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Assessment and Management of Older People in the General Hospital Setting

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Abstract

Worldwide, populations are ageing. Older people, particularly centenarians, represent the fastest growing sector and are counted as the success of the society. But not everyone ages successfully and enjoys good health. Many older people have multiple long-term medical, physical, mental, psychological and social problems. This can result in reduced quality of life, higher cost and poorer health outcome including increased mortality. Chronic diseases are associated with disability and low self-reported general health. In addition, physiological changes of ageing and consequent loss of functional reserve of the organ systems lead to the increased physical disability and dependency. Therefore, geriatric medicine could warrant a more holistic approach than general adult medicine. Nearly two-thirds of people admitted to hospital are over 65 years old and an increasing number are frail or have a diagnosis of dementia [1]. Our current training not only generates relatively low number of geriatricians but there also remains a huge need for better staff training and support to provide safe, holistic and dignified care. The cornerstone of modern geriatric medicine is the comprehensive geriatric assessment (CGA). This is defined as multidimensional, interdisciplinary diagnostic process that aims to determine a frail older person's medical conditions, mental health, functional capability and social circumstances in order to develop a coordinated and integrated plan for treatment, rehabilitation and long-term follow-up [2]. All older people admitted to hospital with an acute medical illness, geriatric syndromes including falls, incontinence, delirium or immobility, unexplained functional dependency or need for rehabilitation warrant CGA. CGA could screen for treatable illnesses, establish the key diagnosis leading to hospital admission and formulate a rational therapeutic plan thus resulting in the improved outcome. This chapter starts with an introduction to the ageing nation and impact of ageing on hospitals. This will be followed by discussing physiological changes of ageing and the various components of multidisciplinary assessment for older people admitted to hospital with an acute illness that could lead to high-level holistic care. It also covers a wide range of issues and challenges which medical team/multidisciplinary teams often come across during routine care of acutely

unwell older people. The chapter concludes by a literature review on current evidence on the effectiveness of CGA and recommendations to enhance clinical care.

Keywords: Multidisciplinary, Secondary care, Polypharmacy, Nutrition, Co-morbidity

1. Introduction

Older people attending the emergency department (ED) or acute medical units (AMU) often have more complex needs due to multiple co-morbidities, physical limitations, increased functional dependence and complex psychosocial issues. Thus, they are more vulnerable and could easily decompensate with minor stressors, resulting in increased frailty. There are established detrimental effects of hospitalisation on older adults and about 17% of older medical patients who were independently mobile 2 weeks prior to hospital admission required assistance to walk at hospital discharge [3, 4]. Therefore, to improve outcomes for frail older people with multiple co-morbidities and an acute illness, admission should be to an Emergency Frailty Unit (EFU), a separate unit within an AMU but led by a geriatrician and the multidisciplinary team (MDT) to provide comprehensive person-centred care.

The clinical assessment of frail older people is challenging, as they often have multiple co-morbidities and diminished functional and physiological reserves. In addition, the physical illness or adverse effects of drugs are more pronounced resulting in atypical presentation, cognitive decline, delirium or inability to manage routine activities of daily living (ADLs) [5]. Among the potential adverse outcomes for frail older inpatients, are the risks of continued deterioration as a consequence of medical complications such as pressure sores, hospital-acquired infections or functional decline. This can also lead to long-term increased dependency, institutionalisation and death.

1.1. Impact of ageing on hospitals

Hospitals face a rising demand from an increasing number of acute emergency admissions of people aged 65 years and above with multiple co-morbidities and psychosocial problems. The admission rates for people over 65 years are three times higher than for people aged 16–64 years. Older patients cannot always be transferred quickly from the hospital after acute illness and on average hospital length of stay (LoS) is significantly higher than for under 65 years [6]. The older people occupy around two-thirds of acute hospital beds and emergency admissions have been rising for several years [7]. The healthcare cost and the proportion of hospital bed days used by older people are likely to increase further due to ageing population [8].

1.2. Physiological changes of ageing

The normal physiological changes occur with ageing in all organ systems (**Table 1**) and this has implications for the clinical assessment of older people [9–11]. Therefore, it is essential to be aware of these changes as these have an impact on drug metabolism and pharmacodynam-

ics. In addition to comprehensive geriatric assessment (CGA), these changes can be delayed or reversed with appropriate diet, exercise and medical intervention.

	Change in physiology	Impact on health
Cardiovascular	↓ Heart rate and cardiac output	Easy fatigability and loss of stamina for physical work
	↓ Arterial compliance	Peripheral oedema
	↑ Systolic blood pressure	Isolated systolic hypertension
	↑ Myocardial irritability	Dysrhythmias
	↓ Tissue perfusion	Cold sensitivity in the hands/feet
	↑ Circulation time	
Nervous system	↓ Normal reflexes	Impaired cognition
	↓ Proprioception	Falls
	↓ Baroreceptor response	Postural hypotension
	↓ Sympathetic response	
	↑ Sensitivity to anticholinergics	
Sensory	↓ Salivation and taste	Aspiration
	↓ Thirst	Dehydration
	↓ Response to pain	Falls
	↓ Visual acuity and peripheral vision	Increased isolation and depression
	↓ Hearing	
Lungs	↓ Tidal volume	Low oxygen saturations
	↓ Vital and total lung capacity	
	↓ Lung compliance	
	↓ Response to hypoxemia	
	↑ Residual volume	
Kidneys	↓ Glomerular filtration rate	Higher chance of drug side effects due to reduced renal clearance (serum creatinine level remains relatively constant due to reduced muscle mass and reduced creatinine production)
	↓ Renal flow and kidney size	
Bladder	Smaller voided volume	Urinary incontinence
	↓ Bladder capacity	Urgency

	Change in physiology	Impact on health
	↑ Involuntary detrusor contractions	Overactive bladder symptoms
	↑ Residual volume	
Gastrointestinal	↓ Gastric emptying	Weight loss
	↓ Bowel movements	Constipation
	↓ Transit time and absorption	Slower drug metabolism and reduced hepatic first-pass effect, thus increased bioavailability
	↓ Liver mass (by 30-40%)	Dehydration
	↓ Sense of thirst	
	↓ Capacity to conserve water.	
Endocrine	↓ Insulin sensitivity	Hyperglycaemia during acute illness
	Thyroid impairment	Risk of hypothermia
	↓ Metabolic rate	Osteopenia/fragility fractures
	↓ Temperature regulation	
	↓ Bone mineral density	
Body composition	Atrophy of skin epidermis	Easy bruising
	↓ Subcutaneous fat	Pressure ulcers
	↓ Sweat glands	Dry skin
	Atrophy of muscle cells	Sarcopenia
	Degenerative changes in many joints	Falls
Immune system	↓ Neurohumoral response	Higher infection rate
	↓ T-cell response	Higher probability of infection

Table 1. Normal physiological changes of ageing.

2. Assessments of older people in hospital

The holistic assessment of older people is best achieved by the MDT. The MDT members include doctors, nurses, physiotherapist (PT), occupational therapist (OT), dietician, clinical pharmacist, social worker (SW), specialist nurses (e.g. tissue viability nurse and Parkinson’s disease nurse specialist), hospital discharge liaison team and carers. Input from a clinical

psychologist or old age psychiatrist may be needed depending on individual patients’ needs. All members engage with patients and carers to complete their assessments and intervention, followed by multidisciplinary meeting (MDM) to formulate ongoing care plan and follow-up.

2.1. Medical assessment

The medical assessment begins at the time of admission to an AMU or an EFU with the appropriate investigations and thus establishing the relevant diagnosis. In addition to treating acute illness, there must be an attempt to optimise the symptoms and treatment of chronic diseases [12]. The common medical diseases among older people are listed in **Table 2**. A carer or a relative usually accompanies an older patient to the hospital, and a short conversation with them can rapidly reveal the diagnosis and direct ongoing management.

Mostly seen in older people	Alzheimer’s disease
	Normal pressure hydrocephalus
	Temporal arteritis (giant cell arteritis)
	Diastolic heart failure
	Inclusion body myositis
	Atrophic urethritis and vaginitis
	Shingles (herpes zoster)
	Benign prostatic hyperplasia
	Aortic aneurysm
	Polymyalgia rheumatica
Common in older age group	Degenerative osteoarthritis
	Overactive bladder with urinary incontinence
	Diabetic hyperosmolar nonketotic coma
	Falls and fragility hip fracture
	Osteoporosis
	Parkinsonism
	Accidental hypothermia
	Pressure ulcers
	Prostate cancer
	Stroke
	Glaucoma and cataract
	Monoclonal gammopathies

Table 2. Common medical diseases among older people.

2.1.1. Acute medical illness

Older people admitted to the hospital with an acute illness often a non-specific presentation, which can obscure the serious underlying pathology or medical diagnosis. For example, acute bowel infarction in older people may not present with typical abdominal pain or tenderness or lack of typical signs on meningism in bacterial meningitis. The atypical presentation in older

people could be one or combination of 'feeling unwell', 'inability to cope', 'off-legs', 'fall', 'confusion', 'dizziness', 'incontinence', 'weight loss', etc. The atypical presentation with possible background sensory impairment, lack of collateral history, polypharmacy and high prevalence of cognitive deficits limits good clinical assessment.

'Feeling unwell' or 'inability to cope' could be a presentation of an acute infection, exacerbation of underlying chronic disease (e.g. chronic heart failure), drug side effect (e.g. constipation) or dehydration. However, this could be due to underlying malignancy; therefore, such a presentation warrants good clinical examination and appropriate investigations.

Worldwide, falls are the second most common cause of unintentional injury and death. A non-accidental fall is a complex system failure in the human organ system, where a person comes to rest on the ground from a standing or a sitting height, unintentionally with no associated loss of consciousness [13]. The prevalence of falls increases with age, and oldest old is at highest risk. One-third of older adults over 65 years and half of older people above 80 years could experience one fall in a year [14, 15].

Falls are most common in institutionalised older people [16] and half of the fallers will fall again within a year [17]. Older people with high risk of falls are sometimes admitted to the hospital to avoid future falls but in reality, hospitals are associated with a higher risk of falling due to several new risk factors such as unfamiliar environment, increased risk of delirium, high beds, single rooms and so on [18, 19]. Falls are associated with a threefold increased risk of future falls, fear of falling, prolonged hospital stay, functional decline, increased dependency, institutionalisation, increased expenditure, morbidity and mortality [20, 21]. Falls result in injury (4%) and fragility hip fracture (1%), following which up to 10% of people will die within a month, a third dying during the following year after [22].

The evaluation of falls begins by distinguishing it from brief sudden loss of consciousness (syncope). However, it could be challenging to do so in certain cases but every effort should be made. Falls cannot only be simply related to underlying medical or neurological disorder as falls are usually multifactorial including a wide range of intrinsic and extrinsic factors. The most common factors leading to falls in neurological patients are the disorder of gait and balance (55%), epileptic seizures (12%), syncope (10%), stroke (7%) and dementia. Falls have particularly being linked to Parkinson's disease (62%), polyneuropathy (48%), epilepsy (41%), spinal disorders (41%), motor neuron disease (33%), multiple sclerosis (31%), psychogenic disorders (29%), stroke (22%) and patients with a pain syndrome (21%) [16]. Dementia is associated with impaired mobility and is an independent risk factor for falling [23]. People who present with a fall or report recurrent falls in the past year or demonstrate abnormalities of gait and/or balance should have multifactorial, multidisciplinary assessment for falls, risk factors, perceived functional abilities and fear of falling. In addition, bone health and history of previous fragility fractures should be explored [24].

'Delirium' is a common syndrome affecting older people admitted to AMU or EFU. It is a serious acute problem which has been best understood as an 'acute brain dysfunction' or an 'acute confusional state' characterised by a rapid onset of symptoms, fluctuating course and an altered level of consciousness, global disturbance of cognition or perceptual abnormalities.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) defines delirium as 'a disturbance of consciousness that is accompanied by a change in cognition that cannot be better accounted for by a pre-existing or evolving dementia' [25].

The diagnosis of delirium is based on clinical observations, cognitive assessment, physical and neurological examination. Despite the common problem, delirium remains a major challenge and often under-diagnosed and poorly managed. Clinically, delirium can be divided into hyperactive, hypoactive or mixed forms, based on psychomotor behaviour. The Confusion Assessment Method (CAM) supports a diagnosis of delirium if there is a history of acute onset of confusion with a fluctuating course and inattention in the presence of either disorganised thinking and/or altered level of consciousness [26]. Collateral history from the family member or carers is helpful to detect a recent change in cognition.

Delirium usually occurs as a result of complex interactions among multiple risk factors such as cognitive impairment, Parkinson's disease, stroke, poor mobility, history of previous delirium, hearing or visual impairment, malnutrition or depression. It is often precipitated in the hospital setting due to acute medical illnesses including infection, acute coronary syndrome, bowel ischaemia, surgical disorder, polypharmacy, pain, dehydration, electrolyte imbalance, new environment, sleep deprivation, constipation, hypoxia, use of restraints or indwelling catheters.

Delirium, if not recognised early and managed appropriately, can result in poor outcomes, including prolonged hospital stay, increased functional dependence, institutionalisation, a risk of developing dementia, increased inpatient and post-discharge mortality [27–29]. Therefore, an older person admitted to hospital with confusion should be promptly assessed for delirium to improve clinical outcomes. The optimal assessment should be completed to identify underlying modifiable risk factors and treating precipitating factors, followed by reorientation and restoration of cognitive functions using non-pharmacological strategies including carer support and education, good communication among MDT and appropriate follow-up. The pharmacological drugs including haloperidol or risperidone should be used to manage severe agitation or behavioural disturbance.

'Dementia' is often recognised for the first time as an incidental condition when people are admitted to an acute hospital for another reason. More than one-third of acute medical admissions (42.4%) for over 70s have been reported to have dementia and only half of which were diagnosed prior to admission [30]. However, dementia can be misdiagnosed as an acute illness and can be accompanied by reversible cognitive decline. In addition, older people with known dementia who present with an altered mental state can be mislabelled as having progressed to another stage of dementia missing undiagnosed delirium. Older people with cognitive impairment are at increased risk of falls [31] and are also more likely to die during hospitalisation, and increased severity of cognitive impairment is associated with higher odds of mortality (from 2.7 in those with moderate impairment to 4.2 in those with severe impairment) [32]. Therefore, older people in hospital settings should be carefully assessed for underlying cognition. Dementia is a chronic progressive brain disorder marked by a disturbance of more than two domains of brain functions for more than 6 months. The various cognitive deficits may include short-term memory loss, language- or word-finding difficulties,

mood and personality changes, impaired reasoning, learning new skills, inability to concentrate, plan or solve problems, difficulty in taking decisions or completing a task, disorientation, visuospatial difficulties or problems with calculations. Dementia is the most appropriate diagnosis when two or more cognitive deficits have an impact on ADLs or social interaction, often associated with behavioural and psychological symptoms of dementia (BPSD) [33].

'Frailty' is defined variably and there is no single generally accepted definition. Fried et al. [34] reported a clinical definition of frailty based on the presence of three or more frailty indicators: unintentional weight loss, slow walking speed, subjective exhaustion, low grip strength and low levels of physical activity. Frailty, based on these criteria, was predictive of poor outcome including institutionalisation and death [34]. Whereas Rockwood and Mitnitski [35] had advocated an alternative approach to frailty by considering frailty in relation to the accumulation of deficits with age, including medical, physical, functional, cognitive and nutritional problems. The frailty index expresses the number of deficits identified in an individual as a proportion of the total number of deficits considered. Higher values indicated a greater number of problems and hence greater frailty. For example, if 40 potential deficits were considered, and 10 were present in a given person, their frailty index would be $10/40 = 0.25$ [36]. A valid index can be derived from the routine information collected on CGA [37–39]. Therefore, the presence of frailty on clinical judgement should prompt consideration to holistic assessment by MDT.

2.1.2. Chronic co-morbidities

Older people usually have more than five medical conditions and one pathological disorder in an organ, which can weaken another system. This results in increased disability, physical dependence, functional deterioration, isolation or even death. Long-term conditions in older people require very careful assessment and monitoring particularly whilst undergoing acute medical treatment in the hospital. Every older person admitted to MAU or EFU should have assessment of underlying chronic medical conditions, including ischaemic heart disease, heart failure, chronic respiratory diseases, chronic inflammatory and autoimmune problems. Modifiable cardiovascular risk factors such as diabetes mellitus, hypercholesterolemia, hypertension, obesity, excessive smoking or alcohol consumption should be reviewed and optimally addressed.

2.2. Mental health assessment

Many people with long-term physical health conditions also have mental health problems [40]. Mental health problems are common in older people, and 8–32% of patients admitted to acute hospitals were found to be depressed [41, 42]. Depression is not a natural part of ageing but can be easily missed in older patients, thus resulting in adverse outcome including delayed recovery and suicide. It is often reversible with early recognition and prompt intervention. Delirium has been reported in 27% of older patients above 70 years [41]. The prevalence of dementia in acute hospitals was reported as 48% in men and 75% in women older than 90 years [30].

The current service models for the provision of mental health input in general medical care wards are variable. The prevailing view in the United Kingdom is that old age psychiatrists have the main responsibility for the diagnosis and management of dementia and other mental health problems. In many hospitals, both psychiatric and medical notes are not easily accessible and are mostly kept separately [43].

The National Service Framework (UK) for older people was published in 2001 — standard seven aims to promote good mental health in older people and to treat and support those older people with dementia [44]. The liaison mental health services have not only shown improved clinical outcomes as measured by the length of hospital stay or discharge to original residence but also suggested cost effective models. However, concerns have been raised about the reliability and validity of the various studies included in this systematic review [45]. The hospital liaison multidisciplinary mental health team is the model advised in the United Kingdom to offer a general hospital a complete service.

The Rapid Assessment Interface and Discharge (RAID) service model is an example in the United Kingdom where a psychiatry liaison service provides MDT input to acutely unwell older people with existing mental health admitted to hospital [46]. The RAID service has shown to be an effective, enhanced service model for older people who are at risk for dementia or other mental health problems and has shown good outcomes with quality improvements in the care of older people [46].

Collateral history from the family or carers remains the key feature for initial assessment. If dementia is suspected in a person, a full medical assessment must be completed, an example being the British Geriatrics Society's guidance on CGA of the frail older people [12]. Older people in the hospitals should be assessed for mood, anxiety and depression. The hospital anxiety and depression scale (HADS) is a simple, valid and reliable tool for use in hospital practice [47]. It is a self-assessment screening tool, which warrants further assessment based on abnormal scores. The score for the entire scale for emotional distress can range from 0 to 42, with higher scores indicating more distress. Score for each subscale (anxiety and depression) can range from 0 to 21 (normal 0–7, mild 8–10, moderate 11–14, severe 15–21) [48]. A short-form Geriatric Depression Scale (GDS) consisting of 15 questions can be used for depression [49]. Any positive score above 5 on the GDS short form should prompt a detailed assessment and evaluation. Generalised anxiety disorder (GAD) is the most common mental disorder encountered in older patients and is often accompanied by depression. It could be helpful to assess older person's emotional state and sense of well-being as they may report psychological burden of the disease, for example, fear of falling or fear of being in the hospital which is associated with loss of independence by older people. History of delusions and hallucinations or previous use of psychotropic drugs may suggest a mental health problem. Patient's permission should be sought before interviewing their relatives or carers for collateral history.

Following initial suspicion or diagnosis of a mental health problem in older people, a more collaborative work between physicians and old age psychiatrists for the prompt diagnosis and management of mental health problems will improve outcome [46].

2.3. Drugs

Drug prescribing increases with both age and incidence of co-morbidities [50, 51]. Polypharmacy is defined as use of either five or more concurrent medications or, at least, one potentially inappropriate drug. Half of older people aged between 65 and 74 years and two-thirds of those aged 75 years and over are affected by polypharmacy including conventional and complementary medicines [52]. Polypharmacy is associated with adverse outcomes including hospital admissions, falls, delirium, cognitive impairment and mortality [53, 54]. Although drugs have an important role in managing co-morbidities, it is not without harm and adverse outcomes [55].

There is conflicting evidence that psychotropic medications are associated with higher falls in people with dementia [56, 57] though there is clear evidence that there is associated increased fall risk in cognitively intact people [58]. Other classes of drugs including Parkinson's disease drugs, anticonvulsants, steroids and fluoroquinolone can result in acute confusion [59]. Drug interactions could impair electrolytes, cause postural hypotension, hypothermia, gait disorder or gastrointestinal disturbance, resulting in prolonged hospital admission [55].

Therefore, all older inpatients should have drug review and withdrawal of any possible offending agent if practical would be logical. This can be based on screening tool of older persons' prescriptions (STOPP), and a tool to alert doctors to commence appropriate treatment (START) criteria should be used [60]. Patients should also be assessed for their ability to manage their drugs, understanding of drug, dexterity and vision. At the same time, appropriate new medications if deemed necessary and evidence-based should be commenced. Older people with cognitive impairment should be prescribed with greater care, adhering to the principle of, 'starting low and going slow' [61].

2.4. Physical performance

Gait and balance are regulated by both central and peripheral nervous system; thus, various neurological disorders can result in postural instability and poor mobility. Balance system can be affected by the impact of neurological disease on postural responses, postural tone, sensory feedback, visuospatial disorder, executive dysfunction or delayed latencies. Gait disorders have been classified into lower (e.g. peripheral), middle (e.g. spinal, basal ganglia) and higher level gait disorders (e.g. frontal or psychogenic) [62]. The more pragmatic approach could be used to describe gait disorders including hypokinetic gait disorders, dystonic, hemi- or paraparetic gait, ataxia, vestibular, neuromuscular and psychogenic gait [62]. All components of gait including initiation of walking, step length, coordination, walking speed, symmetry, stride width, rhythm and posture should be assessed. Various tools/scales can be used for further assessment of gait and balance (**Table 3**). Most physicians work closely with PT and rely on their assessment of patient's needs in relation to mobility, balance and posture. Multidimensional assessment and multiagency management of mobility in older people lead to better outcomes.

	Technique	Normal values
Turn 180° [63]	A measure of dynamic postural stability, asking a patient to take few steps and then turn around by 180° to face opposite direction. Count the number of steps taken to complete a 180° turn	Five or less steps
3-m TUG test [64]	A measurement of mobility. A person is asked to stand up from seated position, walk for 3 m, turn and walk back to a chair and sit down. Measure the time taken in seconds	12 or fewer seconds, can vary with age by 2–4 s
Near tandem stand [65]	A measure of balance and ankle strength. A person is asked to stand in a near tandem position with their bare feet separated laterally by 2.5 cm with the heel of the front foot 2.5 cm anterior to the great toe of the back with their eyes closed. A person can hold arms out or move the body to help keep the balance but do not move the feet	Able to stand >30 s with eyes closed
Alternate step test [66]	A measure of strength, balance, coordination and stair climbing. It provides a measure of mediolateral stability. A person should be asked to place alternate whole left and right bare foot onto a 19-cm high stepper for a total of eight times	10 or fewer seconds, can vary with age by 2–4 s
Sit-to-stand test [67]	A measurement of functional mobility, balance and lower limb strength. A person should be able to stand up and sit down five times with crossed arms from a 45-cm straight-backed chair	11.4 s (60–69 years); 12.6 s (70–79 years); 14.8 s (80–89 years)

Table 3. Gait and balance assessment tools.

Physical activity interventions for people with an intact cognition are well documented and shown to be effective in improving balance and reducing falls. People with dementia are two to three times more likely to fall [16] and risk is further increased in people with Lewy body dementia (LBD) and Parkinson's disease dementia (PDD) [23, 68]. There is limited evidence showing significant gait and balance improvement following the targeted exercise programme in the community-dwelling older people with dementia [69]. More recently, it has been shown that supervise exercise training in people with dementia living in community could improve muscle strength and physical activity [70]. There is dearth of similar studies in the hospital setting and further research is required. A simple flexible home-based muscle strengthening and balance-training exercise programme along with medication could improve the physical performance in the older people.

2.5. Functional status

It is not uncommon for older people to be admitted to the hospital with functional deterioration or increased dependence, thus unable to cope. Older people admitted to the hospital with an acute medical problem, 'geriatric giants' [71, 72], incontinence, immobility, postural instability (falls) and intellectual impairment (dementia) or who are frail with one or more disability should get an appropriate functional assessment. A typical geriatric assessment for such

people should begin with a review of their functional status. This is usually captured in two commonly used functional status measurement—basic ADL and instrumental ADL (IADL). The ADL that is initially affected includes complex or IADLs such as shopping, handling finances, driving, cooking or using the telephone followed by basic ADL including bathing, dressing, toileting, transferring, continence or feeding. Whether patients can function independently or need some help is usually determined by OT, as part of the comprehensive geriatric assessment. OTs work closely with the physiotherapists to assess patient's own environmental and home status with the identification of appropriate equipment and its delivery before discharge. In addition to optimising functional independence, OT intervention also enhances home comfort, safe use of available facilities, safe access to transport or potential use of telehealth technology and local resources.

The assessment of functional limitations is best completed by an interview with the person and caregiver with open-ended questions about their ability to perform activities. They can further be assessed by direct observation either in their usual place of residence or whilst performing a routine activity, for example, toilet use. The functional status can also be assessed using a standardised assessment instrument with questions about specific ADLs and IADLs. There are more than 15 validated scales to complete functional assessments including Katz index of independence in activities of daily living [73], the modified Blessed dementia scale [74], the instrumental activities of daily living scale [75], the Functional Assessment Questionnaire [76], Functional Assessment Staging Test [77], Barthel Activities of Daily Living Index Scale [78], Alzheimer's Disease Co-operative Study-Activities of Daily Living Inventory [79], Disability Assessment for Dementia [80] and Bristol activities of daily living [81].

The functional scales can detect early functional impairment and often help discriminate mild dementia in comparison to those with no cognitive impairment. The scales that assess complex social functional activities are better in detecting dementia compared to those scales that involve basic ADLs [82]. A good timely recognition of functional difficulties may arrest further decline, postponing the need for care-home placement. The functional assessment scales can only provide a guidance and these scales are commonly used to assess the treatment efficacy in scientific research studies.

2.6. Continence assessment

Urinary incontinence (UI) is defined by the International Continence Society as 'the complaint of any involuntary leakage of urine'. Older people may assume that UI is a normal consequence of ageing and often may not be reported. UI is a common problem and older people may feel embarrassed to discuss the problem and avoid evaluation. Incontinence is associated with social isolation, institutionalisation and medical complication including skin irritation, pressure sores, recurrent infections and falls. The prevalence of urinary incontinence depends on the age and gender; for older women, the estimated prevalence of urinary incontinence ranges from 17 to 55% (median = 35%, mean = 34%). In comparison, incontinence prevalence for older men ranges from 11 to 34% (median = 17%, mean = 22%) [83].

There is a strong association of faecal incontinence (FI) with age; FI increases from 2.6% in 20–29-year-old up to 15.3% in 70 years or above [84]. In hospital settings, UI can be an atypical presentation and is a risk factor for adverse outcomes. The aetiology of incontinence in older people is often multifactorial. People with cognitive impairment usually encounter UI and later FI. Older people often find it difficult and challenging to express the need of regular toilet use, and as dementia progresses, it could be difficult to identify toilet or use it appropriately. Incontinence and inability to use toilet independently can be frustrating and distressing, which may lead to psychological burden, isolation, immobility or institutionalisation.

Therefore, a good continence assessment should be an essential component for any older people admitted to hospital to ensure good-quality person-centred care, promoting independent living. Assessment of precipitating factors and identification of treatable, potentially reversible conditions are essential steps. Continence problems can be secondary to drug side effects, constipation, impaired mobility, arthritic pain, inappropriate clothing or dexterity.

A good clinical history could categorise UI as stress UI (involuntary urine leakage on exertion), urgency UI (a sudden compelling desire to urinate) or mixed UI (involuntary urine leakage associated with both urgency and exertion). Overactive bladder (OAB) is defined as urgency that occurs with or without incontinence and usually with frequency and nocturia. Bladder diary (72-h urine frequency volume chart) and pre- and post-void bladder scan support clinical diagnosis. Vaginal inspection is helpful to exclude vaginal atrophy, prolapse or infections. Older people with FI should have an anorectal examination to exclude faecal loading, lower gastrointestinal cancer, rectal prolapse, anal sphincter problems or haemorrhoids. Neurological causes of cauda equina syndrome, frontal lobe tumours, neurodegenerative disorders or stroke could also result in UI or FI.

The continence problems can be minimised by promoting regular toilet use, appropriate toilet adaptations and providing walking aids to improve accessibility to toilet. Nocturnal incontinence remains a challenging situation but can be managed using various containment methods or limiting fluid intake in the evening. Drug treatment after specialist continence assessment is usually the next step if non-drug measures failed to provide symptomatic benefits. The aim should be to treat the underlying cause but people who continue to have episodes of UI or FI after initial management should be considered for specialised management.

2.7. Nutritional assessment

Older people admitted with an acute illness are at increased risk of weight loss and this remains a challenge for the teams in the hospital setting. Acute illness can result in loss of appetite, and management of an acute illness may take priority, therefore making older people more vulnerable in the hospitals, particularly those with cognitive impairment or those who cannot communicate their needs. The National UK Dementia Audit Report in 2013 showed that nutritional assessments were undertaken in less than 10% of patients in some hospitals [85].

A detailed nutritional assessment should be undertaken on admission to hospital and should include any recent weight loss, dietary intake and habits. The risk factors including dry mouth, poor oral hygiene, problems with dexterity, reduced vision, acute or chronic confusion,

constipation or pain should be explored and actively managed to avoid poor nutrition. Regular nutritional assessments using Malnutrition Universal Screening Tool (MUST) can be helpful and this has been validated to be used by any health professional in the hospital. It is a five-step screening tool, which can identify those who are at risk of weight loss or are malnourished [86].

A collective and simple approach with involvement of family and carers can prevent malnutrition during hospitalisation. Patients should be offered small frequent meals and regular snacks or preferred food is often helpful. Protected meal times and regular prompting or assistance for those with cognitive impairment can lead to improved food intake [87].

2.8. Personal hygiene

2.8.1. Oral and dental hygiene

Higher levels of poor oral health can be commonly observed and it is challenging to provide good and regular oral hygiene care to older people in hospitals. The oral hygiene in older people can be compromised secondary to impaired sensory functions, reduced physical dexterity and functional dependence. Older people are often on polypharmacy including anticholinergics, diuretics, antidepressants and antipsychotics. The common side effects of drugs are reduced salivary flow, which could affect the efficiency of chewing, leading to dental problems. Older people with cognitive deficits are at higher risk of developing oral diseases and conditions including dental caries, dental plaques and missing teeth [84]. Poor oral hygiene can also be related to uncontrolled diabetes, inappropriately fitted dentures, lack of teeth, poor mobility or salivary gland dysfunction [88].

Oral Health Assessment Tool (OHAT) screening has been proposed for the timely assessment of oral and dental hygiene. This tool has been validated for use by nursing staff in care-home residents [89] also those with dementia [90]. There could be reluctance and resistivity to maintain basic good oral hygiene by choice or lack of knowledge/information. Enhanced engagement of carers with oral hygiene strategies, a good education on oral hygiene in older people and timely identification of oral health problems by regular dental consultations could be effective in preventing oral diseases.

2.8.2. Skin

Older people, in general, are at higher risk of skin problems including pruritus, eczematous dermatitis, purpura, venous insufficiency and pressure ulcers. Other risk factors include loss of protective fat, malnutrition, frailty, sarcopenia, urinary or bowel incontinence and cognitive impairment. The risk of pressure ulcers further increases with hospitalisation secondary to poor oral intake and reduced physical activities.

Prompt assessment and appropriate skin-care plan including good personal hygiene, healthy balanced diet, avoiding excessive heat and friction, promoting continence and early mobilisation are the key factors to minimise the risk of skin breakdown.

2.9. Vision

Visual impairment is common in older people and this risk increases with advancing age. The visual impairment increases from 6.2% at ages 75–79 to 36.9% at age 90 or over [91]. Blindness also increases from 0.6 (75–79) to 6.9% in 90 years or over. Visual impairment in older people is often under-diagnosed and can complicate the accurate assessment of ADLs. Older people who experience visual problems may avoid activities that require good vision and become isolated or even need to be institutionalised. People with cognitive impairment may further experience visuoperceptual difficulties such as visual hallucinations, colour perception, background contrast and depth perception.

Simple measures such as the use of blinds or shades to reduce glare, wearing the correct glasses, minimising visual and physical obstacles, using colours and contrasts to mark different areas, assistive technologies such as automatic lights, audio labels or audio books can minimise the risks. Requesting eyesight testing by involving optometrists or ophthalmologists to examine eyes for the causes of sight loss is a first step in defining appropriate interventions.

2.10. Hearing

Hearing impairment is one of the three most common chronic diseases along with arthritis and hypertension [92]. People with hearing loss are less likely to participate in social activities and are less satisfied with their life as a whole. Hearing loss does not only affect individual's emotional well-being but also their ability to manage IADLs. Older people with hearing loss are prone to develop dementia [93] and hearing loss is commonly reported in people with dementia.

Hearing loss can be conductive and sensorineural. The causal factors that may contribute to hearing impairment could include ear wax build-up, ear infections, degenerative ageing process, excess occupational noise, stroke, head injuries, drug side effects or neoplasms like an acoustic neuroma.

All patients with hearing impairment require thorough examination and presence of dementia should not preclude assessment for a hearing aid. Simple measures such as speaking in a normal tone, giving attention and making eye contact are helpful. Appropriate seating, eliminating background noise and repeating the key phrases or summary points improve communication. Hearing aids are often useful, though they do not improve cognitive function or reduce BPSD but has shown that patients improved on global measures of change [94].

2.11. Pain

Pain should be treated as a fifth vital sign. Pain assessment involves holistic evaluation of the person on the first presentation of pain and then following up with regular pain assessment. Pain assessment should include the site of pain, type, precipitating factors and impact of pain on the individual. Physical assessment should be performed for any skin bruise or infection, constipation, reduced range of joint movement, vertebral tenderness, recent injury or fracture. There are several pain scales available, visual analogue scale or the numerical rating scales are most useful.

Older people with cognitive impairment and those who cannot verbally communicate their symptoms particularly pain, observation or collateral information from relative or carer or suggestion of change in person's behaviour could help to assess the severity of pain [95]. The numeric pain-rating scale (0–10, where 10 being most severe pain) is often used in routine clinical practice. The specific pain-screening tools such as 'Assessment of Discomfort in Dementia (ADD)' are available to be used in patients with cognitive impairment. The tool involves assessing pain history, physical examination and administration of analgesics and giving analgesics as needed [96].

2.12. Sociocultural assessment

It is important to assess person's language, ethnic background, cultural beliefs, personality, education, family experience, socio-economic status and life experience to complete assessment holistically and provide person-centred care. A detailed assessment of social network, daytime activities and informal support available from family or friends should be done on the first day of admission to the hospital.

A prompt, patient-centred identification of the requirement of social services input helps with safe timely discharge to the most suitable and friendly environment. Social Worker (SW) should ideally be allocated if a need for social services is anticipated at the time of hospital admission. Once all the needs of the patient are identified, SW should be contacted to organise formal carers or care-home placement if the patient is not suitable for home discharge.

2.13. Quality of life

The quality of life (QoL) assessment was almost unknown 20 years ago but it is now an established fact that the psychological burden of an illness cannot be described fully by measures of disease status. It has been acknowledged that various psychosocial factors such as apprehension, anxiety, restricted mobility, difficulty in fulfilling ADLs and the financial burden must also be addressed to complete holistic assessment of older people. The most important constituents of the quality of life in older age from older people's perspective are having good social relationships with family, friends and neighbours; participating in social and voluntary activities and individual interests and having good health and functional ability [93, 94]. Other measures of good QoL include living in a good home and neighbourhood, having a positive outlook and psychological well-being, having an adequate income and maintaining independence and control over one's life [97, 98].

The assessment of a patient's experience of disease and its effect on their quality and outcome framework (QoF) should be one of the central components of healthcare assessment to acknowledge safe and early hospital discharge. The family members should be involved on occasions when it is difficult to measure the patient's QoL due to underlying cognitive impairments and communication deficits [99].

2.14. Sexuality

Sexual desires and the physical capacity to engage in sex continue throughout life. Though many older people enjoy an active sex life, there has been a little mention of sexuality or the problems that older people may face related to sexual issues in government policies [96].

There are several causes for loss of interest and frequency of sexual activity in later life including physical health problems, emotional distress, drug use, male or female sexual dysfunction, practical problems, willingness or lack of partner and not necessarily only ageing [100]. Healthcare professionals routinely avoid discussing sexual problems with older people; however, sharing physical relations and closeness are very important in maintaining long-term emotional and physical intimacy.

3. Examination

Thorough physical examination from head to toe in a systematic fashion is essential, especially if the cause of acute illness or deterioration is not clear from the history. The clinical signs may not be very obvious as often older people have an atypical presentation, for example, hypothermia instead of hyperthermia, lack of typical signs of heart failure or meningism. Older people sometimes get fatigued after history taking; in such occasions, physical examination may have to be done at a different time.

4. Investigations

The investigations should be requested only as indicated by clinical examination. For example, urine analysis should only be done if symptomatic, unexplained systemic sepsis or delirium. As over diagnosis of urinary tract infection may point towards inadequate assessment of frail older people. The common investigations usually include blood oxygen saturation, complete blood count, kidney, liver, bone profile, urinalysis and a chest radiograph. An electrocardiogram should be obtained because there is a higher risk of silent myocardial infarction in older people. Other investigations including CT brain or lumbar puncture are helpful in those with unexplained altered mental status.

5. Management

The drug and non-drug treatment should be evidence based with aim to treat underlying medical illness. The management of older people needs close liaison work with geriatricians, acute physicians, ED and MDT. The model of care should be established in hospitals so that supportive care for older people can be provided within the first few hours of an admission [101]. For older people with frailty, multiple co-morbidities and an acute illness, admission

should be to an Emergency Frailty Unit (EFU), a separate unit within an AMU. EFU or a similar unit led by a geriatrician and the multidisciplinary team (MDT) could not only provide comprehensive person-centred care but also enhance clinical outcomes irrespective of age [102]. In addition, a close working with liaison old-age psychiatry can improve outcome [43]. There should be minimal intra- and inter-hospital transfer to reduce the risk of delirium. Interventions should be planned very carefully and keeping the associated risks in mind, for example, older people should not be routinely catheterised unless there is evidence of urinary retention.

5.1. Patient education

Hospital admission could be a good opportunity to educate older people and their carers on chronic disease and its management, healthy lifestyles, physical activity, sufficient fluid intake and healthy nutritious foods. Alcohol consumption is under-recognised in older people and an informal discussion by a health professional could be beneficial. A brief discussion with a clinical pharmacist can improve adherence to medication in older people.

5.2. Staff training

Training in hospitals is usually directed towards patient safety, managing acute medical conditions, good handover, and rapid response to a sick patient; however, it is equally essential to augment knowledge and skills of hospital staff in assessing and managing older frail patients. The majority of older patients are admitted to hospital through AMU or directly to EFU, which justifies the need for an EFU geriatrician taking a lead in staff training at the front end [101]. Nursing staff need regular training and education on geriatric giants and frailty [103]. Systematic nurse training has shown to reduce work-related stress [104] and improved outcomes as measured by reduction of inpatient falls [105]. Dementia awareness training should be mandatory and should also be included in induction programmes. Staff members should be encouraged to collect personal information about people with dementia to help improve care, for example, use of 'This is Me' document. Information sharing and communication among staff, carers and patients should be improved to ensure that all staff coming into contact with older frail people are aware of their problems and associated needs.

5.3. Caregiver problems

Occasionally, problems of older patients are related to neglect or abuse by their caregiver. Hospital staff should consider the possibility of 'elder abuse' if there are suggestions on clinical assessment. Certain injury patterns are particularly suggestive, including frequent bruising (middle of the back, upper arms or groin area), fearfulness of a caregiver or unexplained burns.

5.4. Service outcome review

The regular involvements in audits and analysis of hospital readmission rates, delayed discharge and mortality could identify the needs for service improvement and provision of safe enhanced good quality care for older people.

6. Discharge planning

Older people admitted to hospital are entitled to receive a smooth transition from one stage of hospital care to the next stage of care in the community. A lack of coordinated and person-centred discharge planning can lead to poor outcomes for the patients, thus affecting their health and safety. Poor discharge planning can also lead to inappropriate prolonged LoS or premature discharge and thus result in possible readmission to the hospital.

6.1. Independence

Maintenance of independence and participation in social and voluntary activities are the key benefits of home discharge. This has been quoted as one of the major elements of good QoL. Older people usually have a fear of losing independence as a result of ageing. Older people have reported that being independent, free to please oneself and freedom from time constraints are the best things about growing old [106]. Independence is usually associated with good health, living in own home and ability to walk independently. However, independence is felt to be lost if older people are unable to manage their ADLs. The perceived physical environmental barriers and mobility or ADLs have significant positive correlation [107].

6.2. Safe, effective and timely discharge

The principal aims of the safe and effective discharge process are to ensure that patients should not stay in the hospital any longer than necessary. Discharge should be on 'pull system' rather than on 'push system' in order to maximise their social interaction and independence by providing timely and comprehensive carer support according to their needs.

Discharge planning should be a systematic coordinated process, which should begin on the first contact with health professional based on the specific needs of the patient with documentation of expected date of discharge (EDD). An older person must be assumed to have capacity unless suggested otherwise and all patients should be encouraged to take their informed decision with an aim to maintain their maximum independence and social interaction in the community.

Where a discharge process is complex, a safe discharge meeting (SDM) should be set and should be attended by members of MDT with SW and preferably by the patient's relative/carer. There should be a clear purpose of the meeting and needs of the patients should be discussed. The information should be gathered from the SW regarding existing care support services. If there is no need for further specialist referral then discharge date should be set and appropriate requirement of support should be requested by involving social services or voluntary organisations. The confirmation of fitness to discharge must be agreed at least 24 h in advance of EDD with appropriate arrangements for transport.

6.3. Ethical issues related to discharge

The patient's autonomy should be respected both ethically and legally considering that a patient can understand proposed place of discharge, alternatives, risks and benefits in order

to consent or refuse it. Patient's autonomy also requires consulting them and obtaining their informed consent before planning a discharge. The healthcare professionals should practice the principles of beneficence and non-maleficence together and aim at producing net medical benefit with minimal or no harm

6.4. Individual's interests and family wishes

The patient's interests and wishes should be taken into account when considering discharge planning and future care. The hospitalised patients can wax and wane in the level of alertness, so they should be assessed when they are fully awake and have not received any medications, which can impair their cognitive functions. If there are any doubts about the patient's expressed wishes, they should be evaluated at a later stage. There should be an attempt to involve the family and carers to organise patient-centred hospital discharge process, particularly for those patients who have underlying cognitive or uncorrected sensory impairment.

6.5. Decision-making capacity

According to English Law, an adult has the right to make decisions affecting his or her own life, whether the reasons for that choice are rational, irrational, unknown or even non-existent. Adults over 16 or those who lack capacity to make their own decisions to medical care and treatment are protected by The Mental Capacity Act (MCA) (UK).

The MCA provides a statutory framework and aims to support an individual's right to protect them from any harm caused due to lack of capacity to make autonomous decisions for themselves [108]. Therefore, every effort should be made to support people who lack capacity to make their own decisions; however, if the person clearly lacks capacity, this should be formally assessed. The decision should be discussed among MDT members and 'best interest meetings' should be organised in liaison with family or carers to make important decisions.

7. Follow-up

Older people discharged should have appropriate access to outpatient follow-up clinics, intermediate and social-care services. There should be effective electronic information-sharing with primary care and community.

7.1. End-of-life care

Some older frail people discharged from hospital could have a poor outcome. Mortality rates for frail older people in the year following discharge from AMUs are high (26% in one series) [109]. Most very old individuals with severe dementia in the community die away from a usual place of residence and hospitals remain the most common place of death [110]. Dementia care during end of life is not similar to the other life-limiting illness [111]. The symptoms experienced by the people with dementia are similar to those with cancer patients but often dementia is not considered as a life-threatening illness. People with dementia not only experience

symptoms over longer period but also need more support from the social services and palliative teams [112].

Therefore, healthcare and social care professionals should discuss and record advance care planning statements, advance decisions to refuse particular treatments or preferred place of care in future. The decisions made should be shared with community team and families/carers.

8. Current evidence on CGA

The concept of CGA evolved as a result of multiple complex problems in older patients. The first comprehensive meta-analysis of the benefits of CGA was conducted in 1993, which demonstrated that CGA could improve the functional status, survival, reduce the hospital LoS and subsequent health service contacts as well as reduce care-home admissions. This meta-analysis also showed that an improvement in physical function from the geriatric evaluation and management unit (GEMU) interventions was maintained at 12 months (odds ratio (OR): 1.72; 95% confidence interval (CI): 1.06–2.80) [113].

Although there is a proven role for intensive geriatric rehabilitation in improving the functional outcome and independence in patients with hip fracture [114, 115], other randomised control trials (RCTs) comparing CGA to routine care in later years showed no significance in physical functioning or hospital LoS [116–118].

The systematic review of the literature including 20 randomised controlled trials (RCT) (10, 427 participants) of inpatient CGA for a mixed elderly inpatient population was conducted in 2005. This review confirmed the benefits of inpatient CGA and increased chances of living at home at 1 year, and improved physical and cognitive function with no long-term mortality benefits [119]. More recently, systematic review and meta-analysis involving 17 trials with 4780 people compared the effects of general or orthopaedic geriatric rehabilitation programmes with usual care. The specifically designed inpatient rehabilitation for geriatric patients showed beneficial effects over usual care for functional improvement, preventing admissions to nursing homes and reducing mortality [120].

It appears that setting up a CGA unit carries increased staffing costs or insufficient cost-effective data are available [120] but in American studies of medical and surgical patients the financial costs of managing care for older people in a specialised hospital unit were not more expensive than caring for patients on a usual-care ward [121, 122]. A meta-analysis of RCTs in 2011 has confirmed not only benefits of CGA but also a potential cost reduction compared to general medical care [123]. However, the nature of CGA varies and many, but not all, older people have complex care needs. Therefore, it is difficult to identify which patients will benefit the most and those at risk of adverse outcomes. Frailty status measurement by an index of accumulated deficits generated from routine CGA has shown strong association with adverse outcome; therefore, frailty index may have clinical utility, augmenting clinical judgement in the management of older inpatients [39]. In summary, older frail patients should have early

access to inpatient CGA and interdisciplinary involvement in a specialist ward for optimal care to reduce LoS, regain function and physical stability [120].

9. Limitations to a good assessment

1. Lack of training for doctors, nurses and multidisciplinary members and unfamiliarity with key principles and practices of geriatric medicine [103, 124].
2. Awareness and support to MDT members is relatively poor.
3. Lack of interest and associated negative societal attitudes towards older people.
4. Limited access to dementia care training to meet the complex care needs of older people [125].

10. Conclusion

Comprehensive geriatric assessment has proven benefit and this should be considered as the evidence-based standard of care for the frail older inpatients. There is a need to configure emergency, acute medical and geriatric services to deliver high-quality CGA for frail older people at the earliest possible time following contact with the acute sector. The aim should be better integration among multidisciplinary members to achieve well-coordinated, high standard of care and improve outcomes. Older people are the major users of acute care and AMU is the key area for initial decision-making; therefore, staff training to meet the needs of frail older people in Acute Medical Unit or Emergency Frailty Unit is mandatory.

11. Conflict of interest

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