPANTS

Gender-wise comparison of anthropometric variables is given in Table 8. Participant's height and weight ranged from 125 to 189 cm (Mean (SD) = 156.3 (10.24)) and 35 to 86 kg (Mean (SD) = 59.7(11.81)) respectively. We observed a significant difference in height and weight based on gender. A small but significant difference in the BMI was observed between the male and female study participants, females having a higher mean BMI.

Handgrip strength (kg) right hand of participants ranged from 1.2 to 45kg in the study participants and a (Mean (SD) = 18.94 (9.21)). The handgrip strength differed between male and female participants, with more handgrip strength in males compared to females. We observed a difference in mean DBP at the supine position for male and female participants, females having a higher DBP compared to male participants. All the other measurements of SBP and DBP were similar across both the genders.

Table 8 ANTHROPOMETRIC VARIABLES IN STUDY POPULATION (N=240)

Variables	Females (N=142) Mean (SD)	Males (N=98) Mean (SD)	p-value
Age (in year)	69 (7.39)	68.64 (6.66)	0.94[a]
Height (cm)	151.42 (8.35)	163.26 (8.55)	**<0.001[a**]**
Weight (kg)	57.06 (11.26)	63.53 (11.59)	**<0.001[a**]**
BMI (kg/m2)	24.77 (3.78)	23.72 (3.22)	**0.045[a*]**
Handgrip strength right(kg)	15.59 (7.39)	23.81 (9.44)	**<0.001[a**]**
Handgrip strength left(kg)	14.14 (7.18)	23.26 (9.62)	**<0.001[a**]**
SBP supine (mmHg)	141.03 (24.83)	136.7 (19.63)	0.28[a]
SBP standing at 1minute(mmHg)	134.96 (25.75)	133.41 (23.88)	0.58[a]
SBP standing at 2minute(mmHg)	138.89 26.02)	136.4 (23.65)	0.37[a]
SBP standing at 3minute(mmHg)	140.51(25.85)	138.31 (23.98)	0.45[a]
DBP supine (mmHg)	78.51 (14.15)	73.95 (10.42)	**0.007[a*]**
DBP standing at 1minute(mmHg)	77.48 (16.45)	74.63 (12.33)	0.28[a]
DBP standing at 2 minute (mmHg)	78.49 (15.35)	76.51 (11.49)	0.41[a]
DBP standing at 3 minute (mmHg)	79.18 (14.72)	77.04 (10.83)	0.42[a]
pulse rate supine - baseline	73.25 (9.37)	72.89 (12.38)	0.78[a]
pulse rate standing at 1 minute	83.96 (10.29)	84.05 (13.72)	0.8[a]
pulse rate standing at 2 minute	87.69 (47.28)	83.28 (13.58)	0.54[a]
pulse rate standing at 3 minute	83.51 (10.92)	83.12 (13.59)	0.75[a]

a Mann-Whitney U test, * $p<0.05$, **$p<0.001$

PREVALENCE OF OH, OHT, FALL AND FRAILTY

Prevalence of OH is shown in Table 9. Prevalence of Consensus OH at 3rd minute (COH) was found to be 9.6 percent (95% CI= 5.83-13.33), while Revised Consensus for OH revealed a lower prevalence of 8.3 percent (95% CI= 4.81 - 11.86) and Fedorowski OH index revealed a prevalence of 7.5 percent (95% CI =4.14-10.86).

Table 9 PREVALENCE OF ORTHOSTATIC HYPOTENSION (N = 240)

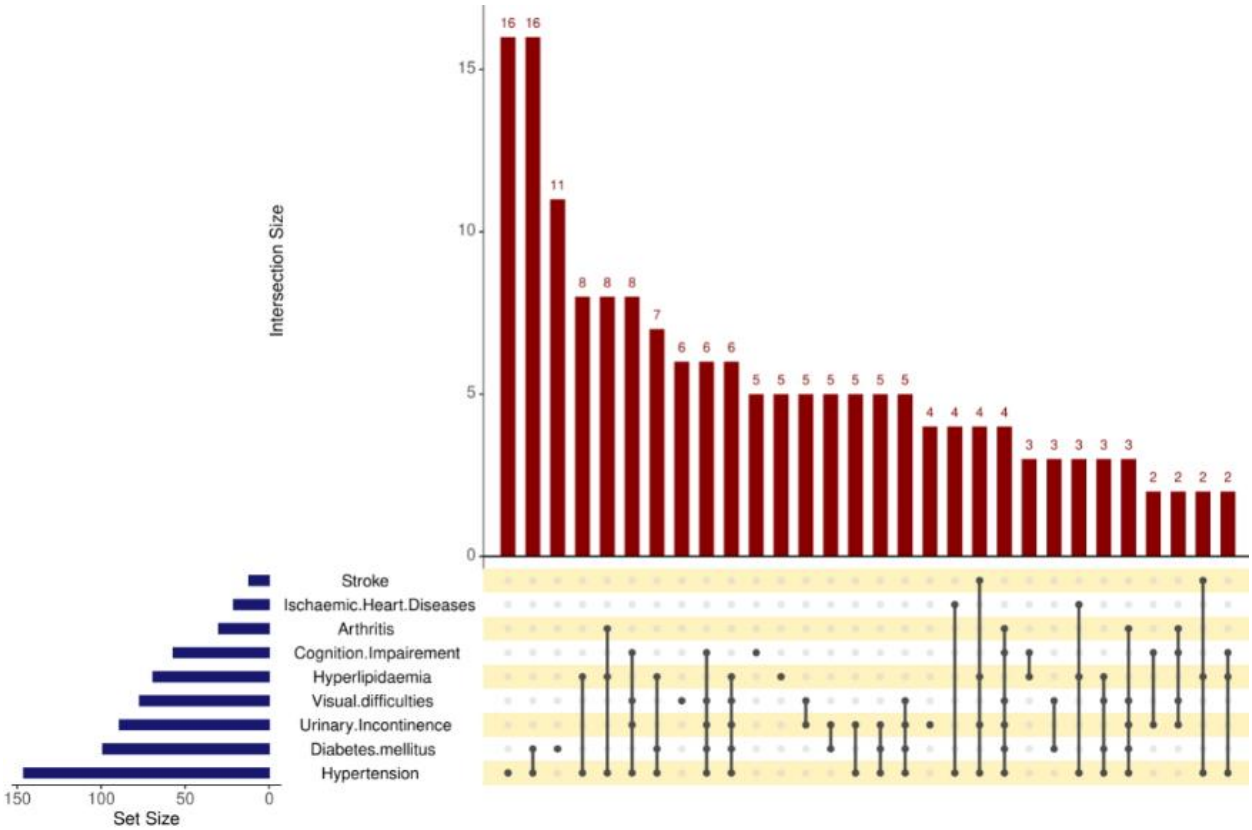
VARIABLES	Female n=142(%)	Male n=98(%)	N=240 (%)	95% Confidence Interval
OH At 1 minute (OH_1)	36 (25.4)	13 (13.3)	49 (20.4)	15.28 - 25.55
OH At 2 minute (OH_2)	26 (18.3)	12 (12.2)	38 (15.8)	11.18 - 20.49
OH At 3 minute (COH/OH)	13 (9.2)	10 (10.2)	23 (9.6)	05.83 - 13.33
Revised COH	13 (9.2)	7 (7.1)	20 (8.3)	04.81 - 11.86
Fedorowski OH (FOH)	11 (7.7)	7 (7.1)	18 (7.5)	04.14 - 10.86

Prevalence of OHT, fall and comorbidities are shown in Table 10. The prevalence of OHT at 3rd minute was found to be 12.1 percent (95% CI = 7.93-16.24) among the study participants. Males reported a higher prevalence of OHT, 16.3 percent compared to the 9.2 percent reported in the females (x^2 = 2.8 (p = 0.094@)). More than one-third (37.9 percent) of the study participants reported a fall at least once in the past year with females reporting a higher prevalence of fall (47.2%). Fear of falling and risk of falling (calculated from the checklist) were found to be higher in the females (76.1% and 66.9%). Self-reported diabetes in males was more (46.9%) than females (37.3%). Prevalence of Hypertension was found to be 60.8 percent; with a higher percentage of females (66.9%) compared to males (53.1%). Nearly a third of the male participants (29.6%) were found to have cognitive impairment.

Table 10 PREVALENCE OF OHT, FALL AND CO MORBIDITIES (N=240)

VARIABLES	Female n=142(%)	Male n=98(%)	N=240 (%)	95% Confidence Interval
OHT	13 (9.2)	16 (16.3)	29 (12.1)	07.93 - 16.24
Fall in last year	67 (47.2)	24 (24.5)	91 (37.9)	31.73 - 44.09
Fear of falling	108 (76.1)	24 (24.5)	132 (55)	48.66 - 61.34
Risk of falling	95(66.9)	45(45.9)	140 (58.3)	52.05 - 64.62
Hypertension	94 (66.2)	52 (53.1)	146 (60.8)	54.61 - 67.05
Diabetes mellitus	53 (37.3)	46 (46.9)	99 (41.3)	34.98 - 47.52
Cognitive impairment	38 (19.7)	29 (29.6)	57 (23.8)	18.33 - 29.17

Figure 6: Intersection of Comorbidities among study participants



Intersection of various co-morbidities can be seen from Figure 6. Hypertension and diabetes mellitus were the two comorbidities, which showed the highest interaction in the study participants.

Table 11 shows the prevalence of frailty and the components for deriving the Frailty index. The prevalence of Frailty was found to be 29.2 percent (95% CI= 23.37-34.96). Females had a higher prevalence of frailty (34.5%) than males (21.4%), (x^2 = 4.8 p = 0.028).

Table 11 PREVALENCE OF FRAILTY: MODIFIED FRIED FRAILTY PHENOTYPE (N=240)

		N (%)	95% C I
Frailty[$]		70 (29.2)	23.37 - 34.96
Frailty Criteria			
i.	Exhaustion- poor endurance and energy	93 (38.8)	32.54 - 44.96
ii.	Weight loss	19 (7.9)	4.48 - 11.36
iii.	Weakness-Isometric handgrip strength	49 (20.4)	15.28 - 25.55
iv.	Slowness	190 (79.2)	73.99 - 84.34
v.	Low physical activity	93 (38.8)	32.54 - 44.96

$ Frailty criteria score 0-2= Not Frail, 3-5= Frail

OH AND SOCIODEMOGRAPHIC FACTORS

The frequencies of OH across various socio-demographic variables are shown in Table 12. A higher prevalence of OH was observed in older age groups and in participants with better SES (APL group) although the association was not significant. Importantly females in APL group showed an association with OH (x^2 = 5.1, p = 0.02[@]).

Table 12 DISTRIBUTION OF OH ACROSS SOCIO-DEMOGRAPHIC CHARACTERISTICS OF POPULATION (N=240)

VARIABLES		OH absent N (%)	OH present N (%)	Chi-square (p-value)
Gender	Female	129 (90.8)	13 (9.2)	0.07 (0.79[@])
	Male	88 (89.8)	10 (10.2)	
Place of residence	Urban	108 (90)	12 (10)	0.05 (0.83[@])
	Rural	109 (90.8)	11 (9.2)	
Age group	60-69	126 (92.6)	10 (7.4)	2.6 (0.27[@])
	70-79	72 (88.9)	9 (11.1)	
	>=80	19 (82.6)	4 (17.4)	
Currently married	Yes	121 (91)	12 (9)	0.11 (0.74[@])
	No	96 (89.7)	11 (10.3)	
Education-completed primary	Yes	143 (89.4)	17 (10.6)	0.6 (0.44[@])
	No	74 (92.5)	6 (7.5)	
Job status-currently working	Yes	41 (91.1)	4 (8.9)	0.03 (1[#])
	No	176 (90.3)	19 (9.7)	
Activities of daily living	Yes	180 (91.8)	16 (8.2)	2.5 (0.15[#])
	No	37 (84.1)	7 (15.9)	
People needing care	Sometimes	26 (86.7)	4 (13.3)	7.16 (0.24[#])
	Always	10 (71.4)	4 (28.6)	
	Never	181 (92.3)	15 (7.7)	
Hospitalization in the past year	Yes	77 (89.5)	9 (10.5)	0.12 (0.73[@])
	No	140 (90.9)	14 (9.1)	
Socio economic status (SES)	BPL	108 (93.9)	7 (6.1)	3.11 (0.08[@])
	APL	109 (87.2)	16 (12.8)	

@Pearson Chi-Square test # Fisher's Exact Test * p<0.05, **p<0.001

The frequencies of OH across various lifestyle factors are shown in Table 13. Comorbidities and polypharmacy were found to be significantly associated with OH.

Table 13 DISTRIBUTION OF OH ACROSS LIFESTYLE FACTORS (N=240)

VARIABLES		OH absent n (%)	OH present n (%)	Chi-square (p-value)
Smoking history	Current smokers	7 (77.8)	2 (22.2)	1.87 (0.39#)
	Previous smokers	37 (92.5)	3 (7.5)	
	Non smokers	173 (90.6)	18 (9.4)	
Smokeless tobacco	Current users	25 (100)	0	2.99(0.22#)
	Previous users	19 (90.5)	2 (9.5)	
	Non users	173 (89.2)	21 (10.8)	
Alcohol	Current users	35 (92.1)	3 (7.9)	0.31(0.86#)
	Previous users	6 (85.7)	1 (14.3)	
	Non users	176 (90.3)	19 (9.7)	
Additional Salt users	Yes	59 (88.1)	8 (11.9)	0.6(0.44@)
	No	158 (91.3)	15 (8.7)	
Physically activity	Active	133 (90.5)	14 (9.5)	0.02(0.97@)
	Sedentary (<600MET)	84 (90.3)	9 (9.7)	
Overweight (BMI>25)	Yes	97 (90.7)	10 (9.3)	0.13(0.91@)
	No	120 (90.2)	13 (9.8)	
Co-morbidities	**No comorbidities**	**31 (100)**	**0**	**14.65(0.001@**)**
	1- 3 comorbidities	**119 (94.4)**	**7 (5.6)**	
	>3 comorbidities	**67 (80.7)**	**16 (19.3)**	
Polypharmacy	**No medicines**	**54 (100)**	**0**	**17.25(0.001@**)**
	1-2 medicines	**100 (93.5)**	**7 (6.5)**	
	>2 medicines	**63 (79.7)**	**16 (20.3)**	

@Pearson Chi-Square test # Fisher's Exact Test * p<0.05, **p<0.001

Distribution of OH among co-morbidities, frailty and fall is shown in Table 14. Prevalence of OH was higher in participants with diabetes (x^2=14.37, p <0.001@), cognitive impairment (x^2 =11.35, p<0.001@) and Hypertension (x^2 =9.91, p=0.002@).

Table 14 DISTRIBUTION OF OH AMONG CO-MORBIDITIES, FRAILTY AND FALL (N=240)

VARIABLES		OH absent N (%)	OH present N (%)	Total	Chi-square (p-value)
Diabetes	Yes	81(81.8)	18(18.2)	99	14.37 (**<0.001**$^{@**}$)
	No	136(96.5)	5(3.5)	141	
Arthritis	Yes	24(80)	6(20)	30	4..29 (**0.049**$^{\#*}$)
	No	193(91.9)	17(8.1)	210	
Urinary incontinence	Yes	74(83.1)	15(16.9)	89	8.63 (**0.003**$^{@*}$)
	No	143(94.7)	8(5.3)	151	
Heart diseases	Yes	18(85.7)	3(14.3)	21	0.59 (0.44$^{\#}$)
	No	199(90.9)	20(9.1)	219	
Visual difficulties	Yes	62(80.5)	15(19.5)	77	12.82 (**<0.001**$^{@**}$)
	No	155(95.1)	8(4.9)	163	
Cognition impairment	Yes	45(78.9)	12(21.1)	57	11.35 (**<0.001**$^{@**}$)
	No	172(94)	11(6)	183	
Hypertension	Yes	125(85.6)	21(14.4)	146	9.91 (**0.002**$^{@*}$)
	No	92(97.9)	2(2.1)	94	
Frailty	Yes	63(90)	7(10)	70	0.02 (0.89$^{@}$)
	No	154(90.6)	16(9.4)	170	
Fall in last year	Yes	81(89)	10(11)	91	0.33 (0.56$^{@}$)
	No	136(91.3)	13(8.7)	149	
Risk of falling	Yes	120(85.7)	20(14.3)	140	8.58 (**0.003**$^{@*}$)
	No	97(97)	3(3)	100	
Fear of falling	Yes	117(88.6)	15(11.4)	132	1.07 (0.30$^{@}$)
	No	100(92.6)	8(7.4)	108	

@Pearson Chi-Square test # Fisher's Exact Test * p<0.05, **p<0.001

Urinary incontinence (x^2 =8.63, p=0.003$^{@}$), visual difficulties (x^2 =12.82, p<0.001$^{@}$), and risk of falling (x^2=8.58, p=0.003$^{@}$) also showed an association with the high prevalence of

OH in the participants. Importantly only males having cognitive impairment had a higher prevalence of OH (x^2 =8.73, p=0.007[#]).

OH showed no association with frailty or fall in last year but OH at the first minute was associated with frailty (x^2 =2.75, p=0.097[@]) and fall in last year (x^2 =4.49, p=0.034[@]) and FOH showed association with fall (x^2 =4.45, p=0.035[@]), but not with frailty. Fall in last year and Frailty showed an association (x^2 =26.11, p<0.001[@]).

The prevalence of OH related symptoms or symptomatic OH is shown in Table 15. Half of the participants (51%) reported fatigue after standing and more than one-third of the participants (37%) reported feeling weakness after standing. One-fifth of the participants (~20%) reported symptoms of orthostatic intolerance upon standing.

Table 15 PREVALENCE OF SYMPTOMATIC OH (N=240)

Symptoms	**Female n=142(%)**	**Male n=98(%)**	**N (%)**	**95% CI**
Orthostatic Intolerance	32(22.5)	15(15.3)	47 (19.6)	14.53 - 24.64
Problems with vision	18(12.7)	6(6.1)	24 (10)	6.18 - 13.82
Weakness	68(47.9)	21(21.4)	89 (37.1)	30.93 - 43.24
Fatigue	80(56.3)	43(43.9)	123 (51.3)	44.88 - 57.62
Trouble concentrating	4(2.8)	0	4 (1.7)	0.04 - 3.29
Head and neck discomfort	28(19.7)	15(15.3)	43 (17.9)	13.03 - 22.80

One sample t-test significant at p-value <0.05

Table 16 shows the distribution of OH among participants having symptomatic OH. Fatigue showed a strong association with OH (x^2 =12.9, p<0.001[@]). Weakness was also associated with OH (x^2 =4.12, p=0.04[@]). Orthostatic intolerance was associated with OH (x^2 =6.17, p=0.02[#]).

Table 16 DISTRIBUTION OF OH AMONG OH RELATED SYMPTOMS (N=240)

VARIABLES		OH absent N (%)	OH present N (%)	Chi-square (p-value)
Orthostatic Intolerance	Yes	38(80.9)	9(19.1)	**6.17(0.02$^{\#*}$)**
	No	179(92.7)	14(7.3)	
Problems with vision	Yes	19(79.2)	5(20.8)	3.89 (0.06$^{\#}$)
	No	198(91.7)	18(8.3)	
Weakness	Yes	76(85.4)	13(14.6)	**4.12 (0.04$^{@*}$)**
	No	141(93.4)	10(6.6)	
Fatigue	Yes	103(83.7)	20(16.3)	**12.9 (<0.001$^{@**}$)**
	No	114(97.4)	3(2.6)	
Trouble concentrating	Yes	2(50)	2(50	**7.67 (0.047$^{\#*}$)**
	No	215(91.1)	21(8.9)	
Head and neck discomfort	Yes	36(83.7)	7(16.3)	2.7 **(**0.15$^{\#}$**)**
	No	181(91.9)	16(8.1)	

@Pearson Chi-Square test # Fisher's Exact Test * p<0.05, **p<0.001

BIVARIATE ANALYSIS

All variables found significant in the univariate analysis were included for the binary logistic regression. Gender, SES, physical activity, excess salt usage, weak handgrip strength, problems with vision, Head and neck discomfort, exhaustion, Frailty, fall in last year and fear of falling failed to show a significant association with OH($p<0.05$).

Table 17 shows the association of different predictor variables with OH. With each increase in the number of co-morbidities, the odds of having OH at 3rd minute becomes higher by 58 percent (OR=1.58(95%CI=1.25-1.99)). The gender-specific analysis revealed that these increased odds were higher for males where the odds double (OR=1.92(95%CI=1.3-2.8)). Participants with impaired cognition had 4 times higher odds of having OH than those without impaired cognition (OR=4.17(95%CI=1.73-10.07)).

Table 17 ASSOCIATION OF DIFFERENT PREDICTOR VARIABLES WITH OH

Variables		Crude Odds Ratio	95% CI	p-value
Age	Increased by 1	1.05	0.99 – 1.12	0.07
Co-morbidities	**Increased by 1**	**1.58**	**1.25 - 1.99**	**<0.001****
Total number of medicine	**Increased by 1**	**1.67**	**1.27 - 2.19**	**<0.001****
Cognition impairment	**Yes**	**4.17**	**1.73 - 10.07**	**0.001***
	No	**Referent**		
Diabetes	**Yes**	**6.04**	**2.16 - 16.90**	**<0.001****
	No	**Referent**		
Arthritis	**Yes**	**2.83**	**1.02 - 7.89**	**0.046***
	No	**Referent**		
Urinary incontinence	**Yes**	**3.62**	**1.47 - 8.94**	**0.005***
	No	**Referent**		
People with visual difficulties	**Yes**	**4.69**	**1.89 - 11.61**	**<0.001****
	No	**Referent**		
Hypertension	**Yes**	**7.73**	**1.77 - 33.79**	**0.007***
	No	**Referent**		
Risk of falling	**Yes**	**5.39**	**1.56 - 18.67**	**0.008***
	No	**Referent**		
Orthostatic Intolerance	**Yes**	**3.03**	**1.22 - 7.51**	**0.017***
	No	**Referent**		
Weakness	**Yes**	**2.41**	**1.01 - 5.76**	**0.047***
	No	**Referent**		
Fatigue	**Yes**	**7.38**	**2.13 - 25.56**	**0.002***
	No	**Referent**		
Trouble concentrating	**Yes**	**10.24**	**1.37 - 76.45**	**0.023***
	No	**Referent**		

* $p<0.05$, ** $p< 0.001$

The gender-specific analysis revealed that males with cognitive impairment have 7 times higher odds of being OH (OR=7(95%CI=1.67-29.43)). Diabetics had six times higher odds of having OH compared to non-diabetics (OR=6.04(95%CI=2.16-16.9)) and gender-specific analysis revealed that female diabetics had 26 times more odds of having OH_3

(OR=25.76 (95%CI=3.24-204.81)). Similarly being a hypertensive increased the odds of having OH 7.7 times (OR=7.73(95%CI=1.77-33.79)).

The gender-specific analysis revealed that males with OI had a higher risk of having OH (OR=7.8 (95%CI=1.92-31.74), p=0.004). Participants with OI had four times the odds to have fallen at least once in last year (OR=4.29 (95%CI=2.19-8.44), p<0.001) and seven times the odds of being frail (OR= 7.65 (95%CI=3.81-15.38), p<0.001) as shown in Table18. Frailty failed to show any association with Orthostatic hypotension at 1st minute, but gender-specific analysis revealed that men with frailty were having 6 times increased odds of being OH at 1st minute (OR=5.92 (95%CI=1.73-20.28),p=0.005). Participants who had OH at the 1st minute had twice the odds (OR=1.97(95%CI=1.05-3.72), p=0.04) to have fallen in the last year and with FOH had nearly three times the odds (OR=2.8(95%CI=1.04-7.48), p=0.04) to have fallen in the last year.

Table 18 ASSOCIATION OF OI FRAILTY AND FALL WITH OH

		OH_1		OH		FOH	
		Crude OR (95% CI)	p-value	Crude OR (95% CI)	p-value	Crude OR (95% CI)	p-value
OI	Yes	1.92 (0.93-3.95)	0.079	**3.03 (1.22-7.51)**	**0.017**	**3.75 (1.39-10.12)**	**0.009**
	No	Referent					
Frailty	Yes	1.74 (0.90-3.36)	0.099	1.06 (0.42-2.73)	0.8	2.07 (0.8-5.5)	0.15
	No	Referent					
Fall in last year	Yes	**1.97 (1.05-3.72)**	**0.036**	1.3 (0.5-3.0)	0.56	**2.79 (1.04-7.48)**	**0.042**
	No	Referent					

p-value significant at p<0.05

MULTIVARIATE ANALYSIS

For multivariate analysis, with OH at 3rd minute as the outcome, multiple models were tested using the Enter method and the best model based on Nagelkerke R Square (*Pseudo* R^2 value) and Hosmer and Lemeshow Test p-value was selected. Ten models were built using the following variables:

Model 1: Age + diabetes mellitus

Model 2: Age + total number of medicines

Model 3: Model 1 + total number of medicines

Model 4: Model 3 + hypertension

Model 5: Model 4+ total number of comorbidities

Model 6: Model 4 + Cognitive impairment

Model 7: Model 4+ frailty

Model 8: Model 1 + total number of comorbidities + Cognitive impairment

Model 9: Model 8 + gender

Model 10: Model 9 + frailty

Model 10 was selected as our final model as it was found to be stable and explained the maximum variance of OH and correctly classified highest percent of the participants.

Nagelkerke R Square = 0.266 (*Pseudo* R^2 value)

Hosmer and Lemeshow Test p-value = 0.063 (p-value > 0.05)

The model explained 26.6% of the variance in OH and correctly classified 92.1% of the participants. The increasing number of comorbidities was associated with an increased

likelihood of exhibiting OH, 1.5 times more. The change in the OR after a multivariate analysis was not observed for the number of comorbidities and cognitive impairment. Although we observed a change in the adjusted OR compared to crude OR in the participants with diabetes mellitus.

Table 19 Results of multiple logistic regression analysis

Variables		**Crude OR**	**95% CI**	**Adjusted OR**	**95% CI**
Age of participant	Increased by 1	1.05	0.99-1.12	0.99	0.91-1.09
Gender	Female	1.13	0.47-2.69	1.13	0.41-3.11
Total number of comorbidities	**Increased by 1**	**1.58**	**1.25 - 1.99**	**1.50**	**1.08-2.09**
Diabetes mellitus	**Yes**	**6.04**	**2.16 - 16.90**	**3.54**	**1.10-11.34**
Cognitive impairment	**Yes**	**4.17**	**1.73 - 10.07**	**4.71**	**1.41-15.75**
Frailty	Yes	1.07	0.42-2.73	0.27	0.06-1.12

CHAPTER–4

DISCUSSION AND CONCLUSION

The present cross-sectional community-based study was envisaged to assess the prevalence of OH in community-dwelling elderly participants of Thiruvananthapuram district. In doing so, we aimed to find the prevalence of frailty and looked for any association of frailty with OH. Furthermore, we tried to find the association of OH with socio-demographic and lifestyle factors.

General characteristics- socio-demographic and behavioural

In our study, women outnumbered men and 60 percent of these women were widows. These study findings are similar to what census of India 2011 reported (Chandramouli and General, 2011). A high proportion of widows among the old might be due to the increased life expectancy among women and the practice among men to marry women a few years younger. The proportion of the participants with no formal education and the working population was found similar to a 2013 study in Kerala, but the proportion of elderly unable to work due to health reasons was almost half of what the 2013 study reported (UNFPA, 2016). Our study reported almost half of our participants in the BPL category, but a state report states that 12 percent of the population is BPL (Kerala State Planning Board, 2019). Even though Kerala had an early demographic transition and a significant proportion of migrants (Zachariah and Rajan, 2015), the proportion of elderly women living alone in our study was small (~1%) compared to what other states of India reported (Tamilnadu-26%) (UNFPA, 2016). Functionality measured in terms of ADLs in our study sample was more than double the national figure, nearly one-fifth of our participants needed full/partial assistance. This may be because the proportion of the oldest-old (>80) is higher in Kerala, which leads to functional limitation (UNFPA, 2016).

Majority of the study participants (~80%) never used any tobacco products nor consumed alcohol, and none of the female participants ever smoked tobacco. These findings are comparable to a study done in rural Kerala were one-tenth of men used smoked tobacco and one-fifth of men used smokeless tobacco (Sathish et al., 2015). Nearly half of the males in our study consumed alcohol, similar to what a study in urban Kerala found (Mohan et al., 2019). Nearly two-thirds of our participants were physically active (61%). Studies assessing the level of physical activity using the GPAQ shows that there is a sizable difference in physical activity across different parts of India. Our study finding is comparable to a study on global ageing and adult health (SAGE) which reported 69 percent of adults above 50 years as physically active using GPAQ (McCarthy et al., 2018) but is substantially different from Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study which assessed the level of physical activity using the GPAQ and reported 46 percent of adults as physically active (Anjana et al., 2014). However, the population in this study was much younger compared to ours, mean age 40±15 years. The difference in the level of physical activity may be due to the increased urbanization leading to lack of agricultural activities along with growing prevalence and burden of diseases. Geographical differences and transportation facilities and age are among other factors affecting the physical activity.

Prevalence of OH

Bedside orthostatic test revealed the prevalence of Consensus OH at 3rd minute to be 9.6 percent. Prevalence of OH as per revised 2011 AAN guidelines was found to be 8.3 percent in our study and prevalence of OH as per Fedorowski criteria (FOH) was found to be 7.5 percent. There is a scarcity of studies regarding the prevalence of OH from India and other LMIC among community-dwelling elderly. A study done in Andhra Pradesh among the elderly (60 and above) who attended an outpatient clinic in a hospital revealed the overall

prevalence of OH as 12.5 percent (Guntupalli, 2018). It is not directly comparable to our study since elderly seeking medical care from hospital were likely to report a higher prevalence of comorbidity and thus, may have a higher prevalence of OH.

Prevalence of OH among community dwellers in the developed countries has been reported between 5-34 percent and a recent systematic review and meta-analysis found the pooled prevalence of COH in community-dwelling older people to be 22.2 percent (Saedon et al., 2020). Our study findings is similar to *Progetto Veneto Anziani* (Pro.V.A) study done in Italy among community-dwelling elderly above 65 years which reported the prevalence of OH as 9.3 percent at baseline (Veronese et al., 2015).

A study done in community-dwelling elderly from the UK using updated consensus definition of 2011 for OH and using the beat to beat BP monitoring, found the prevalence of OH as 25 percent (McDonald et al., 2016). The difference in the prevalence of OH in this study and our study (8.3%) may be due to the relatively younger population in our study group (60% below 70 years) and, the difference in methods used for measuring OH, beat to beat is considered superior to using a sphygmomanometer as the latter is considered unrefined because it underestimates vasodepression. The stage of the epidemiological transition and medications usage pattern of a population may also be a reason for the difference in prevalence across studies.

Neither Fedorowski criteria nor the 2011 AAN criteria for OH with similar definitions were not used widely for OH evaluation. There is no proper, correct assessment for accurate diagnosis and better standardization has to be done for OH investigation (Tzur et al., 2019). We were unable to juxtapose with other relevant studies from Kerala or India or across the globe since no relevant studies were available which used the Fedorowski criteria or 2011 AAN criteria for OH among elderly (Saedon et al., 2020).

Prevalence of OHT

Our study reported the prevalence of OHT at 3rd minute to be 12.1 percent. There is a scarcity of studies regarding OHT from India and other LMIC among community-dwelling elderly. Our findings is similar to the *Progetto Veneto Anziani* (Pro.V.A) study of Italy done in community-dwelling elderly above 65 years which reported a prevalence of 19.5 percent at baseline and 10.9 percent after 4.4 years of follow-up (Veronese et al., 2015). A population-based study done among elderly in China revealed the prevalence of OHT as 3.69 percent (Wu et al., 2008). Another population-based longitudinal study in Israel among the oldest old showed a prevalence of 4 percent (Bursztyn et al., 2016). Systolic hypertension in the elderly program (SHEP) cohort reported the prevalence of OHT as 5 percent (Kostis et al., 2019). Our study findings show similarity more to the likes of studies done among elderly hypertensives, such as the study in elderly outpatients in Japan which showed a prevalence of 10.8 percent (Kario et al., 2002) and the SPRINT cohort which reported a prevalence of 21 percent at baseline among older hypertensive (Townsend et al., 2016). The higher prevalence of OHT in our study may be because of the increased proportion of hypertensive (~61%) among our study participants.

Prevalence of fall

Our study found the prevalence of fall in the last year to be 37.9 percent which was higher than the frequency of fall (27%) reported by a study done in the elderly population of rural Thiruvananthapuram, Kerala (Rekha et al., 2017). Our study included both rural and urban population which can explain this difference and also it is also a possibility that lesser healthy elderly stay at home and our study would have missed the healthy elderly participants. The prevalence of fall among women in our study was 47 percent, which is

similar to an earlier study done among community-dwelling elderly women in Thiruvananthapuram (Johnson, 2006).

Prevalence of frailty

We used a modified fried frailty phenotype and calculated the prevalence of frailty as 29.2 percent among our study participants. The prevalence of frailty found is comparable to other studies done in India and from developing countries. Our results were similar to a study done in rural Tamilnadu, where the prevalence of frailty for physical definition was 28 percent in the elderly (Kendhapedi and Devasenapathy, 2019). A cross-sectional study done in an urban city in Western India among elderly, estimated prevalence to be 26 percent (Kashikar and Nagarkar, 2016). A large population-based cohort study revealed the prevalence of fried frailty model to be 11.8% in urban India and the prevalence of multidimensional frailty model to be 26.1 percent. Handgrip strength was not measured for the fried frailty model in that study (At et al., 2015).

Prevalence of OI

Our study finding of the prevalence of OI as 19.6 percent is not in concurrence with previous studies, the prevalence of Orthostatic Dizziness varied in elderly population-based studies from 2 to 19 percent (Wu et al., 2008). A study done on older ambulatory women above 65 years of age enrolled in a fracture clinic, reported prevalence of orthostatic dizziness as 19 percent. A population-based study done among adults above 40 years of age in china revealed the prevalence of OI as 5.4 percent (Wu et al., 2008) and the Irish Longitudinal Study on Aging-TILDA found 6.7 percent of the adults above 50 years in the community shows symptoms of OI (O'Connell et al., 2015). Number of comorbidities, a higher proportion of women and old age might be the reasons for the increased prevalence of OI in our study, but since there are many known causes of OI, we cannot envisage

whether this is just a characteristic of our population or due to some other underlying factors.

Prevalence of major comorbidities

Prevalence of hypertension in our study was found to be 60.8 percent. Kalavathy et al. found the prevalence of hypertension among elderly of rural Kerala to be 51.5 percent (Kalavathy et al., 2000). A study published in 2018 among elderly (60-70 years) from northern Kerala had found the prevalence of hypertension as 35.7 percent (Jacob and Kannan, 2018). The difference in Prevalence reported may be due to the difference in dietary habits or geographical factors as there were no gender or age differences. Usage of JNC 8 guidelines in our methods might have caused a subtle change in estimating prevalence because the previous study followed JNC 7 guidelines.

Prevalence of diabetes in our study population was 41.3 percent, which is higher than the previously reported studies from Kerala. A study done in urban parts of Kerala reported a prevalence of 29.7 percent in elderly above 65 years of age (Raman Kutty et al., 1999) and another study was done in rural parts of Kerala among elderly above 60 reported a prevalence of 28.2 percent (Vijayakumar et al., 2009). Furthermore, another study done on a rural elderly population (60-70 years) in northern Kerala found the prevalence of diabetes as 23 percent (Jacob and Kannan, 2018). The international diabetic federation has estimated the prevalence of diabetes among older (60-69 years) men and women in India as 17 and 18 percent respectively (Saeedi et al., 2019). A plausible reason for the higher prevalence in our study may be due to over-reporting since diabetes was self-reported or it may be a characteristic of the population in our study group.

The Brief version of CSI-D showed that 23.8 percent of our study participants have cognitive impairment, it is similar to a study done in urban areas of Thiruvanthapuram,

Kerala, which found the prevalence of mild cognitive impairment in community dwelling elderly above 60 as 26.06 percent (Mohan et al., 2019).

Risk factors of OH

Our study findings are similar to a study done in Finland which showed Age and gender were not independently associated with OH in the elderly, unlike what literature suggests (Hiitola et al., 2009). This study also made an attempt to explore other risk factors of OH and univariate analysis revealed that with each increase in the number of co-morbidities, the odds of having OH becomes higher by 58 percent. The gender-specific analysis revealed that these increased odds were higher for males and the odds double. No change in OR after the multivariate analysis was observed for the number of comorbidities after adjusting for age, gender, cognitive impairment and frailty. Previous studies have shown that having multiple co-morbidities increases the odds of OH (Kamaruzzaman et al., 2009).

Our study showed that OH is associated with various conditions that are themselves established risk factors for impaired prognosis such as diabetes mellitus, arthritis, urinary incontinence, hypertension, and cognition impairment, orthostatic intolerance, difficulty in vision and taking multiple medicines (polypharmacy), all these were independently associated with increased the odds of having OH. With age the number of co-morbidities increases resulting in increased medicine intake. The higher number of medications is associated with adverse drug reactions and drug interactions and polypharmacy has been associated with urinary incontinence in the elderly (Küçükdağlı, 2019).

Probably being in the advanced state of epidemiological transition may be another reason for increased comorbidities in our study population. Furthermore, taking certain medicines (some are already proven to be associated with OH) for the already present comorbid conditions may increase OH (Milazzo et al., 2012). Our study shows that OH is associated

with the number of co-morbidities as well as individual co-morbidity. It is very interesting, how the propinquity of these comorbid factors, acting in unison to show a collective effect in changing the haemodynamic reflex.

Patients with pre-existing blood pressure dysregulation like essential hypertension and/or comorbidities that can influence blood pressure changes such as diabetes mellitus will have more divergence in their BP readings than a normotensive individual. We should look for distinguishable findings unallied to OH itself. Since OH can be due to non-neurogenic causes of primary and secondary origin, like the side effects of certain drugs which cause autonomic dysfunction and it can be endocrine, cardiovascular or renal in origin (Perlmuter et al., 2013).

Participants with Diabetes mellitus showed 6 times increased odds but when it was adjusted for known risk factors such as age, gender, the total number of comorbidities and frailty, the AOR was 3.5. The gender-specific analysis revealed that female diabetics had 26 times increased odds of having OH. Our findings lend support to previous findings reporting similar an association between OH with diabetes (Bouhanick et al., 2014; C et al., 2016; Fedorowski et al., 2010; Gaspar et al., 2016; Wu et al., 1996, 2008). Since there was no regulation in the time at which bedside test was conducted, at least in some cases insulin mediated vasodilation may have contributed to postprandial OH, insulin has vasodilation properties and increased insulin levels after large meals could decrease peripheral resistance (Shibao et al., 2007). Females live longer but with increased comorbidities. OH in a diabetic population can occur secondary to autonomic neuropathy, so symptoms of OH such as OI should be carefully looked into such patients (Purewal and Watkins, 1995).

Similarly, having hypertension increased the odds of having OH by 7.7 times. Our findings lend support to previous findings reporting similar associations between OH with

hypertension (Fedorowski et al., 2010; Gupta and Lipsitz, 2007; Ong et al., 2017; Punchick et al., 2016; Wu et al., 1996). Some participants would have been previously on antihypertensive medicines which might have altered the baroreceptor response leading to varied BP levels.

Participants with cognitive impairment had 4 times higher odds of having OH than those without cognitive impairment. The gender-specific analysis revealed that males with cognitive impairment have 7 times higher odds of having OH. AOR for the number of comorbidities was 4.7 after adjusting for age, gender, diabetes mellitus and frailty. A recent systematic review and meta-analysis had found that OH is associated with worse cognition in older populations (Iseli et al., 2019). Bocti et al. opined that OH could represent an under-recognized correlate of cognitive performance. (Bocti et al., 2017). The higher odds may be because low BP is accompanied by the compromised cognitive performance with regards to attention and memory (Duschek and Schandry, 2007) or maybe because of cerebral hypoperfusion due to systemic hypotension (Román, 2004)

Association of OI, frailty and fall with OH

Participants with OI had three times the odds having OH, the gender-specific analysis revealed that males with OI had a higher risk of having orthostatic hypotension at the 1st 2nd and 3rd minute, OH_1 (OR=4.69), OH_2 (OR=5.4), OH_3 (OR=7.8). Participants with OI had four times the odds to have fallen at least once in last year (OR=4.29). Our study findings were also similar to a study done in the Netherlands which reported that an increase in orthostatic complaints increases the risk of falling (van Hateren et al., 2012). Participants with OI had seven times the odds of being frail (OR= 7.65). Our findings lend support to previous findings reporting similar associations between OI and frailty (O'Connell et al., 2015; Romero-Ortuno et al., 2011).

Frailty had failed to show an association with Orthostatic hypotension but gender-specific analysis revealed that men with frailty were at 6 times increased odds of having orthostatic hypotension in the first minute (OR=5.92). Our study findings were also similar to a study done on inpatient in a geriatric clinic which found that frailty was associated with OH at 1st minute (Kocyigit et al., 2019), but they used a different frailty assessment tool-Comprehensive Geriatric Assessment (CGA) and HUT for measuring OH. Rockwood et al. suggested that OH may be a marker of the system dysregulation seen in frailty (Rockwood et al., 2012). A study done using CGA and sitting to standing protocol for OH among elderly in Italy suggested OH as a marker of clinical frailty (Liguori et al., 2018).

Our study showed that fall in the past year was associated with orthostatic hypotension at the 1st minute with twice the odds to have fallen down at least once in the last year. Noteworthy is that FOH a revised OH criteria was also associated with fall. Recent systematic reviews have already shown how fall and orthostatic hypotension were positively associated (Mol et al., 2019, 2018; Saedon et al., 2020, 2018; Shaw et al., 2019. Fall risk has been associated with polypharmacy in previous studies (Leipzig et al., 1999a, 1999b; Ziere et al., 2006) and the high proportion of comorbid conditions coupled with the medication usage, such as the use of a diuretic might cause dizziness as a result of OH and can lead to falling. This can be a reason for the increased frequency of fall in our study population.

Strengths and limitations

To our knowledge, this is the first study that assessed the prevalence of OH and explored the association of OH and frailty of community-dwelling elderly in Kerala. Selection bias is one of the major errors which can come in a cross-sectional study. To avoid it, we have done multistage sampling, and the participants were from different parts of Thiruvananthapuram with reasonable geographical representation. Collection of data was done by a single investigator; this may help in eliminating to a great extent the inter-observer bias. Instruments used for anthropometric measurements were recommended by the WHO in their different studies, and the same instruments were used for all participants. Calibration of instruments was done to remove systematic technical bias from our study.

Despite the number of strengths, the study was cross-sectional with certain inherent limitations like inability to infer causality. Over reporting among participants would have led to information bias and overestimation of the strength of association. The sample would have been prone to volunteer bias and recall bias.

Although 71 percent of the elderly live in rural areas and 29 percent live in urban areas, we have taken equal populations from urban and rural areas. The cross-sectional survey of OH in the community would have underestimated risk since we had excluded people who were admitted in hospitals due to fall, people who were bedridden or unable to mobilize themselves due to fractures occurred from fall or for any other reasons. Our study would have also missed the people who were out at work, especially MNREGA Scheme (Mahatma Gandhi National Rural Employment Guarantee Act) and people who were not present at the time of gathering information for our study.

Socio-economic status was calculated solely on the basis of the colour of ration card provided to participants by the government, so inherent discrepancies already present were

not accounted for or removed from the study. Since we used this as a proxy to estimate poverty, the figures might have been higher in our study. Living alone and abandonment are serious issues elderly face. In our study we found only 1.3 percent of the individuals to be living alone. A majority of the people living alone were reluctant to be a part of the study, possibly for self-preserving themselves from unknown visitors. Interviewer's age and sex may have also influenced their behaviour. This would have led to an underestimation of people living alone.

Study outcome and Conclusion

Kerala is going through a rapid epidemiological and demographic transition at a pace faster than the rest of India. The dual burden of diseases and a high level of migration makes it unique compared to other parts of India. It's crucial for an elderly to be independent throughout the lifetime because fall and related injuries can unsettle the usual working of a household by increasing the economic and psychological burden and the burden to our health system.

The prevalence of OH in our study is comparable to other similar studies from developed countries. Diabetes mellitus, arthritis, urinary incontinence, hypertension, and cognition impairment, orthostatic intolerance, polypharmacy and difficulty in vision may be independent risk factors for OH. People with comorbidities have markedly increased odds of OH independent of age, gender, diabetes mellitus, cognitive impairment and frailty. Our study found that one in every ten older adults is likely to have OH or OHT. Three in every ten older adults will be frail and four in every ten elderly has fallen in the previous year. Frailty may be a risk factor for orthostatic hypotension at the 1st minute.

OH and OHT are easily diagnosable and remediable conditions with important clinical implications and testing for these are not different. Actively monitoring people with comorbidities and with cognitive impairment and checking them for Orthostatic Hypotension and Orthostatic Hypertension and thereby reducing fall and associated morbidities may be an attractive policy option with public health impact.

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ANEXURES

Interview schedule

I. SECTION 1

NO	Question	Coding criterion	Code options	Variable
IDENTIFICATION INFORMATION				
1	Cluster			
2	Location	Panchayat/corporation		UR
3	Date of interview	dd/mm/yy		date
4	Participant ID number	Older person code	###	
SOCIO-DEMOGRAPHIC INFORMATION				
5	How old are you?	Age of the person, in completed years(not running)	###	AGE
6	Sex	Male	0	GENDER
		Female	1	
		Transgender	2	
7	How much schooling have you had?	No formal schooling	1	EDUC
		Some, but did not complete primary	2	
		Completed Primary	3	
		Completed Secondary (metric)	4	
		Completed Tertiary (college)	5	
8	Are you currently married?	Never married	1	PMARRY
		Married/Co-habiting	2	
		Widowed	3	
		Divorced/Separated	4	
9	What is the Colour of the ration card you have?	Yellow	1	COLOR
		Pink	2	
		Blue	3	
		White	4	
		No ration card	5	
10	Previous month's household income from all sources (approx. in Rupees)			HINC
I1	What is the source of your income now?	Paid full-time work	1	JOB
		Paid part-time work	2	
		Retired-pensioner	3	
		Retired -non-pensioner	4	
		Housewife/house husband (full-time)	5	
		Unemployed (able to work)	6	
		Unemployed (unable to work)	7	
12	How many earning members (16 years or over) live with you in this household?	(for people living alone code 0, code 1 for all others)	0 1	LIVING
13	How many hospitalizations did you have in the last year?	None 1-2 >2	0 1 2	HOSP
14	Are you able to do all the activities of daily living on your own? (e.g. Eating, Bathing, Dressing, Mobility Toileting)	Yes No	1, skip to 17 0	ADL
15	Does someone provide care for you?	Always Sometimes Never	2 1 0, skip to 17	CARE
I6	Who provides care for you? Code numbers of adult co-residents within each category	Spouse or partner	#	SPOUSE
		Sons and daughters	#	SDNO
		Sons- or daughters-in-law	#	INLAW
		Brothers and sisters	#	SIBNO
		Other relatives	#	OTHREL
		Friends	#	FRNO
		Others	#	OTHNO

II. SECTION 2

BEHAVIOURAL INFORMATION *Now I am going to ask you some questions about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco*				
TOBACCO- Smoking Tobacco use				
17	Do you currently smoke any tobacco products, such as bidis, cigarettes, cigars or pipes, hookah or any other local smoked tobacco products?	Yes No	1, skip to 19 0	SMK
18	In the past, did you ever smoke tobacco products such as bidis, cigarettes, cigars or pipes daily?	Yes No	1 0, skip to 22	PSMK
19	On an average, how many (number of times in case of hookah) of the following do you smoke each day/week? *(Record for each type), record 88, if any product is not used instead of leaving blank in the product categories. If less than daily, record weekly)*			
	Smoked tobacco product	Daily	Weekly	
	bidis			BIDI
	Manufactured cigarettes			CIG
	Hand-rolled cigarettes			HMCIG
	pipes			PIPE
	Cigars, cheroots			CIGAR
	Hookah/no of shisha session			HUKAH
	Other local smoked tobacco product (specify)…….			LCL
20	At what age did you start smoking?			AGSMK
21	How long ago did you stop smoking? *question is relevant only for past smokers.	….Months …..Years		STSMK
22	Are you currently exposed to tobacco smoke at your home or workplace daily?	Yes No	1 0	PASMK
Smokeless Tobacco use				
23	Do you currently use any smokeless tobacco such as (chewing tobacco, tuibu snuff, betel, gutka, pan masala, etc.)?	Yes No	1, skip to 25 0	SLTB
24	If you are not using currently, in the past did you ever use smokeless tobacco products such as chewing tobacco, tuibu, snuff, betel, gutka, etc.?	Yes No	1 0, skip to 28	PSLTB
25	On average, how many times a day do you use... (*Record for each type) Specify 77 if no products were used in each category instead of leaving categories blank*			
	Smokeless tobacco product	Daily	Weekly	
	Chewing tobacco			CHEW
	Pan with tobacco			PAN
	Tuibu, Tobacco Snuff, by mouth			TAMBK
	Snuff, by the nose			SNIFF
	Other (specify)…….			XTRA
26	At what age did you start using smokeless tobacco products?			ASLTB
27	How long ago did you stop using? (*question relevant for past smokers only)	….Months ago …..Years		SSLTB
ALCOHOL USE				
28	Have you ever consumed any alcoholic products (such as beer, whisky, rum, gin, brandy, wine, toddy or arrack etc.)?	Yes No	1 0, skip to 33	ALC
29	In the past 12 months, how frequently have you consumed any alcoholic products?	Never Monthly or less 2 to 4 times a month 2 to 3 times a week 4 or more times a week	0, skip to 32 1 2 3 4	PALC
30	How many standard drinks (pegs) containing alcohol do you have on a typical day when you are drinking?			PGALC
31	At what age did you start using alcoholic products?			AGALC
32	If not consumed alcohol within the past 12 months, how long ago did you stop alcohol?	Months ago Years ago	PRALC	34

PHYSICAL ACTIVITY (*Next, I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.)* *(Use Showcard wherever necessary or Insert other examples if needed)*				
Activity at work				
33	Does your work involve a vigorous-intensity activity that causes large increases in breathing or heart rate, like (heavy lifting, digging or other work) for at least 10 minutes continuously?	Yes No	1 0, skip to 36	P1
34	In a typical week, how many days do you do vigorous-intensity activities as part of your work?	Days per week		P2
35	On a typical day, how much time do you spend doing vigorous-intensity activities at work?	In hours and minutes Or In minutes		P3(a-b)
36	Does your work involve a moderate-intensity activity that causes small increases in breathing or heart rate, like (brisk walking or carrying light loads) for at least 10 minutes continuously?	Yes No	1 0, skip to 39	P4
37	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Days per week		P5
38	On a typical day, how much time do you spend doing moderate-intensity activities at work?	In hours Or In minutes		P6(a-b)
TRAVEL TO AND FROM PLACES *The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to a place of worship.*				
39	Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	Yes No	1 0, skip to 42	P7
40	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	No of Days		P8
41	On a typical day, how much time would you spend walking or bicycling for travel?	hours minutes		P9(a-b)
RECREATIONAL ACTIVITIES The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure)				
42	Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running] for at least 10 minutes continuously? [INSERT EXAMPLES]	Yes-1 If yes,----days/week & ------hour:--- minutes/day No-0, skip to 45		P10
43	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?	Number of days		P11
44	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours: minutes		P12(a-b)
45	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, and swimming] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD)	Yes-1 If yes,----days/week & ------hour:--- minutes/day No-0, skip to 48		P13
46	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?	Number of days		P14
47	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day	Hours: minutes		P15(a-b)
Sedentary behaviour *The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping. [Insert examples]*				
48	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes		P16(a-b)
DIET (*use Showcard wherever necessary.)*				
49	In a common week, on how many days do you eat fruit?	Number of days		WFRT
50	How many servings of fruit do you eat on one of those days?	Number of servings		FRTS

51	In a common week, on how many days do you eat vegetables?	Number of days		WVEG
52	How many servings of vegetables do you eat on one of those days?	Number of servings		VEGS
53	Do you follow the practice of adding salt to rice when being cooked or served?	Yes No	1 2	SALT
54	How often do you consume each of the following? *(USE CODE: DAILY – 1; AT LEAST ONCE IN A WEEK – 2; ONCE IN A MONTH –3; OCCASIONALLY OR RARELY - 4; NEVER – 5)*			
	Red meat			RM
	Eggs			EGG
	Chicken			CHICK
	Fish			FISH
	salted fish			SALT
	Pickle			PICKL
	Pappad			PAPPD

III. SECTION 3

MORBIDITIES AND TREATMENT HISTORY(self-reported)
(code 1 for yes, if you have the problem, write the age in the age column
Write prescription drugs in the respective column leave blank for don't know or don't want to respond or not relevant. For myocardial infarction the participants have to report if they ever had the diseases)

Problem	Do you have the problem?	Age at which problem was diagnosed	Prescription drugs	
Diabetes				CM1
Stroke				CM2
High blood pressure				CM3
myocardial infarction				CM4
Other heart diseases				CM5
COPD				CM6
Chronic Kidney disease				CM7
Arthritis				CM8
Hyperlipidaemia (Cholesterol)				CM9
Urinary incontinence				CM10
Cataract or visual difficulty				CM11
Deafness				CM12
Others (specify)…….. …….				OCM
Total no of morbidities				TCM

COGNITIVE ASSESSMENT- CSI-D

Instructions. Administer this test in a quiet space, free from distractions, and with the older person alone if possible. Make sure they are attending to you, and speak loud enough and clearly so that they can hear you. Ask the questions exactly as they are written.
CODE 1 for correct answers. CODE 0 for incorrect answers, unintelligible answers, and no answer. Administer all questions, and do not leave any items uncoded.

C0	CSI-D Memory registration task (No coding needs to be made for this item – this is to register the three words) Say "Now I am going to tell you three words and I would like you to repeat them after me – BOAT, HOUSE, FISH" Repeat this process, up to six times, stopping when all three words are repeated accurately. At this point, or after six trials say "Very good, now try to remember these words because I will be asking you later"			
C1	Point to your elbow, and then ask "What do we call this?"	Correct answer "elbow"	#	ELBOW
C2	What do you do with a hammer?	Correct answer "to drive a nail into something", or similar	#	HAMMER
C3	Where is the local market/local store?	Correct answer – a person can plausibly describe the general location	#	STORE
C4	What day of the week is it?	Correct answer – only the correct day of the week is accepted	#	DAY
C5	What is the season?	Correct answers need to be locally determined	#	SEASON
C6	I am going to ask you to carry out the action so	Both actions must be completed	#	POINT

	please listen carefully because I will only tell you one time - Please point first to the window and then to the door	and in the correct order		
C7	Do you remember the three words I told you a few minutes ago?	Correct answer – BOAT HOUSE FISH (CODE total number of words remembered accurately)	0 1 2 3	WORDDEL
C8	TOTAL COGNITIVE SCORE – SUM ALL OF THE BOXES C1-C7			TCS

OH SYMPTOM ASSESSMENT (OHSA)

Please tick the number on the scale that best rates how severe your symptoms from low blood pressure have been on the average over the past week. You should respond to every symptom (symptoms of your low blood pressure problem will appear either upon standing or after you have been standing for some time, and will usually improve if you sit down or lie down. Some patients even have symptoms when they are sitting which might improve after lying down. Some people have symptoms that improve only after sitting or lying down for quite some time)

If you do not experience the symptom, circle zero (0).

	Dizziness, light-headedness, feeling faint or feeling like you might blackout										
None	1	2	3	4	5	6	7	8	9	10	Worst possible
	Problems with vision (blurring, seeing spots, tunnel vision, etc.)										
None	1	2	3	4	5	6	7	8	9	10	Worst possible
	Weakness										
None	1	2	3	4	5	6	7	8	9	10	Worst possible
	Fatigue										
None	1	2	3	4	5	6	7	8	9	10	Worst possible
	Trouble concentrating										
None	1	2	3	4	5	6	7	8	9	10	Worst possible
	Head and neck discomfort										
None	1	2	3	4	5	6	7	8	9	10	Worst possible

CHECKLIST FOR ACCESSING RISK OF FALLING *(Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling)*		Points	####
I have fallen in the past year.	Yes No	2 0	
I use or have been advised to use a cane or walker to get around safely.	Yes No	2 0	
Sometimes I feel unsteady when I am walking	Yes No	1 0	
I steady myself by holding onto the furniture when walking at home.	Yes No	1 0	
I am worried about falling.	Yes No	1 0	
I need to push with my hands to stand up from a chair.	Yes No	1 0	
I have some trouble stepping up onto a curb.	Yes No	1 0	
I often have to rush to the toilet.	Yes No	1 0	
I have lost some feeling in my feet.	Yes No	1 0	
I take a medicine that sometimes makes me feel light-headed or more tired than usual.	Yes No	1 0	
I take medicine to help me sleep or improve my mood.	Yes	1	

	No	0	
I often feel sad or depressed.	Yes No	1 0	
SCORE			RFL

IV. SECTION 4
PHYSICAL MEASUREMENTS

Height (in Centimetres)					HT
Weight (in Kilograms) if too large, code 666.6					WT
BLOOD PRESSURE - Cuff size used (Small, Normal, Large as 1, 2,3)					CUFF
Supine position (baseline) (lying down)	1ST READING	2ND READING	3RD READING	AVERAGE	
Systolic mmHg					SBP0
Diastolic mmHg					DBP0
Pulse rate (per minute)					PL0
Standing position					
At first minute		Systolic mmHg			SBP1
		Diastolic mmHg			DBP1
At second minute		Systolic mmHg			SBP2
		Diastolic mmHg			DBP2
At third minute		Systolic mmHg			SBP3
		Diastolic mmHg			DBP3
Pulse rate (per minute) At 1 minute					PL1
Pulse rate (per minute) At 2 minute					PL2
Pulse rate (per minute) At 3 minute					PL3
ISOMETRIC HAND GRIP STRENGTH					
Which is your Dominant hand		Right		1	DMH
		Left		0	
	Reading 1 (kg)	Reading 2 (kg)	Reading 3 (kg)	AVERAGE (kg)	
Right hand					HGR
Left hand					HGL
SLOW WALKING SPEED -Gait speed test *Instruction: Lay a five-meter length of string along flat ground free of obstacles, and well lit. If required, the person may use a walking aid, but should not be assisted by another person. Ask the person to walk normally to the end of the string, turn round and walk back again observing the number of steps (you will need to count) and the time taken to perform the task*					
Can the person complete the task?		Cannot complete the task		1	NOGAIT
		Completes the task with a walking aid		2	
		Completes the task without walking the aid		3	
gait speed		Time taken to perform the task			NEO12B
number of steps		Number of steps taken to complete the task			STEPNO

1	Exhaustion- Poor endurance and energy (CES-D) Scale- If the answer was three or more days in the last week to either of these two questions, the respondent was considered as frail for this component)			#####
	During the past week- I felt that everything I did was an effort	Rarely or none of the time (less than 1 day) Some or a little of the time (1-2 days) Occasionally or a moderate amount of time (3-4 days) Most or all of the time (5-7 days)	1 2 3 4	
	During the past week- I could not get going	Rarely or none of the time (less than 1 day) Some or a little of the time (1-2 days) Occasionally or a moderate amount of time (3-4 days) Most or all of the time (5-7 days)	1 2 3 4	
2	Weight loss- Self-reported weight loss assessed using a single item from the Geriatric Mental State (Those reporting weight loss of 4.5 kg or more in the last three months were considered to have this frailty.)			
	"Have you lost any weight in the last one year?"	> 4.5kg <4.5kg	0 1	

ചോദ്യാവലി

ഭാഗം 1

ക്ലസ്റ്റർ			
സ്ഥലം	പഞ്ചായത്ത്-1 / കോർപ്പറേഷൻ-2	##	UR
ഐഡി നമ്പർ	വ്യക്തിഗത കോഡ്		
അഭിമുഖ തീയതി			
നിങ്ങൾക്ക് എത്ര വയസ്സായി? (വ്യക്തിയുടെ പ്രായം, പൂർത്തിയായ വർഷങ്ങളിൽ)			AGE
ലിംഗം	സ്ത്രീ	1	GENDER
	പുരുഷൻ	2	
	ട്രാൻസ്ജെൻഡർ	3	
നിങ്ങൾക്ക് എത്ര സ്കൂൾ വിദ്യാഭ്യാസം ഉണ്ട്?	വിദ്യാഭ്യാസം ഇല്ല (NO FORMAL EDUCATION)	1	EDUC
	പ്രാഥമിക വിദ്യാഭ്യാസം പൂർത്തിയാക്കിയിട്ടില്ല	2	
	പ്രാഥമിക വിദ്യാഭ്യാസം പൂർത്തിയാക്കി (PRIMARY)	3	
	സെക്കൻഡറി (മെട്രിക്കുലേഷൻ) പൂർത്തിയാക്കി	4	
	കോളേജ്	5	
നിങ്ങൾ നിലവിൽ വിവാഹിതയോ/ വിവാഹിതനോ ആണോ?	വിവാഹം കഴിച്ചിട്ടില്ല	1	MARRY
	വിവാഹിതർ/ ഒരുമിച്ച് ജീവിക്കുന്നു(living together)	2	
	വിധവ	3	
	വിവാഹമോചനം / വേർപിരിഞ്ഞത്	4	
നിങ്ങളുടെ പക്കലുള്ള റേഷൻ കാർഡിൻറെ നിറം എന്താണ്? (റേഷൻ കാർഡ് ഉണ്ടെങ്കിൽ അടുത്ത ചോദ്യം സ്കിപ് ചെയ്യുക)	മഞ്ഞ	1	COLOR
	പിങ്ക്	2	
	നീല	3	
	വെള്ള	4	
	റേഷൻ കാർഡ് ഇല്ല	5	
കഴിഞ്ഞ മാസത്തെ മൊത്ത കുടുംബ വരുമാനം (IN RUPEES)			INC
നിങ്ങളുടെ വരുമാനത്തിൻറെ സ്രോതസ് എന്താണ്?	മുഴുവൻ സമയ ജോലി	1	JOB
	പാർട്ട് ടൈം ജോലി	2	
	റിട്ടയേർഡ്-പെൻഷനർ	3	
	റിട്ടയേർഡ് -നോൺ-പെൻഷനർ	4	
	വീട്ടമ്മ(മുഴുവൻ സമയം)	5	
	തൊഴിലില്ലാത്തവർ(ജോലി ചെയ്യാൻ കഴിവുള്ളവർ)	6	
	തൊഴിലില്ലാത്തവർ (NOT ABLE TO WORK)	7	
ഈ വീട്ടിൽ വരുമാനമുള്ള എത്ര അംഗങ്ങൾ നിങ്ങളോടൊപ്പം താമസിക്കുന്നു? (16 വയസോ അതിനുമുകളിലോ)	(ഒറ്റയ്ക്ക് താമസിക്കുന്ന ആളുകൾക്ക് കോഡ് 0, മറ്റെല്ലാവർക്കും കോഡ് 1)	0 1	LIVING
കഴിഞ്ഞ വർഷം നിങ്ങൾക്ക് എത്ര തവണ ആശുപത്രിയിൽ അഡ്മിറ്റ് ആകേണ്ടി വന്നു?	0 1-2 >2	1 2 3	HOSP
ദൈനംദിന ജീവിതത്തിലെ എല്ലാ പ്രവർത്തികളും നിങ്ങൾക്ക് സ്വന്തമായി ചെയ്യാൻ കഴിയുന്നുണ്ടോ? (ഉദാ. ഭക്ഷണം, കുളി, വസ്ത്രധാരണം, മൊബിലിറ്റി, ടോയ്ലറ്റിംഗ്)	ഇല്ല അതെ, **(skip to Q 17)**	0 1	ADL
ആരെങ്കിലും നിങ്ങളെ പരിചരിക്കുന്നുണ്ടോ?	ഒരിക്കലും ഇല്ല, **(skip to Q 17)** ചിലപ്പോൾ എല്ലായ്പ്പോഴും	1 2 3	CARE
ആരാണ് നിങ്ങൾക്ക് പരിചരണം നൽകുന്നത്? (ഓരോ വിഭാഗത്തിലുമുള്ള മുതിർന്ന സഹവാസികളുടെ എണ്ണം കോഡ് ചെയ്യുക)	പങ്കാളി		SPOUSE
	മക്കൾ		SDNO
	മരുമക്കൾ		INLAW
	സഹോദരങ്ങൾ		SIBNO
	മറ്റ് ബന്ധുക്കൾ		OTHREL
	ചങ്ങാതിമാർ		FRNO
	മറ്റുള്ളവർ		OTHNO

ഭാഗം2

ബിഹേവിയറൽ വിവരങ്ങൾ- ടൊബാക്കോ- പുകവലി ഉപയോഗം *(വിവിധ ആരോഗ്യ സ്വഭാവങ്ങളെക്കുറിച്ച് ഇപ്പോൾ ഞാൻ നിങ്ങളോട് ചിലചോദ്യങ്ങൾ ചോദിക്കാൻ പോകുന്നു. പുകവലി, മദ്യപാനം, പഴങ്ങളും പച്ചക്കറികളും അടങ്ങിയഭക്ഷണക്രമം,ശാരീരികപ്രവർത്തനങ്ങൾ എന്നിവ ഇതിൽ ഉൾപ്പെടുന്നു. നമുക്ക് പുകവലിയിൽ നിന്ന് ആരംഭിക്കാം.)*			
1.ബിഡി, സിഗരറ്റ്, സിഗാർ അല്ലെങ്കിൽ പൈപ്പുകൾ, ഹുക്ക അല്ലെങ്കിൽ മറ്റേതെങ്കിലും പ്രാദേശിക പുകയില ഉൽപന്നങ്ങൾ ഉപയോഗിച്ച് നിങ്ങൾ നിലവിൽ പുകവലിക്കുന്നുണ്ടോ?	ഇല്ല അതെ, **(skip to Q 3)**	0 1	SMK
2.മുൻകാലങ്ങളിൽ, നിങ്ങൾ എപ്പോഴെങ്കിലും പുകയില ഉൽപന്നങ്ങളായ ബിഡിസ്, സിഗരറ്റ്, സിഗാർ അല്ലെങ്കിൽ പൈപ്പുകൾ എന്നിവ ഉപയോഗിച്ച് ദിവസവും പുകവലിച്ചിട്ടുണ്ടോ?	ഇല്ല, **(skip to Q 6)** അതെ	0 1	PSMK
3.ശരാശരി, ഓരോ ദിവസവും / ആഴ്ചയിൽ നിങ്ങൾ ഇനിപ്പറയുന്നവയിൽ എത്ര (if ഹുക്കയുടെ എണ്ണം) തവണ പുകവലിക്കുന്നു? *(ഓരോതരത്തിനും റെക്കോർഡുചെയ്യുക), ഉൽപ്പന്നവിഭാഗങ്ങളിൽ ശൂന്യമായി ഇടുന്നതിനുപകരം ഏതെങ്കിലും ഉൽപ്പന്നം ഉപയോഗിക്കുന്നില്ലെങ്കിൽ 88 എന്ന് രേഖപ്പെടുത്തുക. ദിവസേന ഉപയോഗം കുറവാണെങ്കിൽ, ആഴ്ചതോറും റെക്കോർഡുചെയ്യുക)*			
പുകയില ഉൽപ്പന്നം	DAILY	WEEKLY	
ബിഡി			BIDI
കമ്പനി സിഗരറ്റ്			CIG
തെറുത്ത സിഗരറ്റ്			HMCIG
പൈപ്പുകൾ			PIPE
സിഗാർ, ചെറൂട്ട്			CIGAR
ഹുക്ക / ഷിഷ സെഷൻറെ എണ്ണം			HUKAH
മറ്റ് പ്രാദേശിക പുകയില ഉൽപ്പന്നം (വ്യക്തമാക്കുക)			LCL
4.ഏത് പ്രായത്തിലാണ് നിങ്ങൾ പുകവലി തുടങ്ങിയത്?			AGSMK
5.എത്ര കാലം മുമ്പ് നിങ്ങൾ പുകവലി നിർത്തി? *(RELEVANT FOR PREVIOUS SMOKERS ONLY)	മാസം/വർഷം		STSMK
6.നിങ്ങൾ നിലവിൽ നിങ്ങളുടെ വീട്ടിലോ ജോലിസ്ഥലത്തോ വച്ച നിഷ്ക്രിയ പുകവലിക്ക് വിധേയരാകേണ്ടിവരാറുണ്ടോ?	ഇല്ല അതെ	0 1	PASMK
പുകയില്ലാത്ത പുകയില ഉപയോഗം			
7.പുകവലിയല്ലാത്ത പുകയില (ച്യൂയിംഗ് പുകയില, തുയിബു സ്നഫ്, ബീറ്റ്റൂട്ട്, ഗുട്ട്ക, പാൻ മസാല മുതലായവ) നിങ്ങൾ നിലവിൽ ഉപയോഗിക്കുന്നുണ്ടോ?	ഇല്ല അതെ, **(skip to Q 9)**	0 1	SLTB
8.നിങ്ങൾ നിലവിൽ ഉപയോഗിക്കുന്നില്ലെങ്കിൽ, മുമ്പ് പുകവലിയല്ലാത്ത പുകയില ഉൽപന്നങ്ങളായ ച്യൂയിംഗ് പുകയില, തുയിബു, ലഘുഭക്ഷണം, വാതുവയ്പ്പ്, ഗുട്ട്ക മുതലായവ നിങ്ങൾ എപ്പോഴെങ്കിലും ഉപയോഗിച്ചിട്ടുണ്ടോ?	ഇല്ല, **(skip to Q 12)** അതെ	0 1	PSLTB
9.ശരാശരി, നിങ്ങൾ ഒരു ദിവസം എത്ര തവണ ഉപയോഗിക്കുന്നു? (ഓരോതരത്തിനുംറെക്കോർഡ്ചെയ്യുക) *വിഭാഗങ്ങൾശൂന്യമായിവിടുന്നതിനുപകരംഓരോവിഭാഗത്തിലുംഉൽപ്പന്നങ്ങളൊന്നുംഉപയോഗിച്ചിട്ടില്ലെങ്കിൽ77 വ്യക്തമാക്കുക)*			
പുകയില്ലാത്ത പുകയില ഉൽപ്പന്നം	DAILY	WEEKLY	
ചവയ്ക്കുന്ന പുകയില			CHEW
പുകയില ഉപയോഗിച്ച് പാൻ			PAN
തുയിബു, പുകയില സ്നഫ്, വായകൊണ്ട്			TAMBK
സ്നഫ്, മൂക്കിനാൽ			SNIFF
മറ്റുള്ളവ (വ്യക്തമാക്കുക)			XTRA
10.ഏത് പ്രായത്തിലാണ് നിങ്ങൾ പുകയില്ലാത്ത പുകയില ഉൽപ്പന്നങ്ങൾ ഉപയോഗിക്കാൻ തുടങ്ങിയത്?			ASLTB
11.എത്ര കാലം മുമ്പ് നിങ്ങൾ ഉപയോഗം നിർത്തി? *(RELEVANT FOR PREVIOUS USERS ONLY)	മാസം/ വർഷം		SSLTB
മദ്യത്തിൻറെ ഉപയോഗം			
12.നിങ്ങൾ എപ്പോഴെങ്കിലും ഏതെങ്കിലും മദ്യ ഉൽപ്പന്നങ്ങൾ (ബിയർ, വിസ്കി, റം, ജിൻ, ബ്രാണ്ടി, വൈൻ, കള്ള് അല്ലെങ്കിൽ വാറ്റ് മുതലായവ) കഴിച്ചിട്ടുണ്ടോ?	ഇല്ല, **(skip to Q 17)** അതെ	0 1	ALC

13.കഴിഞ്ഞ 12 മാസത്തിനിടെ, നിങ്ങൾ എത്ര തവണ മദ്യം കഴിച്ചു? ഒരിക്കലും ഇല്ല, - 1 **(skip to Q 16)** മാസത്തിൽ ഒരിക്കലോ അതിൽ കുറവോ - 2 മാസത്തിൽ 2 മുതൽ 4 - 3 ആഴ്ചയിൽ 2 TO 3 - 4 ആഴ്ചയിൽ 4 OR MORE - 5			PALC
14.നിങ്ങൾ കുടിക്കുന്ന ഒരു ദിവസം സാധാരണ എത്ര പെഗ് മദ്യം കഴിക്കും?			PGALC
15.ഏത് പ്രായത്തിലാണ് നിങ്ങൾ മദ്യം ഉപയോഗിക്കാൻ തുടങ്ങിയത്?			AGALC
16.കഴിഞ്ഞ 12 മാസത്തിനുള്ളിൽ മദ്യം കഴിച്ചിട്ടില്ലെങ്കിൽ എത്ര കാലം മുമ്പ് നിങ്ങൾ മദ്യത്തിൻറെ ഉപയോഗം നിർത്തി?	മാസം/ വർഷം		PRALC

ശാരീരിക പ്രവർത്തനങ്ങൾ-

(അടുത്തതായി,ഒരുസാധാരണആഴ്ചയിൽവ്യത്യസ്തതരത്തിലുള്ളശാരീരികപ്രവർത്തനങ്ങൾചെയ്യാൻനിങ്ങൾചെല വഴിക്കുന്നസമയത്തെക്കുറിച്ച്ഞാൻനിങ്ങളോട്ചോദിക്കാൻപോകുന്നു)

തീവ്രമായ പ്രവർത്തനങ്ങൾ' കഠിനമായ ശാരീരിക പരിശ്രമം ആവശ്യമുള്ളതും ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ വലിയ വർദ്ധനവിന് കാരണമാകുന്ന പ്രവർത്തനങ്ങൾ ആണ്,
മിതമായ ശാരീരിക പരിശ്രമം ആവശ്യമുള്ളതും ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ ചെറിയ വർദ്ധനവിന് കാരണമാകുന്ന പ്രവർത്തനങ്ങളാണ് 'മിതമായ പ്രവർത്തനങ്ങൾ'.)

(ആവശ്യമുള്ളിടത്ത്ഷോകാർഡ്ഉപയോഗിക്കുക, ആവശ്യമെങ്കിൽമറ്റ്ഉദാഹരണങ്ങൾചേർക്കുക).

ജോലിസ്ഥലത്തെ പ്രവർത്തനങ്ങൾ			
17.കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും തുടർച്ചയായി (ഹെവി ലിഫ്റ്റിംഗ്, കുഴിക്കൽ അല്ലെങ്കിൽ മറ്റ് ജോലികൾ) ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ വലിയ വർദ്ധനവിന് കാരണമാകുന്ന തീവ്രമായ പ്രവർത്തനങ്ങൾ നിങ്ങളുടെ ജോലിയിൽ ഉൾപ്പെടുന്നുണ്ടോ?	ഇല്ല, **(skip to Q 20)** അതെ	0 1	P1
18.ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങളുടെ ജോലിയുടെ ഭാഗമായി എത്ര ദിവസം നിങ്ങൾ തീവ്രമായ പ്രവർത്തനങ്ങൾ ചെയ്യുന്നു?	ആഴ്ചയിൽ എത്ര ദിവസങ്ങൾ		P2
19.ഒരു സാധാരണ ദിവസത്തിൽ, ജോലിസ്ഥലത്ത് തീവ്രമായ പ്രവർത്തനങ്ങൾ ചെയ്യുന്നതിനായി നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂറിലും/ മിനിറ്റിലും		P3(a -b)
20.കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും തുടർച്ചയായി ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ ചെറിയ വർദ്ധനവിന് കാരണമാകുന്ന മിതമായ പ്രവർത്തനങ്ങൾ നിങ്ങളുടെ ജോലിയിൽ ഉൾപ്പെടുന്നുണ്ടോ?	ഇല്ല, **(skip to Q 23)** അതെ	0 1	P4
21.ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങളുടെ ജോലിയുടെ ഭാഗമായി എത്ര ദിവസങ്ങളിൽ നിങ്ങൾ മിതമായ പ്രവർത്തനങ്ങൾ ചെയ്യുന്നു?	ആഴ്ചയിൽ എത്ര ദിവസങ്ങൾ		P5
22.ഒരു സാധാരണ ദിവസത്തിൽ, ജോലിസ്ഥലത്ത് മിതമായ പ്രവർത്തനങ്ങൾക്കായി നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂറിലും/ മിനിറ്റിലും		P6(a -b)
ഗതാഗത പ്രവർത്തനങ്ങൾ *(അടുത്തചോദ്യങ്ങൾനിങ്ങൾസാധാരണസ്ഥലങ്ങളിലേക്ക്യാത്രചെയ്യുന്നരീതികളെക്കുറിച്ച്ചോദിക്കാൻആഗ്രഹിക്കുന്നു. ഉദാഹരണത്തിന്ജോലി, ഷോപ്പിംഗ്, മാർക്കറ്റ്, ആരാധനാലയം.)*			
23.യാത്രാവശ്യങ്ങൾക്കായി കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും നിങ്ങൾ തുടർച്ചയായി സൈക്കിൾ ചവിട്ടുകയോ നടക്കുകയോ ചെയ്യാറുണ്ടോ?	ഇല്ല, **(skip to Q 26)** അതെ	0 1	P7
24.ഒരു സാധാരണ ആഴ്ചയിൽ, എത്ര ദിവസം തുടർച്ചയായി 10 മിനിറ്റെങ്കിലും നിങ്ങൾ യാത്രാവശ്യങ്ങൾക്കായി സൈക്കിൾ ചവിട്ടുകയോ നടക്കുകയോ ചെയ്യാറുണ്ട്?	ദിവസങ്ങളുടെ എണ്ണം		P8
25.ഒരു സാധാരണ ദിവസത്തിൽ, നിങ്ങൾ നടക്കാനോ സൈക്കിൾ ചവിട്ടാനോ എത്ര സമയം ചെലവഴിക്കും?	മണിക്കൂറിലും/ മിനിറ്റിലും		P9(a -b)
വിനോദ പ്രവർത്തനങ്ങൾ അടുത്തതായി സ്പോർട്സ്, ഫിറ്റ്നസ്, വിനോദ പ്രവർത്തനങ്ങൾ (ഒഴിവുസമയങ്ങൾ) എന്നിവയെക്കുറിച്ച്ഞാൻനിങ്ങളോട്ചോദിക്കാൻആഗ്രഹിക്കുന്നു.			
26.കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും തുടർച്ചയായി ഓട്ടം പോലുള്ള, ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ വലിയ വർദ്ധനവിന് കാരണമാകുന്ന തീവ്രമായ സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (ഒഴിവുസമയ) പ്രവർത്തനങ്ങൾ നിങ്ങൾ ചെയ്യുന്നുണ്ടോ?	If yes,----days/week &------hour:--- minutes/day ഇല്ല, **(skip to Q 29)** അതെ	0 1	P10
27ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങൾ എത്ര ദിവസങ്ങളിൽ തീവ്രമായ സ്പോർട്സ്, ഫിറ്റ്നെസ് or വിനോദ/ഒഴിവുസമയ പ്രവർത്തനങ്ങൾ ചെയ്യുന്നു?	ദിവസങ്ങളുടെ എണ്ണം		P11

28. ഒരു സാധാരണ ദിവസം തീവ്രമായ കായിക വിനോദങ്ങൾ, ശാരീരികക്ഷമത അല്ലെങ്കിൽ വിനോദ പ്രവർത്തനനങ്ങൾക്കായി നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂർ: മിനിറ്റ്		P12(a-b)
29.കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും തുടർച്ചയായി ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ ചെറിയ വർദ്ധനവിന് കാരണമാകുന്ന മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (ഒഴിവുസമയ) പ്രവർത്തനങ്ങൾ നിങ്ങൾ ചെയ്യുന്നുണ്ടോ?	ഇല്ല, **(skip to Q 32)** അതെ If yes,---- days/week &------ hour:---minutes/day	0 1	P13
30.ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങൾ എത്ര ദിവസങ്ങളിൽ മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (ഒഴിവുസമയ) പ്രവർത്തനങ്ങൾ ചെയ്യുന്നു?	ദിവസങ്ങളുടെ എണ്ണം		P14
31.ഒരു സാധാരണ ദിവസത്തിൽ മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (വിനോദം) പ്രവർത്തനങ്ങൾക്കായി നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂർ: മിനിറ്റ്		P15(a-b)
ഉദാസീനമായ പെരുമാറ്റം *(ഇനിപ്പറയുന്ന ചോദ്യം ജോലിസ്ഥലത്ത്, വീട്ടിൽ, യാത്രക്കിടയിൽ, അല്ലെങ്കിൽ സുഹൃത്തുക്കൾക്കൊപ്പം ചിലവഴിക്കുന്ന സമയത്തെ ക്കുറിച്ചാണ് [ഡെസ്കിൽ ഇരിക്കുക, സുഹൃത്തുക്കളോടൊപ്പം ഇരിക്കുക, കാർ, ബസ്, ട്രെയിൻ, വായന, കാർഡുകൾ കളിക്കുക അല്ലെങ്കിൽ ടെലിവിഷൻ കാണുക], എന്നാൽ ഉറങ്ങാൻ ചെലവഴിച്ച സമയം ഉൾപ്പെടുത്തരുത്)*			
32.സാധാരണയായി ഒരു ദിവസം നിങ്ങൾ ഇരിക്കാനോ ചാരിയിരിക്കാനോ വേണ്ടി എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂർ: മിനിറ്റ്	## ##	P16(a-b)
ഡയറ്റ്			
ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങൾ എത്ര ദിവസം പഴവർഗങ്ങൾ കഴിക്കുന്നു?	NO OF DAYS		WF RT
ആ ദിവസങ്ങളിൽ നിങ്ങൾ എത്ര പഴവർഗ്ഗങ്ങൾ കഴിക്കുന്നു?	NO OF SERVINGS		FRT S
ഒരു സാധാരണ ആഴ്ചയിൽ, നിങ്ങൾ എത്ര ദിവസം പച്ചക്കറി കഴിക്കുന്നു?	NO OF DAYS		WV EG
ആ ദിവസങ്ങളിൽ നിങ്ങൾ എത്ര പച്ചക്കറികൾ കഴിക്കുന്നു?	NO OF SERVINGS		VEG S
അരിപാചകം ചെയ്യുമ്പോഴോ ചോറ് വിളമ്പുമ്പോഴോ ഉപ്പ് ചേർക്കാറുണ്ടോ?	ഇല്ല അതെ	0 1	SAL T
ഇനിപ്പറയുന്നവയിൽ ഓരോന്നും നിങ്ങൾ എത്ര തവണ കഴിക്കാറുണ്ട് *(പ്രതിദിനം - 1; ആഴ്ചയിൽ കുറഞ്ഞത് ഒരു തവണ - 2; ഒരു മാസത്തിൽ ഒരു തവണ -3; സാധാരണ അല്ലെങ്കിൽ അപൂർവ്വം - 4; ഒരിക്കലും - 5)*			
ചുവന്ന മാംസം			RM
മുട്ട			EGG
ചിക്കൻ			CHI CK
Fish മത്സ്യം			FIS H
ഉണക്ക മീൻ/ കരുവാഡ്			SAL T
അച്ചാർ			PIC KL
പർപ്പിടകം			PAP PD

ഭാഗം3

മോർബിഡിറ്റികളും ചികിത്സാ ചരിത്രവും (സ്വയം റിപ്പോർട്ട് ചെയ്യുന്നത്) CODE- NO = O AND YES = 1, if you have problem. പ്രായനിരയിൽപ്രായംഎഴുതുക, ബന്ധപ്പെട്ടനിരയിൽകുറിപ്പടിമരുന്നുകൾഎഴുതുക, അറിയാത്തതോപ്രതികരിക്കാൻആഗ്രഹിക്കാത്തതോപ്രസക്തമല്ലാത്തതോ ആയത് കാലി ഇടുക, ഹൃദയാഘാതം പങ്കെടുക്കുന്നവർക്ക് എപ്പോഴെങ്കിലും ഉണ്ടായിട്ടുണ്ടെങ്കിൽ രോഗമുണ്ട് എന്ന് റിപ്പോർട്ട് ചെയ്യണം)

രോഗാവസ്ഥ	നിങ്ങൾക്ക് ഈ രോഗാവസ്ഥ ഉണ്ടോ?	രോഗാവസ്ഥ കണ്ടെത്തിയ പ്രായം	കുറിപ്പടി മരുന്നുകൾ ഏതെല്ലാം	
പ്രമേഹം				CM1

സ്ട്രോക്ക്/പക്ഷാഘാതം				CM2
രക്തസമ്മർദ്ദം				CM3
ഹൃദയാഘാതം				CM4
മറ്റ് ഹൃദ്രോഗങ്ങൾ				CM5
ശ്വാസകോശരോഗങ്ങൾ (COPD)				CM6
വിട്ടുമാറാത്ത വൃക്കരോഗം (CKD)				CM7
സന്ധിവാതം				CM8
കൊളസ്ട്രോൾ				CM9
യൂറിനറി ഇൻകോണ്ടിനെൻസ്				CM10
തിമിരം അല്ലെങ്കിൽ കാഴ്ചക്കുറവ്				CM11
ബധിരത				CM12
മറ്റുള്ളവ ..				OCM
രോഗാവസ്ഥകളുടെ ആകെ എണ്ണം				TCM

കോഗ്നിറ്റീവ് അസസ്സ്മെൻറ്- സിഎസ് ഐ-ഡി (ഓർമ്മ പരീക്ഷിക്കൽ)

ശാന്തമായ ഒരു സ്ഥലത്ത് വച്ചേ ഈ പരിശോധന നടത്താവൂ, സാധ്യമെങ്കിൽ പ്രായമായ വ്യക്തിയുമായി മാത്രം. അവർ നിങ്ങളെ ശ്രദ്ധിക്കുന്നുണ്ടെന്ന് ഉറപ്പുവരുത്തുക, ഒപ്പം പറയുന്നത് അവർക്ക് കേൾക്കാൻ തക്കവണ്ണം വ്യക്തമായി സംസാരിക്കണം. ചോദ്യങ്ങൾ എഴുതിയതുപോലെ കൃത്യമായി ചോദിക്കുക. ശരിയായ ഉത്തരങ്ങൾക്കായി കോഡ് **1.** *തെറ്റായ ഉത്തരങ്ങൾ, മനസിലാക്കാൻ കഴിയാത്ത ഉത്തരങ്ങൾ, ഉത്തരം പറഞ്ഞില്ലെങ്കിൽ* കോഡ് **0.**

C0	മെമ്മറി രജിസ്ട്രേഷൻ ടാസ്ക്- (ഈ ഇനത്തിനായി കോഡിംഗ് ആവശ്യമില്ല - ഇത് മൂന്ന് പദങ്ങൾ രജിസ്റ്റർ ചെയ്യുന്നതിനാണ്) അവരോട് പറയുക "ഇപ്പോൾ ഞാൻ നിങ്ങളോട് മൂന്ന് വാക്കുകൾ പറയാൻ പോകുന്നു, അവ ഞാൻ പറഞ്ഞതിന് പിന്നാലെ നിങ്ങൾ ആവർത്തിക്കണം - '**ബോട്ട്, വീട്, മത്സ്യം**' മൂന്ന് വാക്കുകളും കൃത്യമായി ആറ് തവണ വരെ ആവർത്തിക്കുക അവർ കൃത്യമായി ആവർത്തിക്കുമ്പോൾ നിർത്തുക. ഈ സമയത്ത്, അല്ലെങ്കിൽ ആറ് പരീക്ഷണങ്ങൾക്ക് ശേഷം അവരോട് പറയുക "വളരെ നല്ലത്, ഇപ്പോൾ ഈ വാക്കുകൾ ഓർമിച്ചുവയ്ക്കാൻ ശ്രമിക്കുക, കാരണം ഞാൻ ഇത് പിന്നീട് നിങ്ങളോട് ചോദിക്കും"			
C1	നിങ്ങളുടെ കൈമുട്ടിലേക്ക് വിരൽ ചൂണ്ടുക, എന്നിട്ട് ചോദിക്കുക "നമ്മൾ ഇതിനെ എന്താണ് വിളിക്കുന്നത്?"	ശരിയായ ഉത്തരം "കൈമുട്ട്"		ELBOW
C2	നിങ്ങൾ ഒരു ചുറ്റിക ഉപയോഗിച്ച് എന്താണ് ചെയ്യുക?	ശരിയായ ഉത്തരം "ആണി അടിക്കും" അല്ലെങ്കിൽ സമാനമായത് ചെയ്യും		HAMMER
C3	ഇവിടുത്തെ പ്രാദേശിക മാർക്കറ്റ് / പ്രാദേശിക സ്റ്റോർ എവിടെയാണ്?	ശരിയായ ഉത്തരം - ഒരു വ്യക്തിക്ക് വ്യക്തമായി സ്ഥാനം വിവരിക്കാൻ കഴിയണം		STORE
C4	ഇന്ന് ആഴ്ചയിലെ ഏത് ദിവസമാണ്?	ശരിയായ ഉത്തരം- ആഴ്ചയിലെ ശരിയായ ദിവസം മാത്രമേ സ്വീകരിക്കുകയുള്ളൂ		DAY
C5	ഇത് ഏത് സീസൺ ആണ്?	ശരിയായ ഉത്തരങ്ങൾ പ്രാദേശികമായി നിർണ്ണയിക്കേണ്ടതുണ്ട്		SEASON
C6	ഞാൻ നിങ്ങളോട് ഒരു കാര്യം	രണ്ട് പ്രവർത്തനങ്ങളും		POINT

	ചെയ്യാൻ ആവശ്യപ്പെടാൻ പോകുന്നു ആയതിനാൽ ദയവായി ശ്രദ്ധിക്കൂ, കാരണം ഇത് ഞാൻ നിങ്ങളോട് ഒരു തവണ മാത്രമേ പറയൂ - ആദ്യം ജന്നലില്ലേക്ക് തുടർന്ന് വാതിലിലേക്കും വിരൽ ചൂണ്ടുക	ശരിയായ ക്രമത്തിൽ പൂർത്തിയാക്കണം		
C7	കുറച്ച് സമയം മുമ്പ് ഞാൻ നിങ്ങളോട് പറഞ്ഞ മൂന്ന് വാക്കുകൾ ഓർക്കുന്നുണ്ടോ? കൃത്യമായി ഓർമ്മിക്കുന്നു വാക്കുകളുടെ എണ്ണം കോഡ് ചെയ്യുക	ശരി ഉത്തരം ബോട്ട്, വീട്, മത്സ്യം	0 1 2 3	WORDDEL
C8	ആകെ സംയോജിത സ്കോർ – എല്ലാ ബോക്സുകളുംC1-C7			TCS

ഓർത്തോസ്റ്റാറ്റിക് ഹൈപോറ്റെൻഷൻ സിംപ്റ്റൻ അസ്സെസ്സ്മെന്റ് (OHSA)

(കഴിഞ്ഞ ഒരാഴ്ചയായി ശരാശരി കുറഞ്ഞ രക്തസമ്മർദ്ദത്തിൽ ലക്ഷണങ്ങൾ എത്രത്തോളം കഠിനമാണെന്ന് സ്കെയിലിൽ നമ്പർ ടിക്ക്ചെയ്യുക. എല്ലാലക്ഷണങ്ങളോടും നിങ്ങൾ പ്രതികരിക്കണം (നിങ്ങളുടെ താഴ്ന്നരക്തസമ്മർദ്ദപ്രശ്നത്തിന്റെലക്ഷണങ്ങൾ നിൽക്കുമ്പോഴോ അല്ലെങ്കിൽ കുറച്ച്സ മയമായിനിന്നശേഷമോ പ്രത്യക്ഷപ്പെടും, നിങ്ങൾ ഇരിക്കുകയോകിടക്കുകയോ ചെയ്താൽ സാധാരണയായി മെച്ചപ്പെടും. ചില രോഗികൾക്ക് ഇരിക്കുമ്പോൾ പോലുംരോഗലക്ഷണങ്ങൾ കാണാം കിടന്നതിനുശേഷം ഇത്തെച്ചപ്പെട്ടേക്കാം. കുറച്ച് ആളുകൾക്ക് ഇരുന്നതിനുശേഷമോ കിടന്നതിനുശേഷമോ മെച്ചപ്പെടുന്ന ലക്ഷണങ്ങളുണ്ട്)

നിങ്ങൾക്ക് രോഗലക്ഷണം അനുഭവപ്പെടുന്നില്ലെങ്കിൽ, സർക്കിൾപൂജ്യം (0).

Dizziness, light-headedness, feeling faint or feeling like you might blackout തലചുറ്റൽ, തലയ്ക്ക് ഭാരക്കുറവ്, ബോധക്ഷയം												OHSA1
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	
Problems with vision (blurring, seeing spots, tunnel vision, etc.) കാഴ്ചയിലെ പ്രശ്നങ്ങൾ (കാഴ്ച മങ്ങുക, പാടുകൾ കാണുക, തുരങ്ക ദർശനം/ തുരങ്ക വീക്ഷണം)												OHSA2
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	
Weakness ബലക്കുറവ്												OHSA3
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	
Fatigue ക്ഷീണം												OHSA4
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	
Trouble concentrating ശ്രദ്ധ കേന്ദ്രീകരിക്കുന്നതിൽ പ്രശ്നം												OHSA5
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	
Head and neck discomfort തലയ്ക്കും കഴുത്തിനും അസ്വസ്ഥത												OHSA6
ഇല്ല	1	2	3	4	5	6	7	8	9	10	ഏറ്റവും മോശം അവസ്ഥ	

വീഴാനുള്ള സാധ്യത തിരിച്ചറിയാനുള്ള ചെക്ക്ലിസ്റ്റ് *(ഓരോ "അതെ" ഉത്തരത്തിനും പോയിന്റുകളുടെ എണ്ണം ചേർക്കുക. നിങ്ങൾ 4 പോയിന്റ്റോ അതിൽ കൂടുതലോ നേടിയിട്ടുണ്ടെങ്കിൽ, വീഴാനുള്ള സാധ്യതയുണ്ട്)*		POINTS	
കഴിഞ്ഞ ഒരു വർഷത്തിൽ ഞാൻ വീണിരുന്നു	അതെ ഇല്ല	2 0	

സുരക്ഷിതമായി നടക്കാൻ ഒരു വടിയോ വാക്കറോ ഉപയോഗിക്കുണ്ട് അഥവാ എന്നോട് വടിയോ വാക്കറോ ഉപയോഗിക്കാൻ നിർദ്ദേശിച്ചിട്ടുണ്ട്.	അതെ ഇല്ല	20	
നടക്കുമ്പോൾ ചിലപ്പോൾ എനിക്ക് ബലക്കുറവ് (അസ്ഥിരത) അനുഭവപ്പെടും	അതെ ഇല്ല	10	
വീടിനുള്ളിൽ നടക്കുമ്പോൾ ഫർണിച്ചറുകൾ മുറുകെ പിടിച്ച് ഞാൻ എന്നെത്തന്നെ ബലപ്പെടുത്തുന്നു (സ്ഥിരമാക്കുന്നു)	അതെ ഇല്ല	10	
വീഴുന്നതിനെക്കുറിച്ച് ഞാൻ വേവലാതിപ്പെടുന്നു	അതെ ഇല്ല	10	
ഒരു കസേരയിൽ നിന്ന് എഴുന്നേൽക്കാൻ എനിക്ക് കൈകൊണ്ട് തള്ളേണ്ടതായിട്ടുണ്ട്	അതെ ഇല്ല	10	
ഒരു തിട്ടയുടെ (പടി/തട /നിയന്ത്രണം) മുകളിലേക്ക് കയറാൻ എനിക്ക് ചെറിയ ബുദ്ധിമുട്ടുണ്ട്.	അതെ ഇല്ല	10	
എനിക്ക് പലപ്പോഴും ടോയ്‌ലറ്റിലേക്ക് ഓടേണ്ടി (പെട്ടന്ന് പോകേണ്ടി) വരും	അതെ ഇല്ല	10	
എൻറെ കാലിൽ കുറച്ച് സംവേദനം നഷ്ടപ്പെട്ടു	അതെ ഇല്ല	10	
ഞാൻ കഴിക്കുന്ന മരുന്ന് ചിലപ്പോ തലയ്ക്ക് ഭാരക്കുറവോ പതിവിലും കൂടുതൽ ക്ഷീണമോ തോന്നിപ്പിക്കുന്നു	അതെ ഇല്ല	10	
ഉറങ്ങാനോ മാനസികാവസ്ഥ മെച്ചപ്പെടുത്താനോ ഞാൻ മരുന്ന് കഴിക്കുന്നു	അതെ ഇല്ല	10	
എനിക്ക് മിക്കപ്പോഴും സങ്കടമോ വിഷാദമോ തോന്നാറുണ്ട്.	അതെ ഇല്ല	10	
സ്കോർ			RFL

ഭാഗം4

ശാരീരിക അളവുകൾ

ഉയരം (സെന്റിമീറ്ററിൽ)					HT
ഭാരം (കിലോഗ്രാമിൽ)					WT
രക്തസമ്മർദ്ദം അളവുകൾ - ഉപയോഗിച്ച കഫ് വലുപ്പം (ചെറുത് 1, സാധാരണ 2, വലുത് 3)					CUFF
സുപൈൻ പൊസിഷൻ (lying down)	1ST READING	2ND READING	3RD READING	AVERAGE	
സിസ്റ്റോളിക്ക് mmHg					SBP0
ഡയസ്റ്റോളിക്ക് mmHg					DBP0
പൾസ് നിരക്ക് (മിനിറ്റിൽ)					PL0
നിൽക്കുന്ന പൊസിഷൻ Standing position					
ഒന്നാം മിനിറ്റിൽ		സിസ്റ്റോളിക്ക് mmHg			SBP1
		ഡയസ്റ്റോളിക്ക് mmHg			DBP1
രണ്ടാം മിനിറ്റിൽ		സിസ്റ്റോളിക്ക് mmHg			SBP2
		ഡയസ്റ്റോളിക്ക് mmHg			DBP2
മൂന്നാം മിനിറ്റിൽ		സിസ്റ്റോളിക്ക് mmHg			SBP3

		ഡയസ്റ്റോളിക്ക് mmHg			DBP3
പൾസ് നിരക്ക് (മിനിറ്റിൽ) At 1 മിനിറ്റിൽ					PL1
പൾസ് നിരക്ക് (മിനിറ്റിൽ) At 2 മിനിറ്റിൽ					PL2
പൾസ് നിരക്ക് (മിനിറ്റിൽ) At 3 മിനിറ്റിൽ					PL3
ഐസോമെട്രിക് ഹാൻഡ്ഗ്രിപ്പ് സ്ട്രെങ്ത്					
ഏതാണ് നിങ്ങളുടെ ആധിപത്യ കൈ		വലത്		1	DMH
		ഇടത്		0	
	Reading 1 (kg)	Reading 2 (kg)	Reading 3 (kg)	AVERAGE (kg)	
വലതു കൈ					HGR
ഇടത് കൈ					HGL

സ്ലോ വാക്കിംഗ് സ്പീഡ് -ഗെയിറ്റ് സ്പീഡ് ടെസ്റ്റ് *(നിർദ്ദേശം: നല്ല വെളിച്ചം ഉള്ള തടസങ്ങളിലാത്ത പരന്ന നിലത്ത് അഞ്ച് മീറ്റർ നീളമുള്ള ഒരു വള്ളി ഇടുക. ആവശ്യമെങ്കിൽ, വാക്കിങ് എയ്ഡ് ഉപയോഗിക്കാം, പക്ഷേ മറ്റൊരു വ്യക്തി സഹായിക്കാൻ പാടില്ല. വ്യക്തിയോട് വള്ളിയുടെ അവസാനം വരെ സാധാരണ രീതിയിൽ നടക്കാൻ ആവശ്യപ്പെടുക, എന്നിട്ട് തിരിഞ്ഞ് വീണ്ടും നടക്കാൻ പറയുക, കാൽചുവടുകളുടെ എണ്ണവും അതിന് എടുത്ത സമയവും നിരീക്ഷിക്കുക)*

വ്യക്തിക്ക് ടാസ്ക് പൂർത്തിയാക്കാൻ കഴിയുമോ?	ടാസ്ക് പൂർത്തിയാക്കാൻ കഴിയില്ല	1	NOGAIT
	ഒരു വാക്കിംഗ് എയ്ഡ് ഉപയോഗിച്ച് ടാസ്ക് പൂർത്തിയാക്കുന്നു	2	
	വാക്കിംഗ് എയ്ഡ് ഇല്ലാതെ ടാസ്ക് പൂർത്തിയാക്കുന്നു	3	
നടത്തയുടെ വേഗത	ടാസ്ക് തീർക്കാൻ എടുത്ത സമയം		NEO12B
കാൽചുവടുകളുടെ എണ്ണം	ടാസ്ക് തീർക്കാൻ എടുത്ത സ്റ്റെപ്പുകളുടെ എണ്ണം		STEPNO

ക്ഷീണം- മോശം സഹിഷ്ണുതയും ഊർജവും (CES-D) Scale ഈരണ്ട് ചോദ്യങ്ങളിൽഏതെങ്കിലുംഒന്നിന് ഉത്തരംകഴിഞ്ഞആഴ്ചയിൽമൂന്നോഅതിലധികമോദിവസമായിരുന്നുവെങ്കിൽ, പ്രതികരിക്കുന്നയാളെഈഘടകത്തിന്ദുർബലനായികണക്കാക്കുന്നു)			
കഴിഞ്ഞ ആഴ്ചയിൽ- ഞാൻ ചെയ്തത് എല്ലാം ഒരു പരിശ്രമം ആയിട്ട് എനിക്ക് തോന്നി (I felt that everything I did was an effort)	അപൂർവ്വമായി അല്ലെങ്കിൽ ഒരിക്കലും ഇല്ല (1 ദിവസത്തിൽ കുറവ്) (Rarely) കുറച്ച് അല്ലെങ്കിൽ കുറച്ച് സമയം (1-2 ദിവസം) ഇടയ്ക്കിടെ അല്ലെങ്കിൽ മിതമായ സമയം (3-4 ദിവസം) എല്ലാ സമയവും (5-7 ദിവസം)	1 2 3 4	CESD 1
കഴിഞ്ഞ ആഴ്ചയിൽ - എനിക്ക് അങ്ങോട്ട് മുന്നോട്ട് പോകാൻ കഴിയുന്നില്ലായിരുന്നു (I could not get going)	അപൂർവ്വമായി അല്ലെങ്കിൽ ഒരിക്കലും ഇല്ല (1 ദിവസത്തിൽ കുറവ്) കുറച്ച് അല്ലെങ്കിൽ കുറച്ച് സമയം (1-2 ദിവസം) ഇടയ്ക്കിടെ അല്ലെങ്കിൽ മിതമായ സമയം (3-4 ദിവസം) എല്ലാ സമയവും (5-7 ദിവസം)	1 2 3 4	CESD 2
ശരീരഭാരം - കഴിഞ്ഞ ഒരു വർഷത്തിനുള്ളിൽ നിങ്ങൾക്ക് ഭാരം കുറഞ്ഞിരുന്നോ?	< 4.5kg > 4.5kg	0 1	WTLOS

Participant Information Sheet

Sir/ Madam,

Namaskaram, I am Akhil.S, studying for Masters of Public Health (MPH) at Achutha Menon Centre for Health Sciences Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum. I am planning to conduct a research titled 'Prevalence of Orthostatic Hypotension among community-dwelling elderly aged 60 and above in Thiruvananthapuram district.' as a part of the course requirement for postgraduate studies (Masters of Public Health). This consent form may contain terms and information that you do not understand. Please ask me if any words or information is not clearly understood by you.

Purpose of the study

There is a growing concern about the increase in injuries due to falling in our country among the elderly. One such risk factor for fall is orthostatic hypotension in the elderly. People who are at high risk of fall have to be identified. This study is done to find the prevalence of orthostatic hypotension in the elderly in our community setting.

Procedure

The survey would take approximately 50-60 minutes of your valuable time. You will be asked questions in private. Questions will be related to behaviours like smoking/chewing tobacco, drinking alcohol, diet, physical activities. Questions inquiring about the history of diabetes, hypertension and previous illness will be asked. Height, weight, blood pressure and handgrip strength will be measured using instruments. The collected data will be used for research purpose only.

Why have you been invited

You are invited for this study since you full fill the inclusion criteria defined for this survey. Your ward was selected randomly by a lottery system.

Voluntary participation

Your participation in this study is purely voluntary, which means you can decide whether to participate or not. If at any stage you wish to discontinue, you are free to do so without any adverse consequences.

Possible disadvantages and risks of taking part

Participation in the study poses no risk to your health and well-being. One of the rare risks may be a loss of confidentiality. We have taken measures to minimize the risks. You would be asked questions which you may find personal, such as questions about your behaviour and lifestyle and questions about morbidity (diseased condition) which you may find stressful. You may get exhausted while trying to answer the questionnaire or in compliance with taking physical measurements and may require a break in between while participating.

Possible benefits of taking part

There may not be any direct benefit to you from this study other than knowing your blood pressure, height and weight. The information we get from the study will help to increase the understanding of the prevalence of orthostatic hypotension in the elderly. This understanding may help others in the future.

Cost and financial benefit

There will be no costs to you for participating in this study. And you will not be paid for your participation in this study.

Confidentiality

You will be interviewed in private. All information related to you will be kept confidential and at no stage, your identity will be revealed. A respondent identification number (RIN) will be assigned to each participant that will help in maintaining the confidentiality of the data collected. Access to this number will be restricted to those analysing the data only. Participant confidentiality will be safeguarded during and after the study. The study data will be stored for a period of 3 years from the date of data collection.

Results of the research study

The final thesis report will be submitted for the fulfilment of the requirements of the MPH degree. The conclusions emerging from the study will be presented to experts in the field for comments and to initiate further research. The findings will be shared with the health department for implementing new actions and policy changes. The thesis will be published in Dspace sctimst. The findings may get published as a working paper and presented in scientific conferences and may be shared in appropriate scientific journals.

Contact information

If you have any research-related questions you may contact me or if you have any ethics-related questions or you would like to verify my credentials, you may contact me or a member of our institute's ethics committee at the following address

Akhil.S	Dr Mala Ramanathan
MPH 2018	Member Secretary, Institutional Ethics Committee
AMCHSS, SCTIMST, TRIVANDRUM-695011	AMCHSS, SCTIMST, TRIVANDRUM
Mobile: 7907480675	Office: 2524234
Email: crsanair@gmail.com	Email: iec.mem.sec@sctimst.ac.in

CONSENT FORM

I have read/been read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered satisfactorily. By signing the consent form, I indicate that I understand what will be expected of me and that I am willing to participate in this study. I understand that participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that my identity will not be disclosed. Further information will not be released to third parties or published. I have been informed who should be contacted if the need arises. I have been given a copy of the information sheet for my reference.

Participant's name

Participant's signature/ thumb impression

Date

Interviewer's name

Interviewer's signature

Date

വിവരണ പത്രിക

(പഠനത്തിൽ പങ്കെടുക്കുന്നവർക്കായുള്ള പഠന വിവരണം)

സർ / മാഡം,
നമസ്കാരം ഞാൻ അഖിൽ.എസ്, തിരുവനന്തപുരം ശ്രീ ചിത്തിരതിരുനാൾ മെഡിക്കൽ ഇൻസ്റ്റിറ്റ്യൂട്ടിലെ ശാസ്ത്ര ആരോഗ്യ വിദ്യാഭാസ ഗവേക്ഷണ കേന്ദ്രമായ അചുത മേനോൻ സെന്ററിൽ, പൊതുജന ആരോഗ്യ ബിരുദാനന്തരബിരുദത്തിന് (മാസ്റ്റേഴ്സ് ഓഫ് പബ്ലിക് ഹെൽത്ത് - എംപിഎച്ച്) പഠിക്കുന്നു. 'തിരുവനന്തപുരം ജില്ലയിൽ വീടുകളിലായി താമസിക്കുന്ന 60 വയസോ അതിനുമുകളിലോ പ്രായമുള്ള വയോജനങ്ങൾക്കിടയിൽ ഓർത്തോസ്റ്റാറ്റിക് ഹൈപ്പോടെൻഷന്റെ വ്യാപനം' എന്ന തലക്കെട്ടിലുള്ള പഠനം, ബിരുദാനന്തരബിരുദ പഠനത്തിനുള്ള കോഴ്സിന്റെ ആവശ്യകതയുടെ ഭാഗമായാണ് നടത്തുന്നത്. ഈ സമ്മത ഫാറത്തിൽ നിങ്ങൾക്ക് മനസ്സിലാകാത്ത വാക്കുകൾ അടങ്ങിയിരിക്കാം. ഏതെങ്കിലും വാക്കുകളോ വിവരങ്ങളോ നിങ്ങൾക്ക് വ്യക്തമായി മനസ്സിലായില്ല എങ്കിൽ ദയവായി എന്നോട് ചോദിക്കുക.

പഠനത്തിൻറെ ഉദ്ദേശം
നമ്മുടെ രാജ്യത്ത് പ്രായമായവർക്കിടയിൽ വീഴ്ചയുടെയും പരുക്കിന്റെയും വർദ്ധനവിനെക്കുറിച്ച് ആശങ്ക വർദ്ധിച്ചുവരികയാണ്. ഓർത്തോസ്റ്റാറ്റിക് ഹൈപ്പോടെൻഷനും ശരീര ദുർബലതയും പ്രായമായവരിൽ വീഴാനുള്ള അപകട സാധ്യതാഘടകങ്ങളാണ്. അപകടസാധ്യത കൂടുതലുള്ള ആളുകളെ തിരിച്ചറിയേണ്ടതുണ്ട്. നമ്മുടെ കമ്മ്യൂണിറ്റി ക്രമീകരണത്തിൽ പ്രായമായവരിൽ ഓർത്തോസ്റ്റാറ്റിക് ഹൈപ്പോടെൻഷന്റെ വ്യാപനം കണ്ടെത്തുന്നതിനാണ് ഈ പഠനം നടത്തുന്നത്.

നടപടിക്രമം-പ്രവർത്തനങ്ങളും സമയബോധവും
സർവേയിൽ പങ്കെടുക്കുവാൻ നിങ്ങളുടെ വിലയേറിയ സമയത്തിന്റെ ഏകദേശം 50-60 മിനിറ്റ് വേണ്ടിവന്നേക്കാം. നിങ്ങളോട്, സ്വകാര്യമായിട്ടാണ് ചോദ്യങ്ങൾ ചോദിക്കുക. പുകവലി / ചവയ്ക്കുന്ന പുകയില, മദ്യപാനം, ഭക്ഷണക്രമം, ശാരീരിക പ്രവർത്തനങ്ങൾ തുടങ്ങിയവയുമായി ചോദ്യങ്ങൾ ബന്ധപ്പെടും. പ്രമേഹം, രക്തസമ്മർദ്ദം, മുൻപ് ഉണ്ടായിട്ടുള്ള രോഗങ്ങളെ പറ്റി എന്നീ ചോദ്യങ്ങൾ ഉണ്ടാവും. ഉപകരണങ്ങൾ ഉപയോഗിച്ച് ശരീര ഉയരം, ഭാരം, രക്തസമ്മർദ്ദം, ഹാൻഡ്ഗ്രിപ്പ് ശക്തി എന്നിവ അളക്കും. ശേഖരിച്ച വിവരങ്ങൾ ഗവേഷണ ആവശ്യങ്ങൾക്കായി മാത്രം ഉപയോഗിക്കും.

നിങ്ങളെ എന്തിനാണ് ക്ഷണിക്കുന്നത്?
ഈ സർവേയ്ക്കായി നിശ്ചയിച്ചിരിക്കുന്ന ഉൾപ്പെടുത്തൽ മാനദണ്ഡങ്ങൾക്ക് നിങ്ങൾ അനുയോജ്യൻ ആണ്, ആയതിനാൽ ഈ പഠനത്തിനായി നിങ്ങളെ ക്ഷണിക്കുന്നു. ഒരു ലോട്ടറി സമ്പ്രദായത്തിലൂടെ ആണ് നിങ്ങളുടെ വാർഡ് തിരഞ്ഞെടുത്തത്.

സന്നദ്ധ പങ്കാളിത്തം
ഈ പഠനത്തിലെ നിങ്ങളുടെ പങ്കാളിത്തം പൂർണ്ണമായും സ്വമേധയാ ഉള്ളതാണ്, അതിനർത്ഥം പങ്കെടുക്കണോ വേണ്ടയോ എന്ന് നിങ്ങൾക്ക് തീരുമാനിക്കാം. ഏത് ഘട്ടത്തിലും നിങ്ങൾ നിർത്താൻ ആഗ്രഹിക്കുന്നുവെങ്കിൽ, പ്രതികൂല ഫലങ്ങൾ ഇല്ലാതെ നിങ്ങൾക്ക് അത് ചെയ്യാൻ സ്വാതന്ത്ര്യമുണ്ട്.

പ്രയോജനങ്ങളും ദോഷങ്ങളും
പഠനത്തിലെ പങ്കാളിത്തം കൊണ്ട് നിങ്ങളുടെ ആരോഗ്യത്തിന് ഒരു അപകടവുമില്ല. അപൂർവമായ അപകടസാധ്യതകളിലൊന്ന് രഹസ്യാത്മകത നഷ്ടപ്പെടാം എന്നതാണ്. അപകടസാധ്യതകൾ കുറയ്ക്കുന്നതിനുള്ള നടപടികൾ ഞങ്ങൾ കൈക്കൊണ്ടിട്ടുണ്ട്, എന്നിരുന്നാലും, നിങ്ങളുടെ സ്വഭാവത്തെയും ജീവിതരീതിയെയും കുറിച്ചുള്ള ചോദ്യങ്ങൾ, രോഗാവസ്ഥയെക്കുറിച്ചുള്ള ചോദ്യങ്ങൾ എന്നിവ പോലുള്ള വ്യക്തിപരമായ ചോദ്യങ്ങൾ നിങ്ങളോട് ചോദിക്കും. ചോദ്യാവലിക്ക് ഉത്തരം നൽകാൻ ശ്രമിക്കുമ്പോഴോ ശാരീരിക അളവുകൾ എടുക്കുന്നതിന് അനുസ്യൂതമായോ നിങ്ങൾക്ക് ക്ഷീണം തോന്നാം, പങ്കെടുക്കുന്നതിന് ഇടയിൽ ഇടവേള ആവശ്യമായി വന്നേക്കാം
പങ്കെടുക്കുന്നതിന്റെ നേട്ടങ്ങൾ

നിങ്ങളുടെ രക്തസമ്മർദ്ദം, ഉയരം, ഭാരം എന്നിവ അറിയുകയല്ലാതെ ഈ പഠനത്തിൽ നിന്ന് ഒരു നേട്ടവും നിങ്ങൾക്ക് ഉണ്ടാകണമെന്നില്ല. പഠനം നിങ്ങളെ സഹായിക്കുമെന്ന് ഞങ്ങൾക്ക് ഉറപ്പുനൽകാൻ കഴിയില്ല, പക്ഷേ പഠനത്തിൽ നിന്ന് ലഭിക്കുന്ന വിവരങ്ങൾ പ്രായമായവരിൽ ഉണ്ടാക്കുന്ന ഓർത്തോസ്റ്റാറ്റിക് ഹൈപ്പോടെൻഷന്റെ വ്യാപനത്തെക്കുറിച്ച് മനസ്സിലാക്കാൻ സഹായിക്കും. ഈ ധാരണ ഭാവിയിൽ മറ്റുള്ളവരെ സഹായിച്ചേക്കാം.

സാമ്പത്തിക നേട്ടവും, ചിലവും
ഈ പഠനത്തിൽ ഏർപ്പെടുന്നതിന് നിങ്ങൾക്ക് നിരക്കുകളൊന്നും ഉണ്ടാകില്ല. ഈ പഠനത്തിലെ നിങ്ങളുടെ പങ്കാളിത്തത്തിന് നിങ്ങൾക്ക് പ്രതിഫലം ലഭിക്കില്ല.

രഹസ്യാത്മകത
നിങ്ങളുമായുള്ള അഭിമുഖം സ്വകാര്യമായി നടത്തും. എല്ലാ വിവരങ്ങളും രഹസ്യമായി സൂക്ഷിക്കും, ഒരു ഘട്ടത്തിലും നിങ്ങളുടെ ഐഡന്റിറ്റി വെളിപ്പെടുത്തുകയില്ല. ശേഖരിച്ച വിവരങ്ങൾ രഹസ്യാത്മകത നിലനിർത്താൻ സഹായിക്കുന്ന ഒരു പ്രതികരണ പ്രീതിക) ഐഡന്റിഫിക്കേഷൻ നമ്പർ (ർ. ഐ. ൻ) ഓരോ പങ്കാളിക്കും നൽകും. ഡാറ്റ വിശകലനം ചെയ്യുന്നവർക്ക് മാത്രമായി ഈ നമ്പറിലേക്കുള്ള ഉപയോഗം പരിമിതപ്പെടുത്തും. പഠന സമയത്തും അതിനുശേഷവും പങ്കെടുക്കുന്നയാളുടെ രഹസ്യസ്വഭാവം സംരക്ഷിക്കപ്പെടും. വിവര ശേഖരണ തീയതി മുതൽ 3 വർഷത്തേക്ക് പഠന വിവരങ്ങൾ സൂക്ഷിക്കുന്നതായിരിക്കും.

ഗവേഷണ പഠന ഫലങ്ങൾ
എംപിഎച്ച് ബിരുദത്തിന്റെ ആവശ്യകതകൾ നിറവേറ്റുന്നതിനായി അന്തിമ തീസിസ് റിപ്പോർട്ടായി സമർപ്പിക്കും. പഠനത്തിൽ നിന്ന് ഉയർന്നുവരുന്ന നിഗമനങ്ങൾ അഭിപ്രായങ്ങൾക്കുവേണ്ടിയും കൂടുതൽ ഗവേഷണങ്ങൾക്ക് തുടക്കമിടുന്നതിനുമായി ഈ മേഖലയിലെ വിദഗ്ധർക്ക് സമർപ്പിക്കും. പുതിയ നടപടികളും നയപരമായ മാറ്റങ്ങളും നടപ്പിലാക്കുന്നതിനായി കണ്ടെത്തലുകൾ ആരോഗ്യ വകുപ്പുമായി പങ്കിടും. പ്രബന്ധം DSpace@sctimst ൽ പ്രസിദ്ധീകരിക്കും. കണ്ടെത്തലുകൾ ഒരു വർക്കിംഗ് പേപ്പറായി പ്രസിദ്ധീകരിക്കുകയും ശാസ്ത്രീയ സമ്മേളനങ്ങളിൽ അവതരിപ്പിക്കുകയും ഉചിതമായ ശാസ്ത്ര ജേർണലുകളിൽ ഉൾപ്പെടുത്തുകയും ചെയ്തേക്കാം.

ബന്ധപ്പെടാനുള്ള വിവരങ്ങൾ
നിങ്ങൾക്ക് ഗവേഷണവുമായി ബന്ധപ്പെട്ട എന്തെങ്കിലും സംശയങ്ങളുണ്ടെങ്കിൽ എന്നെ ബന്ധപ്പെടാം. അഥവാ നിങ്ങൾക്ക് ധാർമ്മികതയുമായി ബന്ധപ്പെട്ട എന്തെങ്കിലും സംശയങ്ങളുണ്ടെങ്കിലോ, എന്റെ യോഗ്യതാപത്രങ്ങൾ പരിശോധിക്കാൻ ആഗ്രഹിക്കുന്നുവെങ്കിലോ, ഇനിപ്പറയുന്ന വിലാസത്തിൽ എന്നെയോ അല്ലെങ്കിൽ ഞങ്ങളുടെ സ്ഥാപനത്തിലെ എത്തിക്സ് കമ്മിറ്റി അംഗത്തിനെയോ ബന്ധപ്പെടാം.

അഖിൽ എസ്

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സമ്മതപത്രം

വിവരണ പത്രികയിൽ ഉള്ള എല്ലാ വിവരങ്ങളും ഞാൻ വായിച്ചു. പഠനത്തിൻറെ സ്വഭാവവും ഇടപെടലും എന്നോട് വിശദീകരിക്കുകയും ചെയ്തു .എൻറെ എല്ലാ ചോദ്യങ്ങൾക്കും തൃപ്തികരമായി ഉത്തരം ലഭിക്കുകയും ചെയ്തു. സമ്മത ഫാറത്തിൽ ഒപ്പിടുന്നതിലൂടെ, എന്നിൽ നിന്ന് എന്താണ് പ്രതീക്ഷിക്കുന്നതെന്ന് ഞാൻ മനസിലാക്കുന്നുവെന്നും ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ തയ്യാറാണെന്നും ഞാൻ സൂചിപ്പിക്കുന്നു. പഠനത്തിലെ പങ്കാളിത്തം സ്വമേധയാ ഉള്ളതാണെന്നും മുന്നറിയിപ്പ് നൽകാതെ എപ്പോൾ വേണമെങ്കിലും പിന്മാറാൻ സ്വാതന്ത്ര്യമുണ്ടെന്നും ഞാൻ മനസ്സിലാക്കുന്നു. മൂന്നാമതൊരു കക്ഷിക്ക് വിട്ടുകൊടുക്കുമ്പോഴോ പ്രസിദ്ധീകരികുമ്പോഴോ എൻറെ ഐഡന്റിറ്റി വെളിപ്പെടുത്തില്ലെന്ന് ഞാൻ മനസ്സിലാക്കുന്നു. കൂടുതൽ വിവരങ്ങൾ മൂന്നാമതൊരു കക്ഷിയുമായി പങ്കുവയ്കുകയോ പ്രസിദ്ധീകരിക്കുകയോ ചെയ്യില്ല എന്നും ഞാൻ മനസ്സിലാകുന്നു.ആവശ്യം വന്നാൽ ആരെയാണ് ബന്ധപ്പെടേണ്ടതെന്ന് എന്നെ അറിയിച്ചിട്ടുണ്ട്. സൂക്ഷിക്കുന്നതിനു വേണ്ടി വിവരപത്രത്തിന്റെയും സമ്മതപത്രത്തിന്റെയും ഒരു പകർപ്പ് എനിക്ക് നൽകിയിട്ടുണ്ട്.

പങ്കെടുക്കുന്നയാളുടെ പേര്

പങ്കെടുക്കുന്നയാളുടെ ഒപ്പ് / തള്ള വിരൽ അടയാളം

തീയതി

ഗവക്ഷേകന്റെ പേര്

ഗവക്ഷേകന്റെ ഒപ്പ്

തീയതി

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
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Institutional Ethics Committee

(IEC Regn No. ECR/189/Inst/KL/2013/RR-16)

SCT/IEC/ 1446/NOVEMBER-2019 14.11.2019

Dr. Akhil S
MPH Student, AMCHSS
SCTIMST, Thiruvananthapuram

Dear Dr. Akhil,

The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "PREVALENCE OF ORTHOSTATIC HYPOTENSION AMONG COMMUNITY-DWELLING ELDERLY AGED 60 AND ABOVE IN THIRUVANANTHAPURAM DISTRICT (IEC/1446)" on 2nd November, 2019.

The following documents were reviewed:

Original submission

1. *Covering letter addressed to the Chairperson, IEC, SCTIMST dated 16.10.2019 with checklist forwarded by HOD and Guide*
2. *Full proposal.*
3. *IEC application form*
4. *TAC Approval letter*
5. *Forwarding letter from HOD and Guide*
6. *Tools for the study-Interview schedule in English and Malayalam*
7. *Participant Information Sheet and Informed Consent Form in English and Malayalam*
8. *CV of Principal Investigator*

Revised submission

1. *Covering letter addressed to the Chairperson, IEC, SCTIMST dated 11.11.2019 with checklist*
2. *Copy of IEC Recommendation Letter dated 05.11.2019*
3. *Full proposal.*
4. *IEC application form*
5. *TAC Approval letter*
6. *Forwarding letter from HOD and Guide*
7. *Tools for the study-Interview schedule in English and Malayalam*
8. *Participant Information Sheet and Informed Consent Form in English and Malayalam*
9. *CV of Principal Investigator*

The following members of the Ethics Committee were present at the meeting held on 2nd November, 2019 at G. Parthasarathi Board Room, AMCHSS, SCTIMST

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Dr. Harikrishnan S	MD, DM (Cardiology) DNB (Cardiology)	Male	Clinician	Yes
2.	Dr. Kala Kesavan. P	MBBS, MD	Female	Basic Medical Scientist	No
3.	Smt. Sathi Nair	MA (English Literature)	Female	Lay Person	No
4.	Dr. Christina George	MD Psychiatry	Female	Clinician	No
5.	Dr. Mala Ramanathan	PhD	Female	Social Scientist (Member Secretary)	Yes

IEC Decision

The IEC approved the conduct of the study in the present form.

Remarks:
The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team / Guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,

Mala Ramanathan
Member Secretary, IEC

URKUND

Document Information

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Sources included in the report

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W	URL: https://www.researchgate.net/publication/311387894_Orthostatic_hypotension_Prevale ... Fetched: 11/11/2019 8:11:17 AM	1
W	URL: https://www.researchgate.net/publication/5802039_24-Hour_Blood_Pressure_Monitoring ... Fetched: 11/1/2019 1:15:49 AM	1
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