EARLY DETECTION OF COGNITIVE IMPAIRMENT IN OLD AGE: WHO IS THE BEST ASSESSOR.

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BACKGROUND

- In a rapidly ageing world, cognitive impairment and dementias are important public health issues as cause of morbidity, disability and death in old age.

- Loss of memory is an important complaint in dementia along with at least one among aphasia/ apraxia/ agnosia/ disturbance in executive functioning.

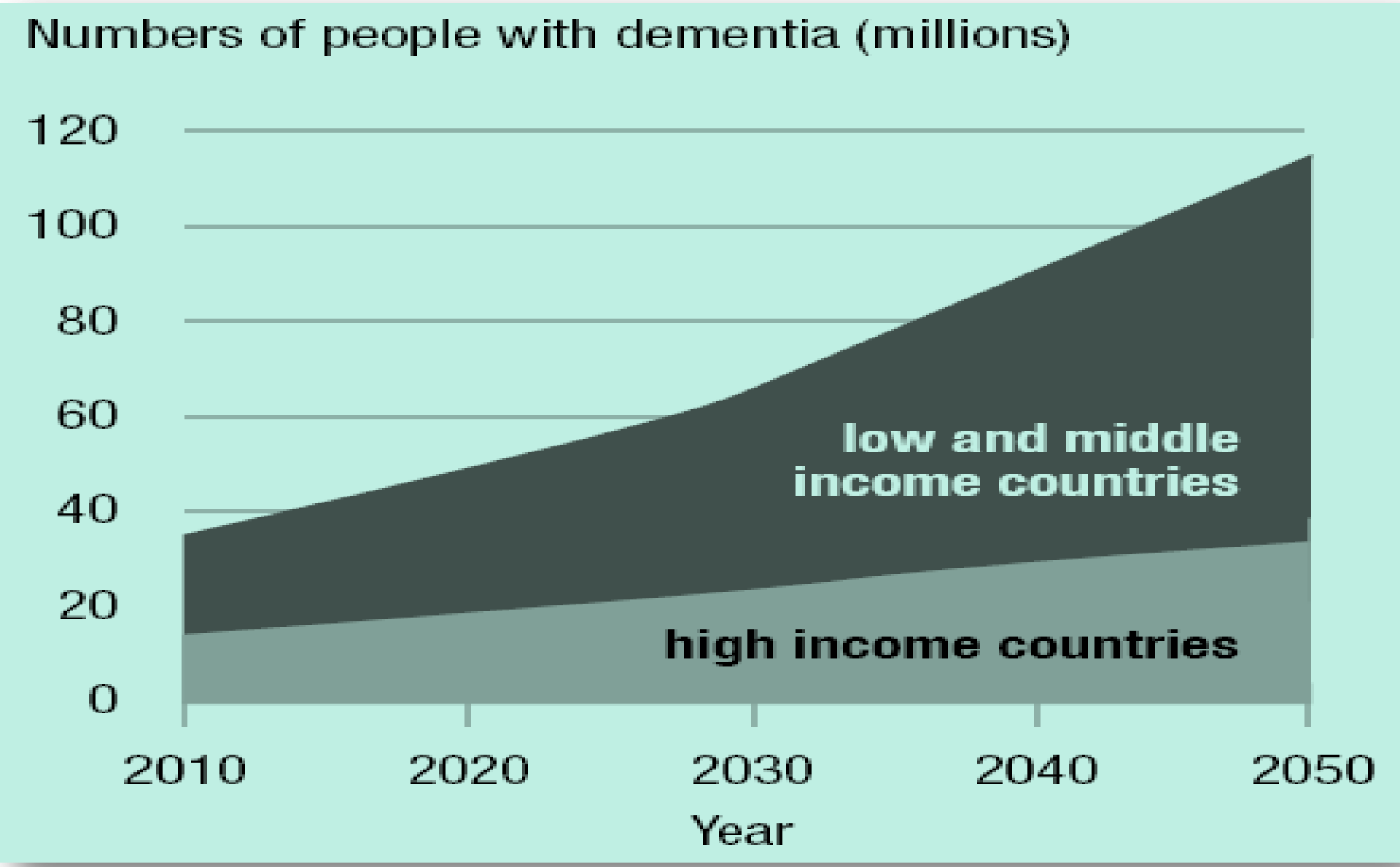
- Alzheimer's disease (AD) starts with a preclinical phase in which AD neuropathological abnormalities begin to accumulate but cognitive ability is normal.

Preclinical Alzheimer's disease and its outcome: a longitudinal cohort study

- *Stephanie J B Vos, Chengjie Xiong, Pieter Jelle Visser, Mateusz S Jasielec, Jason Hassenstab, Elizabeth A Grant, Nigel J Cairns, John C Morris,David M Holtzman, Anne M Fagan*
- ***Lancet Neurol 2013; 12:957–65***

DEPENDANCE BURDEN

- 13% of the world's population aged 60 years and over are dependent.
- Needs for care will nearly treble from 101 to 277 million.
- Particularly dramatic increase in low and middle income countries.
- World Alzheimer Report predicted a near doubling in worldwide societal costs from US$604 billion in 2010 to US$1,117 billion by 2030.
- 89% of total worldwide costs of dementia care are incurred in high income countries.



World Alzheimer Report

Epidemiology - India

- 59.7 million elderly people : 2010
- Rising to 124.5 million in 2030
- Estimated 1.5 million pts with dementia currently
- Similar rates of amyloid burden as high income Countries (Autopsy study – 91 subjects)
- Previous studies of prevalence and incidence – lower rate in India (4.7 / 1000 person years > 65yrs vs 17.5/ 1000 person years > 65 yrs in US)

Dias et al, 2009;Purohit et al, 2011; Chandra et al, 2001

Behavioral & psychological symptoms in dementia (BPSD)

Manifestations

- restlessness
- agitation
  - physically non aggressive
  - verbally non aggressive
  - aggressive
- wandering
- shadowing
- culturally inappropriate behaviors
- sexual disinhibition
- hoarding
- apathy
- anxiety
- depressive mood
- hallucinations
- delusions

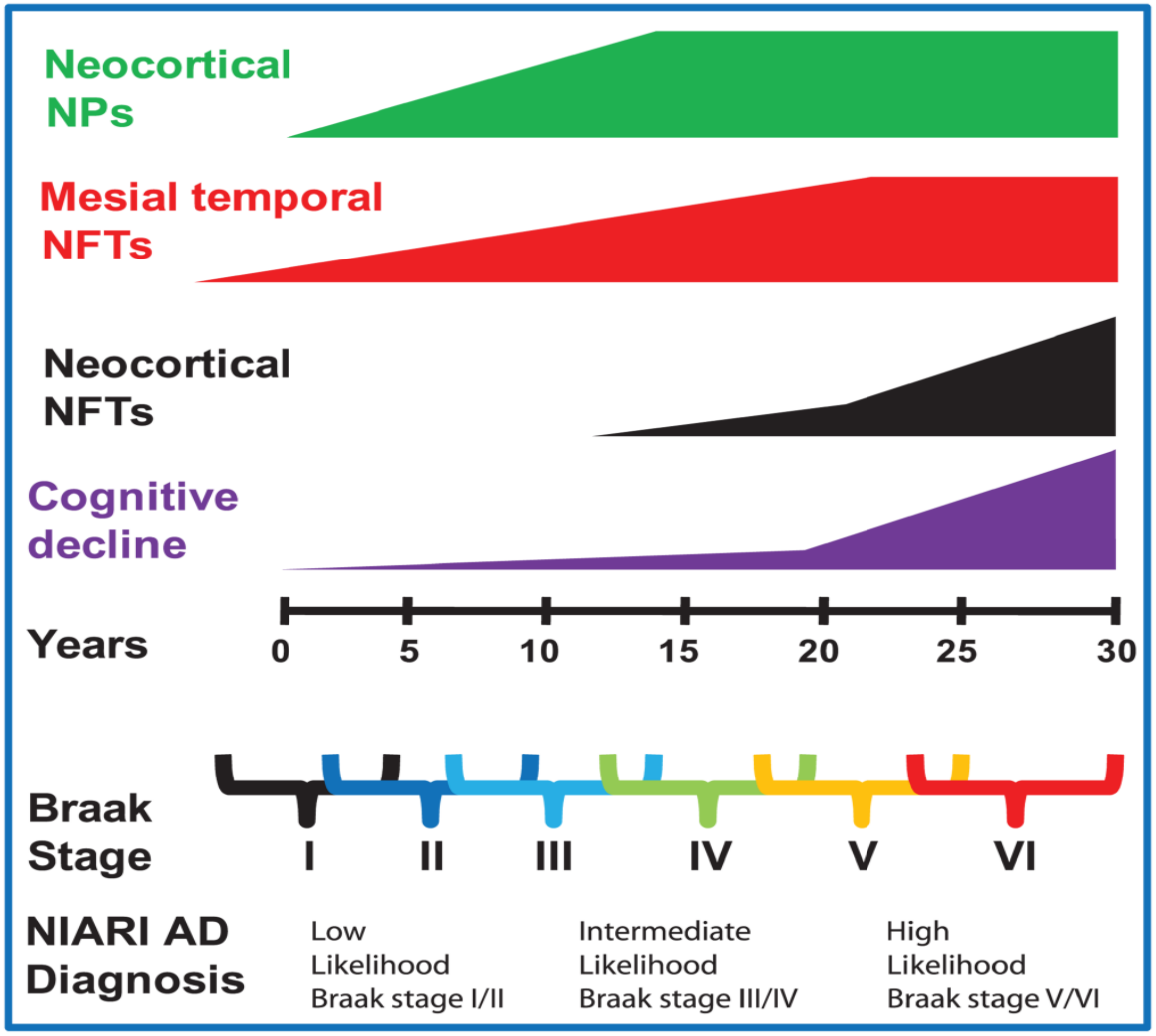
IPA, 2003

Behavioral & Psychological Symptoms

- Variable presentation
- Occur at some point 80% cases
- Increase caregiver burden, precipitate institutional care
- Vascular - depressive mood
- Alzheimer disease – apathy
- DLB - Hallucinations
- FTD - apathy, disinhibition

Aalten et al, 2007; Saz et al, 2009

Clinicopathologic correlation



Association between neocortical NFTs and cognitive decline in AD

Clinico pathologic correlation not absolutely predictable

Threshold of pathology above which impairment occurs

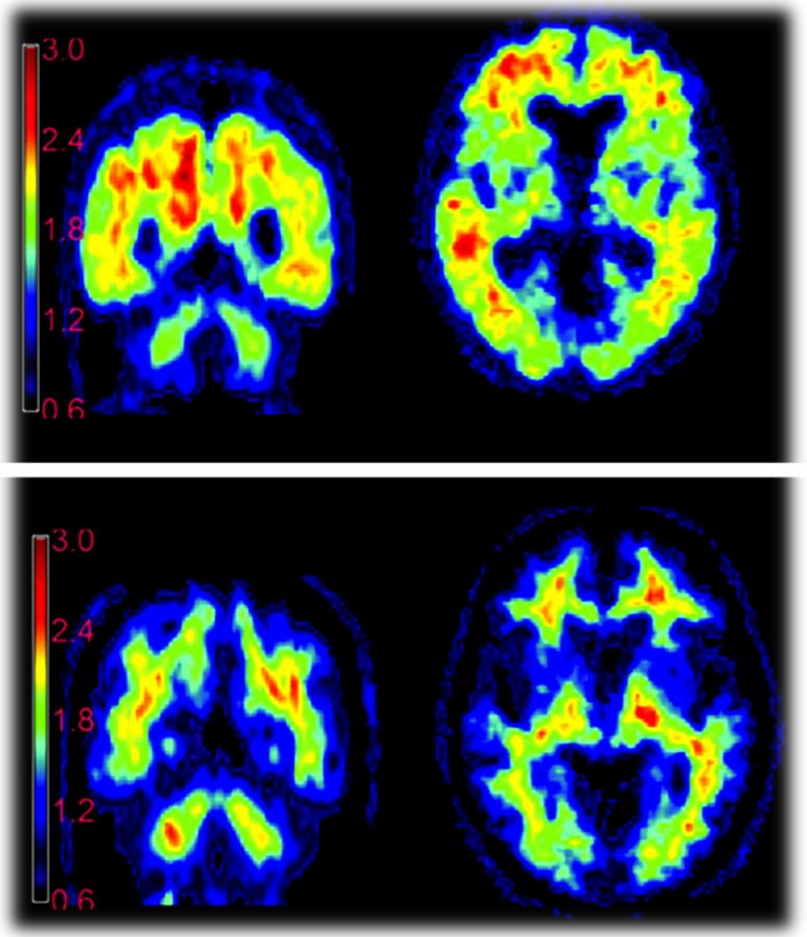
Nelson et al, 2009

NEUROIMAGING - MR

- Whole brain volumes smaller in AD
- Twice the rate of atrophy (1% per yr vs .5% per yr)
- Brain boundary shift integral (BBSI) – volume subtraction of images taken at different time-points
  - regional predilection of atrophy - posterior cingulate and medial temporal cortex

Fotenos, 2005

NEUROIMAGING- PET

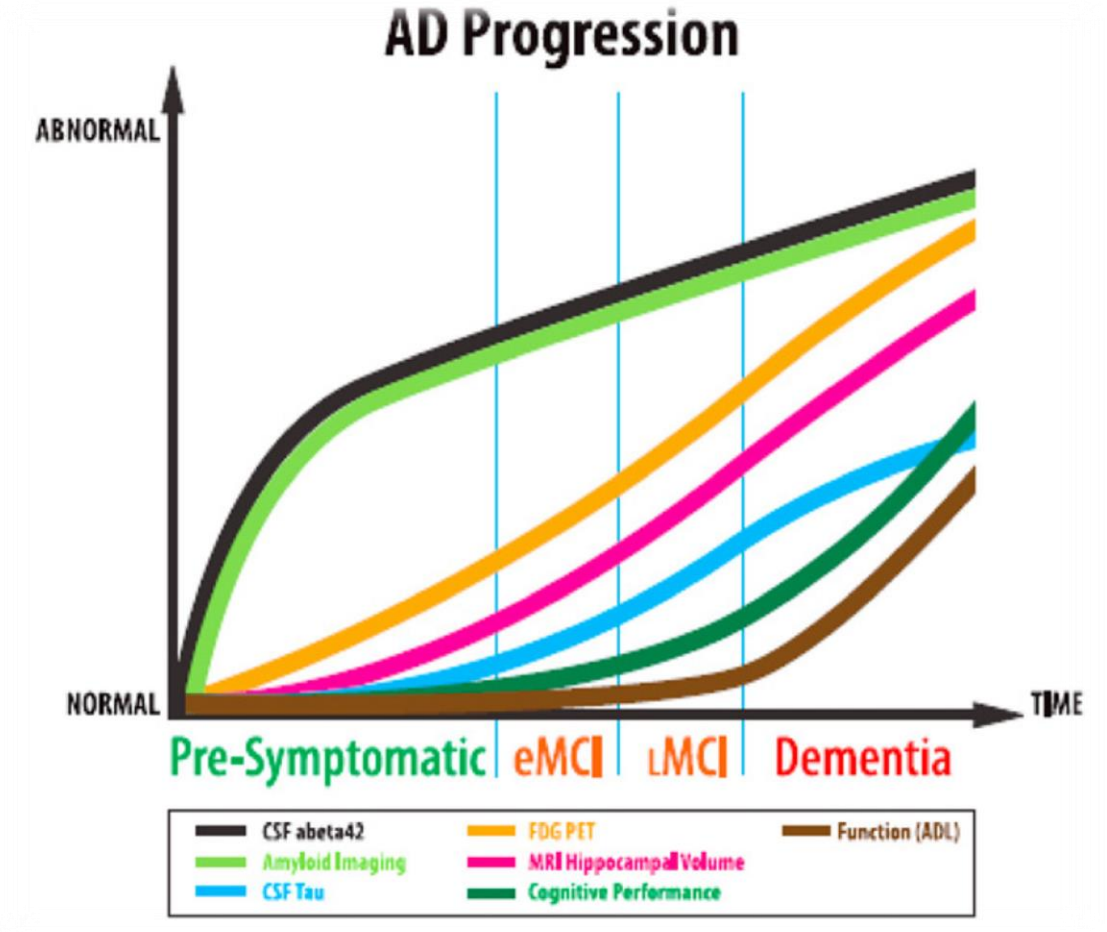


18 F compound PET

Above – subject with MMSE 24

Below - subject with MMSE 30

ADNI – Alzheimer's Disease Neuroimaging Initiative



Relationship of clinical and biochemical markers through normal aging to MCI to AD

Original cohort - 2004 followed 400 MCI, 200 healthy controls and 200 AD

16% MCI to AD 1 yr
additional 24% in 2 yrs

Weiner et al, 2010

Towards a new definition

Beyond NINCDS–ADRDA criteria – Clinical and in vivo biological evidence

	Pathophysiological markers	Topographical markers
Cerebrospinal fluid		
Amyloid β_{42}	Yes	No
Total tau, phospho-tau	Yes	No
PET		
Amyloid tracer uptake	Yes	No
Fluorodeoxyglucose	No	Yes
Structural MRI		
Medial temporal atrophy	No	Yes

AD=Alzheimer's disease.

Table 1: Categorisation of the current, most-validated AD biomarkers

Pathophysiologic markers useful at all stages

Topographical markers prior to appearance of cognitive symptoms

Dubois et al, 2010

AD – New Definition

- **MCI** - Clinical criteria
  - Concern regarding a change in cognition
  - Impairment in one or more cognitive domains
  - Preservation of independence in functional abilities
  - Not dementia

  Biomarkers of brain amyloidosis and neuronal injury

Sperling et al, 2011; Albert et al, 2011

Objective

- To develop protocol to detect cognitive impairment among older people with subjective memory complaints in a tertiary hospital setting.

Methodology

- Cross-sectional study
- Patients attending the "Memory Clinic" of the Department of Geriatric Medicine
- Patients aged 60 and above, with subjective memory complaints.
- Detailed evaluation of the cognitive status, functional status and co-morbidities done as per validated scales.
- Socioeconomic and other demographic characteristics were obtained from the caregivers.
- The diagnosis, management and follow up of patients were carried out in the memory clinic.

BASELINE CHARACTERISTICS OF THE STUDY PARTICIPANTS

	Variable	%of popul
Gender	Male	107(78)
	Female	30(22)
Occupation	Nil	82(59.8)
	Employed	55(40.1)
Education	Illiterate	7
	Primary	46(33.5)
	Upto 12th	56(40.8)
	Graduate	20(14.6)
	Postgraduate	8
Living arrangement	Alone	3
	With spouse	46(34.0)
	With family	86(63.7)
	Old age home	0
Socioeconomic group	Lower	54(43.0)
	Middle	77(56.2)
	Higher	4

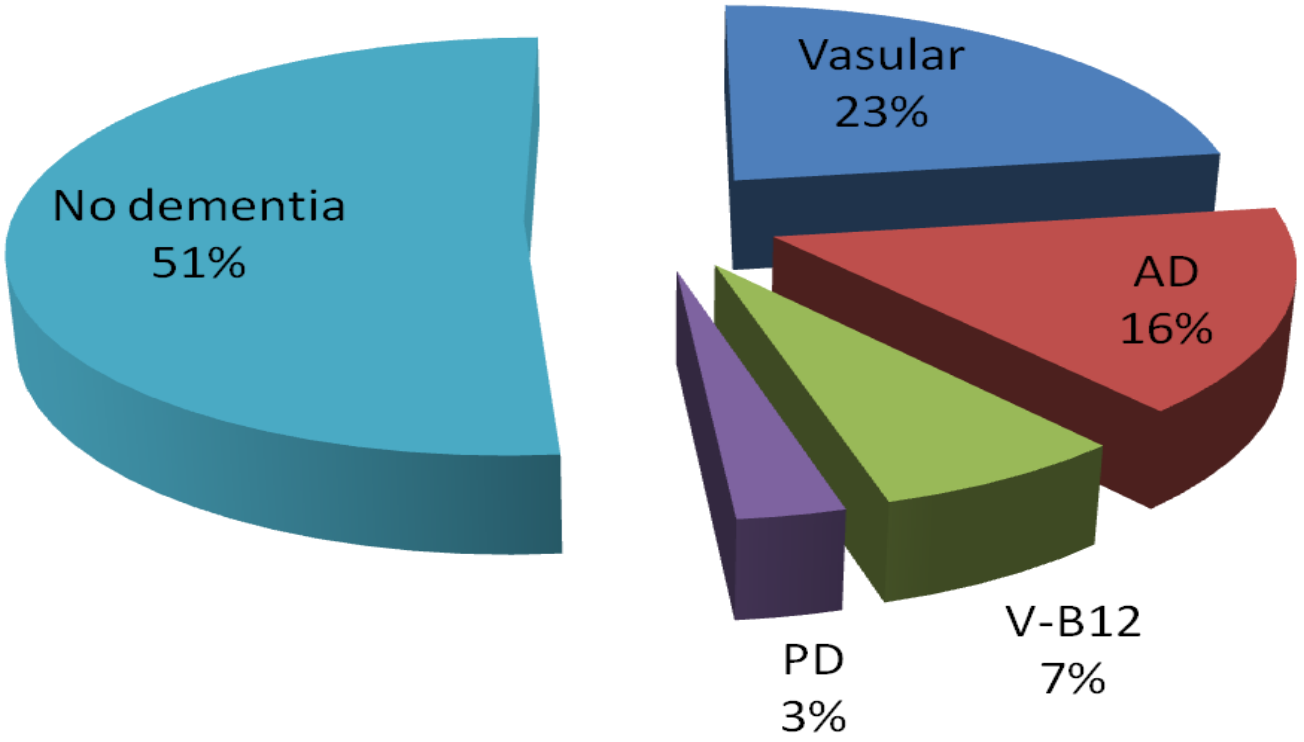
BASELINE CHARACTERISTICS OF THE STUDY PARTICIPANTS

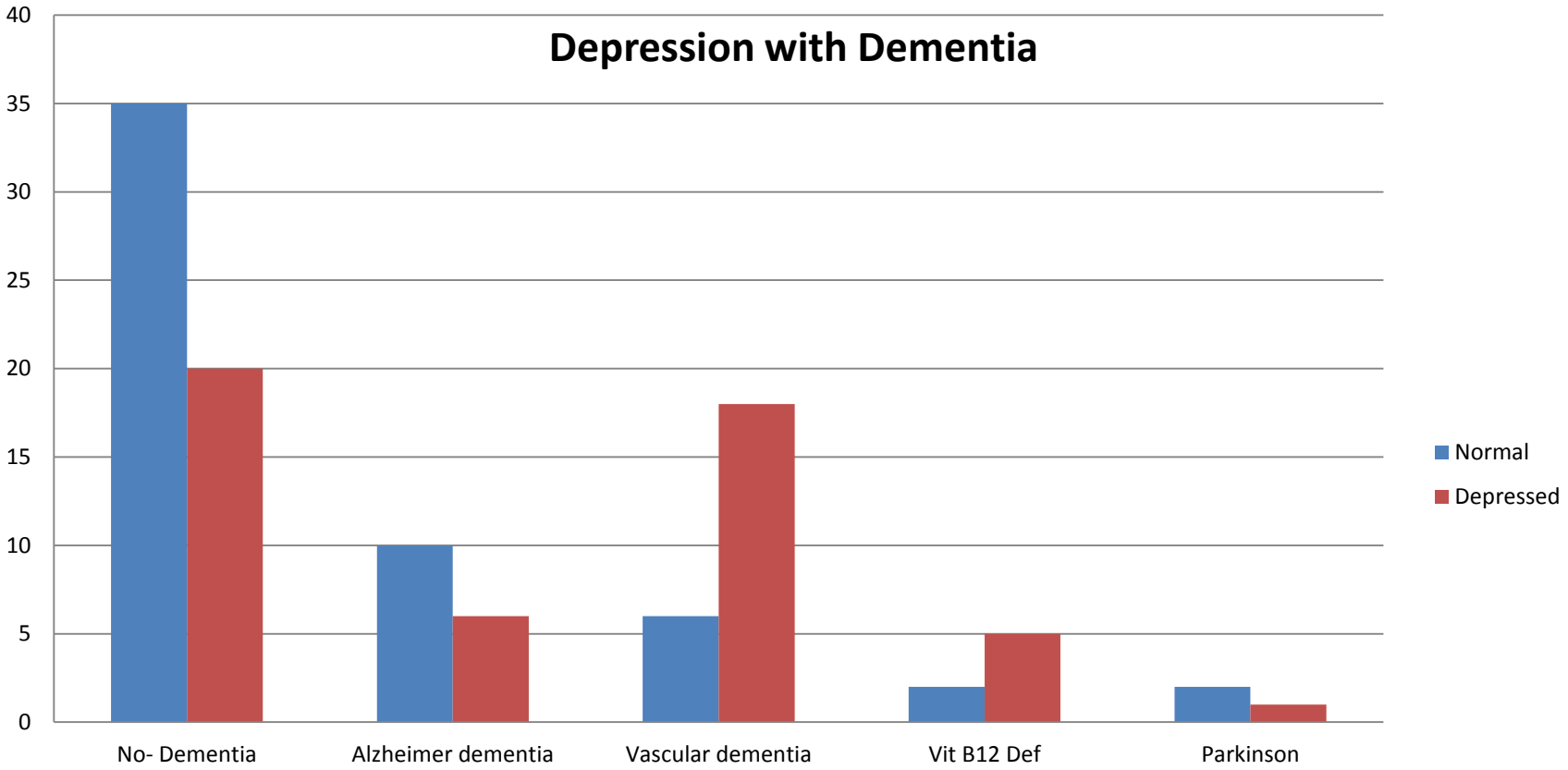
variable		%age of population
Marital status	Married	121(88.3)
	Single	16(11.4)
H/O Hypertension	Absent	71(50.8)
	Present	66(48.1)
H/O Diabeties mellitus	Absent	99(72.2)
	Present	38(27.7)
Dyslipidemia	Absent	106(77.3)
	Present	31(22.6)
Dental problems	Absent	49(36.0)
	Present	87(63.9)
H/O Alcohol addiction	Absent	113(82.4)
	Present	24(17.5)
H/O tobacco addiction	Absent	84(61.31)
	Present	53(38.6)

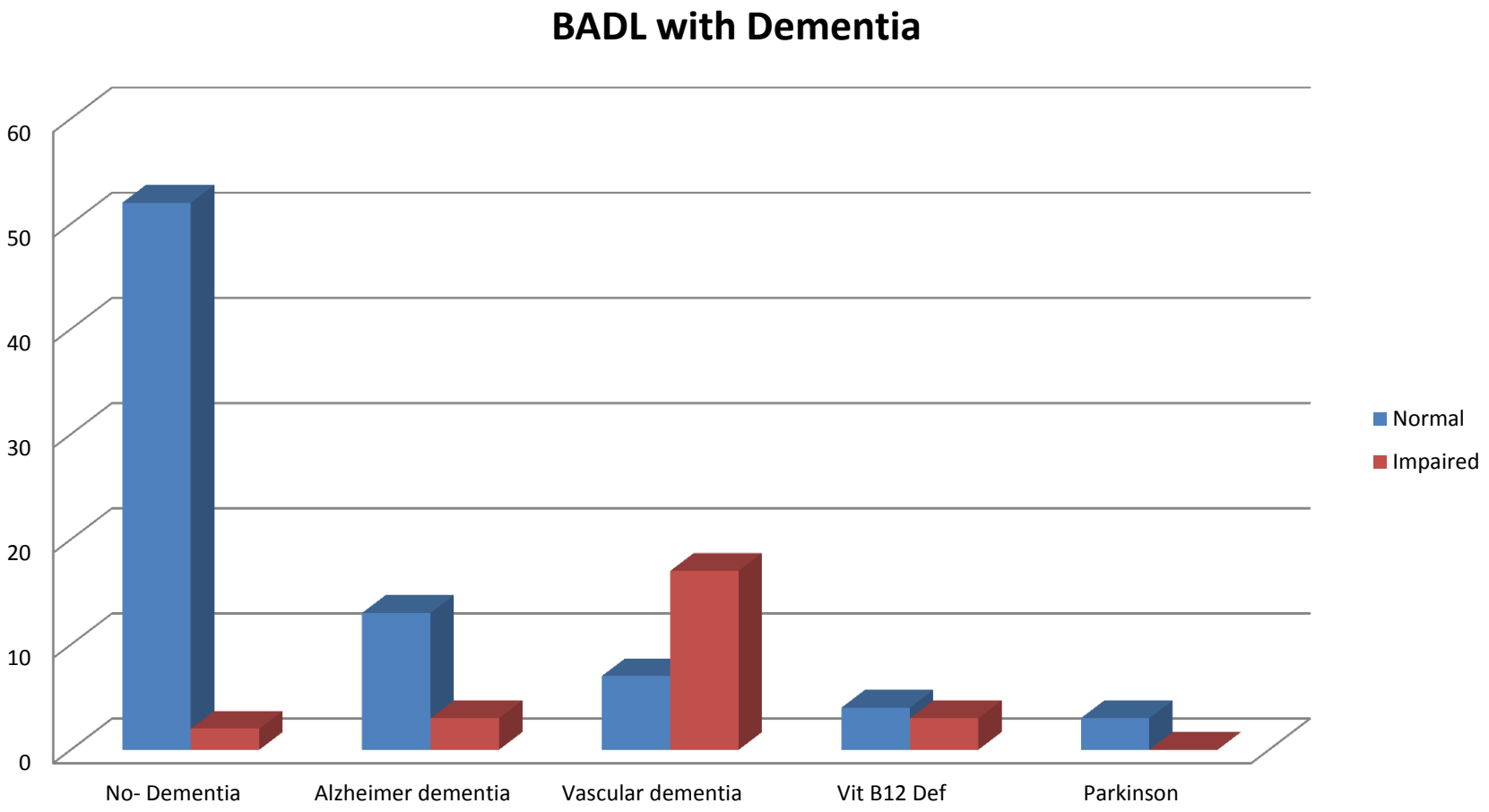
BASELINE CHARACTERISTICS OF THE STUDY PARTICIPANTS

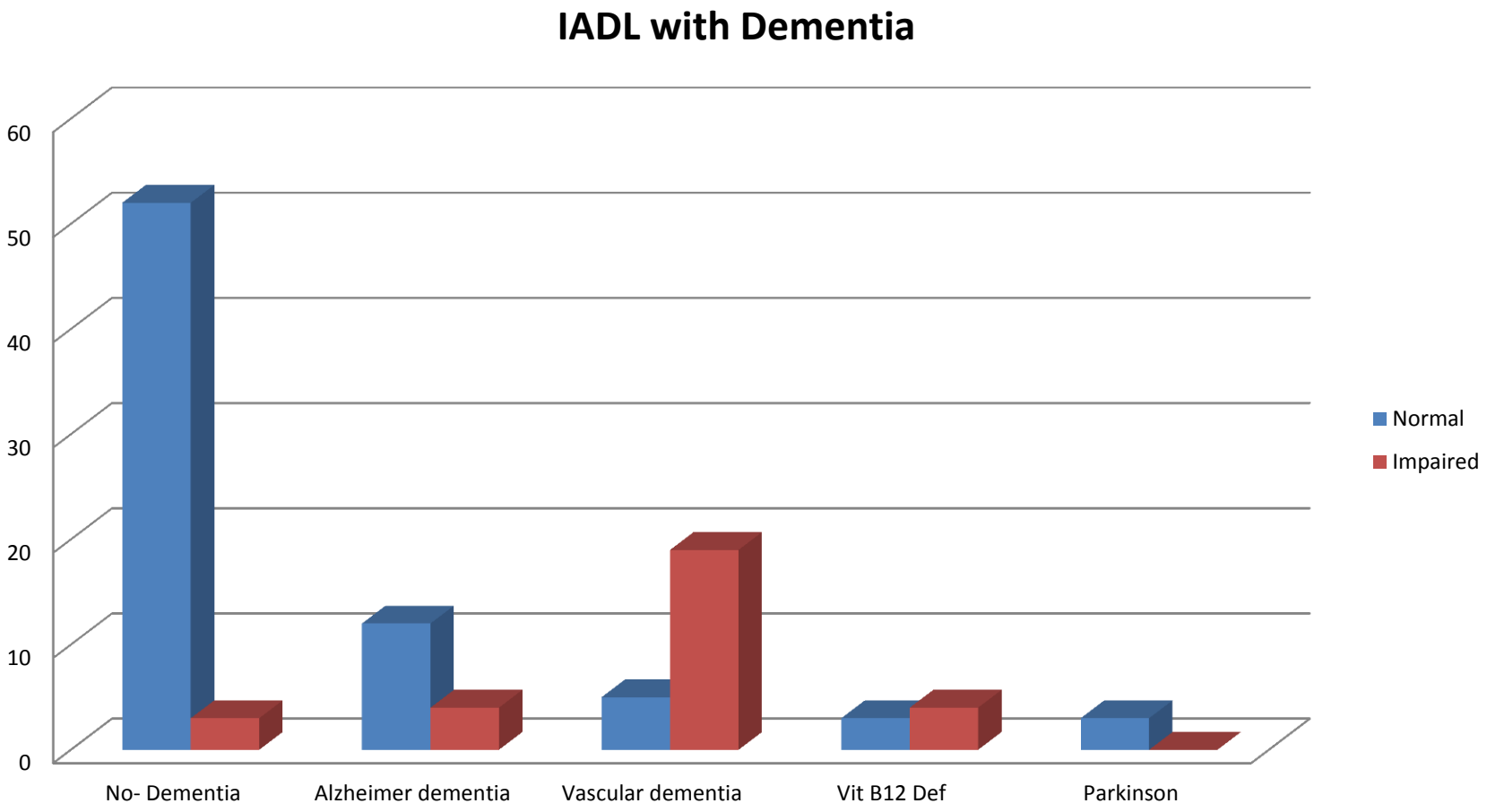
Variable		%of population
Falls	Absent	98(72.0)
	Present	39(28.0)
Hearing problems	Absent	83(60.5)
	Present	54(39.4)
Vision problems	Absent	38(27.7)
	Present	99(72.2)
H/O Urinary incontinence	Absent	117(85.4)
	Present	20(14.6)
Behaviour problems	Absent	114(83.0)
	Present	23(17.0)
H/O Cerebrovascular accident	Absent	109(80.1)
	Present	28(19.8)

EVALUATION OF SML




Depression with Dementia
40
35
30
25
20
15
10
5
0
No- Dementia
Alzheimer dementia
Vascular dementia
Vit B12 Def
Parkinson
Normal
Depressed


BADL with Dementia
60
50
40
30
20
10
0
No- Dementia
Alzheimer dementia
Vascular dementia
Vit B12 Def
Parkinson
Normal
Impaired


IADL with Dementia
60
50
40
30
20
10
0
No- Dementia
Alzheimer dementia
Vascular dementia
Vit B12 Def
Parkinson
Normal
Impaired

UNIVRIATE ANALYSIS OF THE CO-MORBIDITIES

Co-morbidities		Mild Dementia	Moderate dementia	Severe dementia	P Value
CVA	Absent	53	34	22	
	Present	00	3	24	
HT	Absent	28	16	27	0.426
	Present	25	21	20	
DM	Absent	45	23	31	0.030
	Present	8	14	16	
COPD	Absent	45	34	37	0.272
	Present	8	3	10	
Dyslp	Absent	44	25	37	0.218
	Present	9	12	10	
Hearing problem	Absent	38	21	24	**0.093**
	Present	15	16	23	
Urinary Incontinence	Absent	51	34	32	0.000
	Present	2	3	15	
Vision Problem	Absent	21	9	8	0.036
	Present	32	28	39	
Depression	Normal	30	26	12	**0.001**
	Depressed	23	11	35	
Falls	Absent	44	27	27	0.011
	Present	8	10	20	

UNIVRIATE ANALYSIS OF THE CO-MORBIDITIES

Co-morbidities		Mild Dementia	Moderate dementia	Severe dementia	P Value
IADL	INDEPENDENT	51	35	15	0.001
	DEPENDENT	2	2	32	
BADL	INDEPENDENT	51	37	21	0.001
	DEPENDENT	0	1	26	
MNA	NORMAL	39	25	29	0.446
	ABNORMAL	14	12	18	
SEX	FEMALE	6	2	22	0.001
	MALE	47	35	25	
OCCUPATION	UNEMPLOYED	17	11	27	0.011
	EMPLOYED	36	26	20	

Conclusion

- Active surveillance of Subjective memory complaints should be done.
- Dedicated ‘Memory Clinic’ is the cornerstone in management of dementia.
- Vascular dementia was the commonest etiology of dementia in our study.
- Depression is also very common causing pseuodementia.
- Early management of risk factors can reduce the burden of disease in the geriatric population.

- Geriatricians should develop clinical protocol to manage cognitive decline in old age without depending on neurologist and psychiatrists.

- Caregivers counselling and training must be considered at earlier stage

THANK YOU