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*Providing holistic care
for older people*

- ♦ *Health screening for older people—what are the current recommendations?*
- ♦ *Correlation between cognitive impairment and depressive mood of Thai elderly with type 2 diabetes in a primary care setting*
- ♦ *Social support and self-care activities among the elderly patients with diabetes in Kelantan*



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Providing holistic care for older people

Ng CJ

Editor in Chief

Personally, I find managing older people challenging but rewarding. Unlike a younger man, an elderly man with pneumonia may present with confusion or falls rather than fever, cough and breathlessness. A 70-year-old woman with diabetes is likely to also have hypertension, dyslipidaemia, osteoarthritis, hearing difficulty and depression. As a family physician, not only do we have to help them control their blood pressure and glucose, we have to deal with the new symptoms that occur more frequently as they age. How do we pack all these in a short consultation of 10-15 minutes (if we are lucky enough to have that amount of time)? This is not even taking into consideration offering timely and evidence-based screening, such as faecal occult blood test for colorectal screening and mammogram for breast cancer, to the older people as recommended by the clinical practice guidelines.

This first issue of MFP in 2015 brings you a few articles that focus on elderly issues that are important yet often neglected in our busy clinical practice. Sazlina SG provides an overview of screening in older people, emphasising the lack of evidence to screen for the 'old old', (e.g. breast and cervical cancer) and the decision whether or not to screen an older person should be based on 'comorbidity, functional status and life expectancy, and has to be individualised'.¹ Trongsakul S conducted a study in Chiang Mai, Thailand and found that those who had cognitive impairment were more likely to be depressed in a group of older people with type 2 diabetes who had low literacy.² This article highlights the importance of screening for comorbidity in older people as conditions such as dementia and depression (pseudodementia) can coexist and pose a diagnostic challenge due to overlapping symptoms. In a paper by Ahmad Sharoni et al, he found that among 200 people with type 2 diabetes aged 60 years and above in Kelantan, the social support and self-care activities were moderate.³ Interestingly, higher social support was associated with lower self-care activities. This inverse relationship may suggest the 'negative' role of families in discouraging self care activities, which may be unique to local culture and requires further research.

Despite all these challenges, managing older people in general practice can be very rewarding. We have built a close doctor-patient relationship with the patient over time and the trust increases with time which makes the management easier. The consultations become more amicable and often turn into a 'social chat'. In fact, we can learn a lot from our older patients if we spend time listening to them.

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Health screening for older people—what are the current recommendations?

Sazlina SG

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Abstract

The world population of older people is on the rise with improved health services. With longevity, older people are at increased risk of chronic non-communicable diseases (NCDs), which are also leading causes of death among older people. Screening through case finding in primary care would allow early identification of NCDs and its risk factors, which could lead to the reduction of related complications as well as mortality. However, direct evidence for screening older people is lacking and the decision to screen for diseases should be made based on comorbidity, functional status and life expectancy, and has to be individualised.

Introduction

The world population is growing rapidly from 2.5 billion in 1950 to 6.9 billion in 2010.¹ By 2050, the world population of people aged 60 years and more is estimated to reach 2 billion. It is estimated that the proportion of older people living in the lower and middle-income countries such as Malaysia will increase from 60% in 2005 to 80% by 2050.² This growth is attributed to lower fertility rate, greater life expectancy and improved public health services. With increased longevity, more people are at risk of developing chronic non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes and malignancy.³ Approximately 50.0% of adults aged 60 year and more have at least one chronic non-communicable disease and about a third have at least two.² This would lead to a significant disability and diminished quality of life of the older people. In addition, among the people aged 60 years and more, NCDs accounts for more than 80.0% of the healthcare burden in low-, middle- and high-income countries. Globally, NCDs are the leading causes of death and these include ischaemic heart disease, stroke, chronic obstructive pulmonary disease, diabetes, hypertensive heart disease and malignancy.³ In 2012, approximately 45.0% of mortality among adults aged 70 years and more across the globe was due to NCDs.

Targetting the modifiable risk factors and early identification of NCDs in the “young old” (aged 60–75 years) have been shown to reduce morbidity and mortality significantly among older people.⁴ This in turn would decrease the

burden of chronic NCDs, promote the health of older people and improve independence. With this notion, screening for health problems that would emerge in later life was deemed as essential. At present, there are screening or preventive care guidelines for older people available as reference to guide primary care physicians.^{5–9} Most of these guidelines focus on older people's functional ability and preventive activities in older age, which include screening for physical function, vision, hearing, cognition, osteoporosis, falls prevention and immunisation. Some of these guidelines do include screening for early detection of chronic NCDs.^{5,6,8} However, these guidelines discuss screening recommendations for all adults without a focus on older people. Therefore, the current review discusses the recommendations on preventive strategies and early detection of chronic NCDs in older people.

What is screening in primary care?

Screening is an assessment to “identify apparently healthy people who are at increased risk of a disease or health condition.”¹⁰ It is aimed to identify people who would be benefitted from further assessment. Screening in clinical practice is about case finding where the physician takes opportunity to request for a screening test that is more likely to result in follow-up as compared to mass screening. Screening should be on a defined target population and in the presence of scientific evidence on the effectiveness of the screening test.¹¹ In addition, the overall benefits of screening should outweigh harms.

What are the recommendations for screening diseases in older people?

From previous guidelines recommendations for early detection of diseases in adults include screening for cardiovascular risk, diabetes, certain cancers and depression.^{5,6,8}

Screening for cardiovascular risk

With longevity, chronic NCDs such as hypertension, dyslipidaemia and type 2 diabetes are becoming more prevalent among older people leading to significant cardiovascular diseases such as stroke and coronary heart diseases (CHDs), as well as related mortality.¹² Many screening guidelines have now included screening for cardiovascular risk. These include screening for high blood pressure, type 2 diabetes, dyslipidaemia and tobacco use.⁵⁻⁸ Most of these guidelines recommend to start the screening of adults who are 20 years old but do not suggest the upper age limit to stop screening. Since the prevalence of chronic NCDs also increases with age and do impact on older people's functionality and quality of life, therefore, these screening recommendations should extend to the older people in clinical practice too.

Screening for cardiovascular risks requires an understanding of coronary artery disease (CAD) risk assessment. The major risk factors include: advancing age, high total serum cholesterol and low density lipoprotein cholesterol (LDL-C), low levels of high density lipoprotein cholesterol (HDL-C), presence of type 2 diabetes and hypertension, cigarette smoking and family history of CAD. Family history of CAD includes "definite myocardial infarction or sudden death of father or other male first-degree relative before the age of 55 years or death of mother or other female first-degree relative before the age 65 years."¹³

a) Screening for high blood pressure

Hypertension is a common chronic NCD among older people with prevalence ranging between 52.0 and 72.0%.¹⁴ Similarly, the Third Malaysia Health and Morbidity Survey (2006) reported 74.0% of older people have hypertension.¹⁵ Hypertension is a known risk factor for CHD, stroke, heart failure and premature deaths. Treating hypertension has been shown to reduce these morbidities in people aged 60–69 years.¹⁶

A systematic review on screening for high blood pressure found screening program with comprehensive cardiovascular risk assessment and education session for people aged 65 years and more reduced the risk of admission for myocardial infarction (RR = 0.87, 95% CI = 0.79–0.97) and heart failure (RR = 0.90, 95% CI = 0.80–0.99).¹⁷ In addition, there were non-significant reduced trends in stroke (RR = 0.99, 95% CI = 0.88–1.12) and cardiovascular mortality (RR = 0.98, 95% CI = 0.92–1.04).

A meta-analysis also demonstrates indirect evidence for the benefits of treating hypertension regardless of its severity.¹⁶ Lowering the systolic blood pressure by 10 mmHg using antihypertensive agents in people aged 60–69 years could prevent 41.0% of stroke and 22.0% of CAD events. In addition, antihypertensive treatment is beneficial in people aged 80 years and more, which is associated with a 30% reduction in fatal or non-fatal stroke, a 39% reduction in stroke related mortality, a 21% reduction in all cause mortality, a 23% reduction in the rate of death from cardiovascular causes and a 64% reduction in the rate of heart failure.¹⁸ A systematic review showed that harms of pharmacologic therapy for early hypertension was minimal as they were associated with common side effects and serious adverse events were uncommon.¹⁹

The evidence for the effectiveness of screening for high blood pressure or hypertension in older people is limited. However, the indirect evidences showed that identification of older people with hypertension lead to treatment, which in turn improved the risk for cardiovascular diseases. Therefore, screening for high blood pressure or hypertension is suggested at regular clinic visits as recommended by other guidelines.⁵⁻⁷

b) Screening for type 2 diabetes

The prevalence of type 2 diabetes in the European and Asian people aged 60–79 years range between 10 and 20.0%.²⁰ Similarly in Malaysia, the prevalence increases with age with the highest proportion of 26.1% in the 60–64 years age group²¹ and is the leading cause of death.²² The International Diabetes Federation (2013) suggests that older people should be regularly examined for type 2 diabetes as it commonly remain undiagnosed until complications such as CAD and stroke appear, which is associated with significant morbidities and mortality.²³

At present, no randomised trial or cohort studies have evaluated the effectiveness of screening on the frequency of diagnosis, diabetes related complications and mortality in older people. A systematic review found that no previous quality studies have evaluated the health benefits of screening for type 2 diabetes in older people.²⁴ They found that aggressive blood pressure control in people with diabetes leads to 51.0% relative risk reduction of cardiovascular events. Hence, people with hypertension would benefit from the screening because the target for BP would be lower in people with concurrent diabetes than those without. American Diabetes Association (2014) recommends screening for type 2 diabetes in asymptomatic adults aged 45 years and more at 3-year intervals.²⁵ It is recommended that the screening should be done at a healthcare setting to ensure the follow-up screening. In addition, older people with other chronic NCDs such as hypertension and other cardiovascular diseases should be screened for type 2 diabetes as it is a common comorbid condition that is under-diagnosed.

c) Screening for dyslipidaemia

Another risk factor for cardiovascular disease is lipid disorders. High levels of cholesterol and LDL-C and low levels of HDL-C are independent risk factors for CHD. In Malaysia, the prevalence of dyslipidaemia increases with age reaching a peak of 57.2% (95% CI: 52.3–62.0) among the 65–69 year old age group.²⁶ Older people with increased level of total serum cholesterol had increased risk of acute coronary events when compared with middle-aged and younger people. Furthermore, lipid lowering drug therapy cause a 30.0% relative risk reduction in total CAD events and 26.0% relative risk reduction in CAD mortality in people with abnormal lipid levels.²⁷

The recommendation includes annual screening for older people with one or less CAD risk factor (other than age). In addition, screening is recommended at any point of clinical contact if they have multiple risk factors, which include presence of hypertension, diabetes and cigarette smoking.^{13,27,28}

d) Screening for tobacco use

Tobacco use, in particular cigarette smoking is a leading preventable cause of death and results in 6 million deaths annually from cardiovascular diseases, respiratory disease and

malignancy.²⁹ In Malaysia, 35.0% of men older than 60 years smoke cigarettes.³⁰ It is a leading cause of chronic NCDs such as CAD and lung cancer, and the primary cause of mortality. A meta-analysis reported the benefits of smoking cessation at the later age where the relative mortality of smokers reduced with the time since cessation (age 60–69 years: RR = 1.54, 95% CI = 1.41–1.68; 70–79 years: RR = 1.36, 95% CI = 1.25–1.49; 80 years and more: RR = 1.27, 95% CI = 1.04–1.56).³¹ In addition, smoking cessation after 60 years reduced the risk of total mortality among intermittent smokers (RR = 0.61, 95% CI = 0.54–0.70).³²

Smoking cessation interventions such as brief counselling sessions of less than 10 min (using the 5-A behavioural counselling framework: 1) Ask about use, 2) Advice to quit, 3) Assess willingness to quit, 4) Assist to quit and 5) Arrange follow-up and support) and pharmacotherapy are effective in increasing the proportion that achieves abstinence in a year (RR = 2.06, 95% CI = 1.81–2.34).³³ Therefore, at any point of clinical contact, older people should be screened for tobacco use and brief counselling for smoking cessation and pharmacotherapy should be provided to those who use tobacco.^{5,6}

Screening for cancers

Cancer is a leading cause of death in both developed and developing nations.³⁴ Approximately 60.0% of the new cancer cases and 65.0% of the cancer mortality occur in the less developed nations. Worldwide, most frequently diagnosed cancer—based on estimated age-standardised incidence and mortality rate, is breast cancer, followed by prostate cancer and lung cancer.³⁴ The increased burden of cancer is attributed to the population ageing and adoption of unhealthy lifestyle such as less physical inactivity, unhealthy diet and smoking. From previous recommendations on cancer screening in older people, it was proposed to include screening for colorectal cancer, lung cancer and breast cancer in women.^{5,6}

a) Colorectal cancer

Colorectal cancer is the third most common cancer worldwide, with more than 1.3 million (9.7%) new cancer cases and 693,881 (8.5%) cancer mortalities in 2012.³⁴ In Malaysia, it is the most common cancer in men (14.5%) and third most common in women (9.9%) of all

cancers between 2003 and 2005.³⁵ The cancer incidence rate is highest among older people aged 70 years and more for men (177.2 per 100,000 population) than women (133.6 per 100,000 population) in Malaysia. At present, colorectal cancer mortality rate in Malaysia is not available.

A meta-analysis of pooled data of 86,498 individuals recommends screening for colorectal cancer using faecal occult blood testing (FOBT) beginning at 50 years of age and to continue until 75 years every 2 years.³⁶ The colorectal cancer mortality rate has been reduced to 13.0% from 21.0% after 8 to 13 years of biennial FOBT screening in two trials. However, there was no reduction in the all-cause mortality. From their reviews, no studies have reported colorectal cancer mortality or long-term follow-up using other screening modalities such as colonoscopy, flexible sigmoidoscopy, CT colonography and faecal DNA testing. These recommendations were echoed by other guidelines.^{6,37}

b) Breast cancer screening

Breast cancer is one of the most frequently diagnosed cancer (25.2% of total new cancers) and one of the leading cause of cancer mortality (14.7% of total cancer mortality) in women in 2012 worldwide.³⁴ Similarly, in Malaysia it is the most commonly diagnosed cancer in all age groups of women accounting for 29.9% of total new cancers in 2006 and the peak incidence is between the age of 50 and 69 years.³⁸

In view of the significant burden of breast cancer, women aged 50–69 years would be benefitted from biennial screening mammography.³⁹ Meta-analysis of 600,830 women aged 40 years and more showed a 14.0% relative risk reduction of breast cancer mortality through early intervention in women aged 50–59 years (pooled relative risk (RR) of 6 trials = 0.86, 95% CI = 0.75, 0.99). It also reported a 32.0% relative risk reduction of breast cancer mortality in women aged 60–69 years (pooled RR of two trials = 0.68, 95% CI = 0.54, 0.87). Recommendation for women aged 70 years and more could not be determined because of lack of data on benefits or harms of screening mammography as most trials evaluating effectiveness of screening mammography did not include women of this age group. However, a meta analysis that included women aged 39–74 years from seven trials reported that screening mammography did

not significantly reduce breast cancer mortality after 7 (pooled RR = 0.93, 95% CI = 0.79, 1.09) and 13 years (pooled RR = 0.90, 95% CI = 0.79, 1.02).⁴⁰ Further, all-cause mortality was not significantly reduced following screening mammography (pooled RR = 0.98, 95% CI = 0.94, 1.03 after 7 years; and pooled RR = 0.99, 95% CI = 0.95, 1.03 after 13 years). In addition, the total numbers of lumpectomies (pooled RR = 1.31, 95% CI = 1.22, 1.42) and mastectomies (pooled RR = 1.20, 95% CI = 1.08, 1.32) were larger among those who were screened. Therefore, women who are invited for screening mammography should be fully informed about the benefits and harms of screening.

With regard to breast self-examination practice and clinical breast examination screening, clinical trials assessed in systematic reviews showed no reduction in all-cause and breast cancer mortality.^{39,41} Hence, both breast self-examination practice and clinical breast examination screening are not recommended in older people.

c) Lung cancer screening

Lung cancer is one of the most frequently diagnosed cancer (1.8 million (13.0%) of new cancer cases) and one of the leading causes of cancer mortality (1.5 million (19.4%) mortality) globally in 2012.³⁴ In Malaysia, lung cancer was reported as the third most frequently diagnosed cancers between 2003 and 2005, and it is the most frequently diagnosed cancer in men.³⁵

At present there is no recommendation for population screening for lung cancer. A randomised screening trial with 77,464 participants aged 55–74 years reported that chest radiography did not show any reduction in lung cancer mortality at 6 (RR = 0.91, 95% CI = 0.81, 1.03) and 13 years (RR = 0.99, 95% CI = 0.91, 1.07) after screening.^{42,43} However, the adults aged 55–74 years with 30 years and more pack-years of current smoking or who quit within the past 15 years who received annual low dose chest CT screening compared with annual chest radiography screening had a 20.0% relative risk reduction (RR = 0.80, 95% CI = 0.70, 0.92) in lung cancer mortality.^{43,44} Based on these findings, annual low dose chest CT screening in these high risk individuals is recommended for lung cancer screening.⁴⁴ However, further evidence is needed on the cost effectiveness of screening to justify recommendation.

d) Other cancer screening

With regard to prostate cancer, systematic reviews and meta-analysis found prostate specific antigen (PSA)-based screening in men aged 50-69 years after 9 years results in small or no reduction in prostate cancer-specific mortality (pooled RR = 1.00, 95% CI = 0.86, 1.17) compared to those who were not screened.^{45,46} Furthermore, screening was associated with over diagnosis and overtreatment harms such as false-positive results for PSA test, infection and bleeding. It is not recommended to screen older men for prostate cancer, but if they request for the test, patients must be fully counselled about the benefits and harms of the screening.⁶ No studies evaluated the independent role of screening by digital rectal examination.

As for cervical cancer screening, it is not recommended in women aged 65 years and more with three successive negative smears in the past 10 years.⁴⁷ Screening is only recommended in the presence of previous abnormal smears (cervical intraepithelial grade II or more severe diagnosis) or patient may request if she has never been screened in the past.

Screening for depression in later life

Depression is a leading cause of disease burden in middle- and high-income countries with an overall prevalence rate of depressive symptoms among older people worldwide ranging between 10.0 and 20.0%.⁴⁸ In Malaysia, the prevalence of depression among older people attending primary care clinic was 18.0%.⁴⁹ Even though the effective treatment for older people is available but depression is frequently missed or under treated.⁵⁰ Furthermore, it is associated with disability, poorer outcome from physical illness and even mortality. A meta-analysis of 5693 patients showed that screening and feedback of the results alone has no impact on the detection of depression (RR = 1.00, 95% CI = 0.89, 1.13).⁵¹ However, screening older people for depression in primary care is likely to be effective if other clinic's staff provide support for depression care in terms of geriatric assessment and supportive care together with the primary care physician's treatment.⁵²

Table 1 summarises the recommendations for screening in older people in primary care.

Table 1. Screening recommendations for older people

	Recommendations	*Evidence/ recommendation grade
High blood pressure or hypertension	Screening is recommended at regular clinic visits in view of strong evidence on the benefit of treatment in individuals with hypertension	Level I/A
Type 2 diabetes	Screening of asymptomatic older people with underlying hypertension or other cardiovascular disease is recommended at any point of contact	Level II-1/B
Dyslipidaemia	It is recommended that older people with one or less CAD risk factor (other than age) for annual screening Those with multiple risk factors (hypertension, diabetes and cigarette smoking) to be screened at any point of clinical contact	Level I/A
Tobacco use	Older people should be screened for tobacco use at any point of clinical contact Brief counselling for smoking cessation and pharmacotherapy should be provided to those who use tobacco	Level I/A
Colorectal cancer	FOBT beginning at 50 years of age and to be continued until 75 years every 2 years is recommended	Level I/A

	Recommendations	*Evidence/ recommendation grade
Breast cancer	Older women up to 69 years of age with no risk factor for breast cancer would be benefitted from biennial screening mammography, but they must be fully informed about the benefits and harms of screening	Level I/B
Lung cancer	Insufficient evidence to recommend for or against screening for lung cancer with low dose chest CT screening in high risk individuals (based on age and smoking status)	Level I/I
Prostate cancer	It is not recommended to screen older men for prostate cancer If patients request for the test, they must be fully counselled about the benefits and harms from screening	Level I/D
Cervical cancer	Women aged 65 years and more with three successive negative smears in the past 10 years is not recommended for cervical cancer screening	Level III/D
Depression	Screening older people for depression in is recommended if clinical staff to assist primary care physicians in providing depression care is available	Level I/B

*Based on US Preventive Service Task Force⁵

Evidence level:		Grade of recommendation (based on):	
Level I	= Evidence obtained from systematic reviews of randomised controlled trials or at least one properly randomised controlled trial.	A	= Recommends the service. There is high certainty that the net benefit is substantial.
Level II-1	= Evidence obtained from well-designed controlled trials without randomisation.	B	= Recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.
Level II-2	= Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group.	C	= Recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.
Level II-3	= Evidence obtained from multiple time series with or without the intervention.	D	= Recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.
Level III	= Opinion of respected authorities, based on clinical experience; descriptive studies and case reports, or reports of expert committees.	I	= The current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

Conclusion

The key challenge of screening in older people is the lack of evidence to guide recommendations for older people as no studies directly link the screening processes with beneficial health outcomes among older people.⁵ Furthermore, the effectiveness of preventive strategies in older people in the presence of geriatric syndromes and multiple comorbidities has not been addressed. Therefore, it is suggested that the outcome of screening in older people should not only focus on mortality but on function and health-related quality of life as the key outcome; it would be an important outcome to assess the effectiveness of

the provision of healthcare services, especially in older people in view of their life expectancy and functionality.^{5,3} Primary care physicians' decision to screen older patients during clinic visits should be based on presence of comorbidities, their life expectancy and functional status, and should be individualised.^{5,4} In addition, older patients should be made aware of the potential benefits and harms of screening prior to the screening test.

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Correlation between cognitive impairment and depressive mood of Thai elderly with type 2 diabetes in a primary care setting

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Abstract

Objective: The objective of this study was to evaluate the relationship between cognitive impairment and depressive mood in Thai elderly with type 2 diabetes at primary care centres.

Materials and methods: Two-hundred and eighty three (283) older people with type 2 diabetes were enrolled in this study. Mini-Cog and mini-mental state examination (MMSE) Thai 2002 were used to measure cognitive impairment while Thai geriatric screening test (TGDS) was used to measure depressive mood in all participants. Spearman correlation was applied to determine the relationship between cognitive function and depressive mood.

Results: There was a positive relationship between cognitive impairment and depressive mood in older people with type 2 diabetes. The scores from Mini-Cog and MMSE Thai 2002 were negatively correlated with TGDS scores while adjusting for the effects of age and years of education with $r_s = -0.1$, $p = 0.06$ and $r_s = -0.2$, $p < 0.01$, respectively. Although it showed an inverse relationship of the scores between cognitive and depressive mood screening tests, the results between the tests were positive when interpreting the test scores. It means that the higher score in Mini-Cog and MMSE Thai 2002 (non-cognitive impairment) were associated with the lower score in TGDS (non-depressed mood).

Conclusion: The finding of this study showed that older people with type 2 diabetes who had cognitive impairment seemed to have depressive mood. Hence, these two co-morbidities should be considered in order to give an optimal care to older people with diabetes.

Introduction

The prevalence of type 2 diabetes increases with age.¹ More than 80% of people with diabetes live in low-and middle-income countries.² Diabetes care is important in lowering blood glucose level and maintaining a good metabolic control in order to help prevent complication of diabetes. For successful diabetes self-management, individuals must commit to lifelong daily self-care tasks such as adhering to diet, exercise, medication regimens and checking blood glucose level. The coordination of these tasks often requires complex cognitive functioning.³

Research has linked the disease to cognitive impairment in the elderly.^{4,5} Recent evidence from epidemiological studies suggests that

type 2 diabetes is a risk factor for cognitive impairment and dementia, both the vascular dementia (VaD) and Alzheimer's disease (AD)—the two most common forms of dementia.⁶⁻⁹ Older individuals (aged 60–80 years) with type 2 diabetes are associated with approximately 1.5 fold risk of cognitive impairment compared to the group without diabetes.¹⁰ Given the potential for cognitive problems to interfere with the attempts to diabetes self-care management and following a physician's recommendation, cognitive decline among elderly with diabetes could lead to further decline in health.¹¹

Another problem which may relate to cognitive impairment and affect self-care diabetes is depressive mood. Depression is a

common comorbidity of type 2 diabetes.^{12,13} People with diabetes are likely to suffer twice as often from depression as those without diabetes. Depressive symptoms may hinder diabetic patients' ability to adhere to diet, physical activity and oral medication.^{14–16} Moreover, depression by itself is the most common reversible causes of cognitive impairment or pseudodementia, particularly in memory part.^{17,18}

In Thailand, diabetes mellitus is one of the important public health concerns.^{19,20} Recent economic change, reflected by rapid industrialisation, urbanisation and increased wealth at both national and household levels contribute to change of lifestyles, in particular high fat food diet and less physically active patterns. As mentioned earlier, type 2 diabetes is a major and complex public health problem accompanied with several complications and comorbidities, diabetes self-management activities require complex cognitive functioning.²¹ Cognitive decline and depression are common, but often overlooked.²² To date, there is no investigation of the relationship between cognitive impairment and depressive mood in diabetes, particularly in a Thai primary care setting. A primary care centre in Thai community (rural areas or sub-district level) is the first place of healthcare service that provides primary healthcare, prevention and promotion.²² The purpose of this study was to identify and describe the relationship between cognitive function and depressive mood. This study intended to stimulate the healthcare providers' awareness of the potential link between cognitive function and depressive mood in type 2 diabetes for improving multidisciplinary practice and patients care.

Material and methods

A cross-sectional study was carried out from January to April, 2012 in all the 13 primary care centres in San-sai district, Chiang Mai, Thailand. A total of 283 consecutive patients aged 60 years and more with type 2 diabetes who have had at least 1 year of diagnosis (either control or uncontrolled blood sugar), were assessed. Participants excluded from the study were those with a previous diagnosis of either VaD or AD; presence of a formal diagnosis of depressive disorder, schizophrenia, or epilepsy; were receiving medical treatment

with psychoactive drugs (anticholinergics, anticonvulsants, antiparkinsonians or major tranquilizers); had any cerebrovascular accident history or complicated hypertension or renal failure and or communication difficulties, which need an interpreter. The study was conducted in accordance with the declaration of Helsinki and approved by ethics committees of Ministry of Public Health, Thailand.

Screening assessments

The researcher screened the cognitive impairment and depressive mood in all participants using the following instruments.

Cognitive screening tests

- Mini-Cog

Mini-Cog was developed as a very brief screening tool for primary care settings.^{23,24} It consists of two orally presented tasks (a three-item word recall) combined with an executive clock drawing task (CDT). It takes 3 min to administer the test. Mini-Cog scores range from 0 (worst) to 5 (best).²³ A cut-off of two out of five provides the optimal combination of sensitivity (99%) and specificity (96%) for detecting cognitive impairment.²³ The concordance for rating the test result between the expert and naive is high at 96%.²⁴ Mini-Cog is less affected by education and language.²⁴ When considering the length of time to administer, Mini-Cog is suitable to apply in Thai primary care settings because the duration of time to visit primary care settings in Thailand varies between 3 to 5 min.²² Hence, in this study, Mini Cog Thai version was used as this study was carried out in a primary care setting. In addition, a previous study had estimated the reliability of Mini-Cog and concurrent validity with the MMSE Thai 2002 in the same population with this study, as $K = 0.8$, $p < 0.001$, 95% CI = 0.54, 1.00 and Pearson correlation of 0.47, 95% CI = 0.37, 0.55 ($p = 0.007$), respectively.²⁵ Nevertheless, Mini-Cog is new and has not been fully validated for sensitivity and specificity of the test in Thai. Therefore, the MMSE Thai 2002, a main clinical Thai cognitive screening, was used as an independent reference measure for the Mini-Cog.

- Mini-mental state examination (MMSE) Thai 2002

The mini mental state examination (MMSE) Thai 2002 has been translated from its original version in English.²⁶ MMSE remains the most commonly used screening instrument as a global cognitive test²⁷ and is used as a current clinical mainstay cognitive screening instrument in Thailand. The MMSE Thai 2002 is scored in terms of the number of correctly completed items; lower scores indicate poorer performance and greater cognitive impairment²⁶. However, the main limitation of the MMSE Thai 2002 is the impracticality of its administration time (10–15 min) in Thai primary care setting and the low sensitivity of the test in low education level.²⁶

Depressive mood screening test

- Thai geriatric screening test (TGDS)

Thai geriatric screening test (TGDS)²⁸ is used as a depressive mood screening test in this study. It is developed from the geriatric depression scale (GDS) by Yesavage, et al. (1983).²⁹

The TGDS questionnaire contains 30 questions with a “yes/no” answer format. The optimal cut-off score of TGDS >12 showing depressive mood. TGDS was studied for validity and reliability by Train the Brain Forum Thailand (1994)²⁸ in 275 Thai older people, 154 women and 121 men, aged between 60 and 70 years old in all the regions of the country. The results showed that the average time to complete the questionnaire was 10.09 min. The reliability of internal consistency with the high Cronbach's α coefficients degree is 0.93²⁸ while the original version is 0.84.²⁹ TGDS questionnaire has recently been used for both research and clinical assessment of geriatric depression in Thailand.²⁸

Statistical analysis

Data were reported as the mean $\pm$ SD or percentage (%) for frequency data. Spearman's correlation was used to identify association between cognitive function and depressive mood score. All statistical analyses were carried out using statistical package for social sciences (SPSS-Version 14).

Results

Participants' characteristics

The demographic characteristics are shown in Table 1. A total of 283 participants, 103 (36.4%) men and 180 (63.6%) women were assessed. The mean age $\pm$ SD of participants was 68 ± 6 years. A total of 93% (264) of all the participants had attended school; however, the percentage of the participants who attended school for less than 4 years was 89.4% (253). Most participants lived with family (96.5%). A total of 90% of the participants in both groups received health cost support from the government.

Relationship between cognitive impairment and depressive mood (controlling for potential confounders)

As mentioned earlier in the method, Mini-Cog is new and has not been validated for sensitivity and specificity in Thai population. There are only reliability ($K = 0.8$, $p < 0.001$, 95% CI = 0.54, 1.00) and concurrent validity (Pearson correlation (r_p) = 0.47, 95%, CI 0.37, 0.55, $p = 0.007$) with MMSE Thai 2002.²⁵ Thus, in order to propose Mini-Cog as a new cognitive screening tool in Thailand, it is necessary to compare the results of Mini-Cog with MMSE Thai 2002, which is a known reference standard in Thailand.²⁶

Also, as stated in screening assessments, the variables potentially confounding the cognitive screening test and depressive mood screening test in Thai population are age and years of education.^{26,30} Thus, partial correlations were performed to examine the relationship between the cognition scores and depressive mood scores while adjusting for the effects of variables such as age and years of education. With regard to non-normal distribution of the data, spearman correlation was analysed in this study.

Age and years of education are most likely to be positive confounders. The association between cognitive impairment and depressive mood is more extreme. Therefore, on controlling these variables, it would be expected to weaken the association (see Tables 2–4).

Table 1. Summary of the participants' characteristics

Characteristics	N (%)
<i>Gender</i>	
Men	103 (36.4%)
Women	180 (63.6%)
Age ^a	67.60 + 6.42
<i>Age (years)</i>	
60–64	121 (42.8%)
65–69	60 (21.2%)
70–74	52 (18.4%)
75+	50 (17.7%)
<i>Education</i>	
Never attended to school	19 (6.7%)
Attended to school	264 (93.3%)
<i>Year in school</i>	
≤ 4	253 (89.4%)
> 4	30 (10.6%)
<i>Living arrangement</i>	
Alone	10 (3.5%)
With family	273 (96.5%)
<i>Health cost support</i>	
National health care (30 baht scheme policy)	261 (92.2%)
Social/welfare health care	6 (2.1%)
Self-funding/family support	16 (5.7%)

^aMean + SD**Table 2.** Correlation coefficients between cognitive function scores and TGDS scores (partial correlations controlling age)

Scores	Mini-Cog	MMSE Thai 2002
TGDS	–0.2*	–0.3**

* $p < 0.01$; ** $p < 0.001$ **Table 3.** Correlation coefficients between cognitive function scores and TGDS scores (partial correlations controlling years of education)

Scores	Mini-Cog	MMSE Thai 2002
TGDS	–0.1*	–0.2**

* $p < 0.05$; ** $p < 0.001$ **Table 4.** Correlation coefficients between cognitive function scores and TGDS scores (partial correlations controlling for age and years of education)

Scores	Mini-Cog	MMSE Thai 2002
TGDS	–0.1	–0.2*

* $p < 0.01$

As shown in Table 2, after controlling age, the depressive mood (TGDS) scores were significantly correlated with cognitive scores by Mini-Cog ($r_s = -0.2$, $p < 0.01$). Likewise, the depressive mood (TGDS) scores were significantly correlated with cognitive scores by MMSE Thai 2002 ($r_s = -0.3$, $p < 0.001$). However, the correlations between Mini-Cog and MMSE Thai 2002 with TGDS were negative.

In Table 3, after controlling for the years of education, the depressive mood scores were significantly correlated with cognitive scores by Mini-Cog ($r_s = -0.1$, $p < 0.05$). Similarly, the depressive mood scores were significantly correlated with cognitive scores by MMSE Thai 2002 ($r_s = -0.2$, $p < 0.001$). Nonetheless, the correlations between Mini-Cog and MMSE Thai 2002 with TGDS were negative.

After controlling the age and years of education (Table 4), the depressive mood scores were still significant and correlated with cognitive scores from MMSE Thai 2002 ($r_s = -0.2$, $p < 0.01$) but there was no significant correlation between the depressive mood scores and cognitive scores from Mini-Cog ($r_s = -0.1$, $p = 0.06$).

Overall, the negative correlation coefficients in Tables 2–4 show that higher of depression scores was associated with lower of cognitive

function. This implied that the participants who had high scores in depressive mood screening test (scores >12 showing low mood) tended to have low level of cognitive function (scores ≤ 2 for Mini-Cog and scores ≥ 14 for MMSE Thai 2002 showing low cognitive function).

It can be seen from Tables 2–4 that the scores from Mini-Cog and MMSE Thai 2002 were weak negatively correlated with TGDS scores. It seemed that the higher score (cognitive impairment) in Mini-Cog and MMSE Thai 2002 might associated with the lower score in TGDS (depressive mood). In other words, the participants who had cognitive impairment seemed to have depressive mood.

In order to see the correlation between Mini-Cog and MMSE Thai 2002, the Spearman correlation was analysed. As it can be observed from Table 5, there was a significant positive correlation between the scores of Mini-Cog and MMSE Thai 2002 with Spearman's rank order correlation coefficient $r_s = 0.44$, $P = 0.001$. It was clear that the scores in Mini-Cog were moderate positively correlated with the scores in MMSE Thai 2002. The higher score in Mini-Cog was associated with the higher score in MMSE Thai-2002. Therefore, it was shown that Mini-Cog and MMSE Thai 2002 screening tests yielded the results in the same direction.

Table 5. Correlation coefficients between the scores of Mini-Cog Thai version and MMSE Thai 2002

	MMSE Thai 2002	
	Spearman rho (r_s)	p
Mini-cog	0.44	0.001

Discussion

Correlation between cognitive impairment and depressive mood

The scores of both cognitive screening tests (Mini-Cog and MMSE Thai 2002) were negatively correlated with the score of depressive mood test (TGDS) in this study. This implied that the participants who had high scores in cognitive tests (showing possible non-cognitive impairment) seemed to have low scores in depressive mood screening test (showing non-depressed mood). This study was consistent with the previous

studies^{13,17,30}, which showed similar trend of the correlation between cognitive decline and depressive mood.

In addition, the previous studies found that the association between the scores of cognitive screening tests and depressive mood screening test persisted after controlling age, years in school and potential confounding factors in cognitive and depressive mood screening test.³¹ The correlation between cognitive impairment by Mini-Cog and depressive mood seemed not to correlate after controlling age and years in school. It could be possible that this study did not

control the potential confounding factors such as disease severity, complications, blood sugar level and concomitant disease. Also this study had limitations in the heterogeneity of education in the population. The vast majority of the sample in this study (89%) had equal or less than 4 years in school. Therefore, the evidence is still ambiguous in the variable of years in school. However, the result showed a small trend of the correlation between cognitive impairment and depressive mood.

Depressive mood may relate to cognitive impairment in many possible ways. First, prolonged hypercortisolemia associated with depressive symptom may have negative impact on memory through hippocampal damage.^{32,33} Second, depressive symptoms are common in diabetic patients and may hinder their ability to adhere to diet, physical activity and medication and therefore cause poor glucose control (hyperglycaemia) which may also affect vascular and brain function.^{14–16} Lastly, hyperglycaemia and hyperinsulinaemia can affect brain tissue and its metabolism by decreasing the neurotransmitter function, which induce organ damage.³³

Thus, it would be of interest to propose that when cognitive impairment is suspected, screening depression is recommended. Moreover, depression could be the reversible cause of memory impairment and people with diabetes.¹⁰ Treatment of depression may improve the cognitive function, which may also support self-care management and behaviour of the older people with type 2 diabetes.²⁶

Correlation between Mini-Cog and MMSE Thai 2002

As mentioned earlier, Mini-Cog is new and has not been validated in Thai population. Thus, in order to propose Mini-Cog as a new cognitive screening tool in Thailand, it is necessary to compare the results of Mini-Cog with MMSE Thai 2002, which is a known reference standard in Thailand.²⁶

The data in this study showed that both Mini-Cog and MMSE Thai 2002 seem to detect the cognitive impairment in the same direction. The results clearly indicated that the scores in Mini-Cog are moderate positively correlated ($r_s = 0.44$, $p = 0.001$) with the result the scores of MMSE Thai 2002 (Table 5). This finding demonstrated significant correlations between

Mini-Cog as a new test and MMSE Thai 2002 as a standard test in Thailand. This means that Mini-Cog seems to perform in similar direction with MMSE Thai 2002, a standard test, for screen cognitive impairment in this study.

Conclusion

This study shows that older people with type 2 diabetes who had cognitive impairment seemed to have depressive mood. As cognitive impairment and depression have important consequences for diabetic patients and diabetes self-care management,^{34–36} they are crucial components in the individual needs to control an appropriate blood glucose level (an optimal goal for diabetes care) by maximising adherence to diet, exercise, and dosing schedules of the medicine.³⁶ It is important to recognise these two comorbidities and great insight is needed in how cognitive impairment and depressive mood influence the diabetes care and quality of life in the diabetic patients.¹³

How does this paper make a difference to general practice?

- It is important for healthcare providers to review the diabetic patients with a high depression score, to rule out other possible reversible causes of cognitive impairment. This is because the initial poor screening score of the cognitive test may have been due to transient diagnoses such as depression.³⁷
- Cognitive impairment and depression are overlooked in the elderly with chronic disease. An early detection of cognitive impairment can improve the quality of care and life and reduce care expenditures for the diabetic patients and their families.^{38–40}

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Conflicts of interest

None.

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Poor blood pressure control and its associated factors among older people with hypertension: A cross-sectional study in six public primary care clinics in Malaysia

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Abstract

Introduction: Hypertension is highly prevalent in the older people. Chronic disease care is a major burden in the public primary care clinics in Malaysia. Good blood pressure (BP) control is needed to reduce the morbidity and mortality of cardiovascular disease (CVD). This study aimed to determine the status of BP control and its associated factors among older people with hypertension in public primary care clinics.

Materials and methods: A cross-sectional study on hypertensive patients aged 18 years and above was conducted in six public primary care clinics in Federal Territory, Malaysia. A total of 1107 patients were selected via systematic random sampling. Data from 441 (39.8%) patients aged 60 years and more were used in this analysis. BP control was determined from the average of two BP readings measured twice at an interval of 5 min. For patients without diabetes, poor BP control was defined as BP of $\geq 140/90$ mm Hg and $\geq 150/90$ for the patients aged 80 years and more. For patients with diabetes, poor control was defined as BP of $\geq 140/80$ mm Hg.

Results: A total of 51.7% ($n = 228$) of older patients had poor BP control. The factors associated with BP control were education level ($p = 0.003$), presence of comorbidities ($p = 0.015$), number of antihypertensive agents ($p = 0.001$) and number of total medications used ($p = 0.002$). Patients with lower education (less than secondary education) (OR = 1.7, $p = 0.008$) and the use of three or more antihypertensive agents (OR = 2.0, $p = 0.020$) were associated with poor BP control.

Conclusion: Among older people with hypertension, those having lower education level, or using three or more antihypertensive agents would require more attention on their BP control.

Introduction

Hypertension is a common chronic disease burden globally and locally.¹ It is one of the major risk factors for the cardiovascular diseases (CVDs) such as stroke, ischaemic heart disease and heart failure.² In Malaysia, hypertension is a major burden of chronic disease care in public primary care clinics.³ There is an increased number and proportion of older people worldwide due to declining fertility rate and better healthcare.⁴ Hypertension is highly prevalent in the older people. In the West, the prevalence of hypertension among older people ranges from 53% to 72%.⁵ In Southeast Asia, the prevalence of hypertension among older people

is as high as in the West, for example 51.1% in Thailand⁶ and 73.9% in Singapore.⁷ In Malaysia, the Third National Health and Morbidity Survey conducted in 2006 reported a prevalence of 74.0% hypertension among older people.⁸ The high prevalence increases the burden of older people's healthcare, especially in the management of hypertension and its associated complications.

The complications of hypertension can be delayed with good BP control. A meta-analysis reported that BP reduction is associated with large benefit in stroke, cardiovascular, all-cause mortality and heart failure risk in older people.⁹ However, the rate of BP control is low. Local studies have shown

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that BP control rate among older people in the community ranged from 22.6% to 34.0%.^{8,10,11} These results were from the residential home care and household surveys.

Malaysia is a developing country in Southeast Asia. The public and private sectors, and non-governmental organisations support its healthcare system.¹² The public sector is highly subsidised by the government, but the service costs of the private sectors are out-of-pocket expenses. Thus, the burden of the chronic diseases care is mainly borne by the public primary care clinics.³ There is limited literature on the status of BP control among older patients in the public primary care clinics. Therefore, the objectives of this study were to determine the BP control rate and its associated factors among older patients with hypertension in the public primary care settings. This article presents a part of the results, pertaining to older patients; of a larger cross-sectional study investigating treatment non-adherence among hypertensive patients. We hope that the results of this study would provide an insight into the status of BP control among the older patients, to improve the management and care of these patients.

Methods

This was a cross-sectional study conducted in six public primary care clinics in Federal Territory, Malaysia. At the time of this study, there were only six primary care clinics with family medicine specialists in the state of Federal Territory. These six clinics were selected because of having more organised hypertension registry.

The participants were selected via systematic random sampling of hypertensive patients who attended the follow-up clinics for more than 3 months. The number of follow-up hypertensive patients attending each of the clinics ranged between 1000 and 3000. A total of 10% of the patients were recruited from each clinic. The third patient, which was generated using computer random number, who attended the follow-up session, was selected as the first participant. Every tenth patient thereafter was selected systematically. The initial inclusion criteria were hypertensive patients aged ≥ 18 years and on pharmacotherapy for ≥ 1 year. The exclusion criteria were foreigners, pregnant women, medically unstable patients who need urgent medical attention (such as acute renal failure and acute myocardial infarction), and patients

with concurrent psychiatric problems (such as depression and schizophrenia). A total of 1107 patients were recruited. For this article, the analysis had included the data of 441 (39.8%) patients aged ≥ 60 years.

The details of data collection had been described elsewhere.¹³ In brief, the data were collected using a few methods. Face-to-face interview was conducted for sociodemographic characteristics and clinical history (duration of hypertension, family history of hypertension and smoking status). The adherence of medication, salt intake and appointment keeping was measured using self-administered Hill-Bone high BP compliance scale questionnaire (HBTS).¹⁴ HBTS questionnaire was chosen because of its advantage of measuring medication adherence, adherence to salt intake and appointment keeping. Modified Morisky scale was not chosen because it measured only medication adherence and was not validated locally at the time of the study. Although, the Hill-Bone questionnaire also was not validated locally, content and face validation were undertaken prior to data collection. HBTS consisted of 14 items (Nine items for medication taking subscale, three items for salt intake subscale and two items for appointment keeping subscale). Items assessing medication adherence included missing pills, skipping medications and medication refill; items assessing salt intake included frequency of taking high salt diet; items assessing appointment keeping included missing appointment and ensuring next appointment date. The scores for each item of the questionnaire ranged from 1 to 4 with higher score denoting higher level of adherence. Assistance was provided to patients who were unable to read. Information on treatment and comorbidity profiles were retrieved from the medical records by physicians.

Definition of participants

We used the United Nations' demarcation age of 60 years to define older people, as Malaysia uses this definition in its national policy.¹⁵ A person was considered to have hypertension if there was a documented evidence of a diagnosis of hypertension with systolic BP of ≥ 140 mm Hg or the diastolic BP of ≥ 90 mm Hg on each of the two successive readings were measured in rested position with arm at heart level using a cuff of appropriate size¹⁶; and who was being treated with an antihypertensive agent.

Clinical measures

BP control was determined from the average of two BP readings measured twice with an interval of 5 min during the follow-up. Trained registered nurses in the respective clinics performed BP measurements by using calibrated mercury sphygmomanometers. Poor control was defined as BP of $\geq 140/90$ mm Hg for patients without diabetes and $\geq 150/90$ mm Hg for patients aged 80 years and more without diabetes. For the patients with diabetes, poor control was defined as BP of $\geq 140/80$ mm Hg.¹⁶ The attending physicians at the respective public primary care clinics determined the underlying concomitant comorbidity based on medical history, physical examination and laboratory results. The smoking status was considered as “yes” if the patient was a current smoker during the interview. Total number of medications taken was defined as the sum of all types of medications taken for long-term treatment of patients’ chronic illness, e.g. antihypertensive agents, antidiabetic agents, antilipid agents, etc.

This study obtained ethical approval from the University Research Ethics Committee of Universiti Putra Malaysia [UPM/FPSK/PADS/T7-MJKEtikaPer/F01 (LECT_FEB (09)33] and the Medical Research Ethics Committees of Ministry of Health, Malaysia [NMRR-09-301-3349].

Statistical analysis

Data were analysed with Statistical Packages for Social Sciences (SPSS) version 20.0. Categorical variables were presented as frequency (*n*) and percentage (%) and continuous variables were presented as mean and standard deviation. The relationship between BP control and the independent variables were analysed using Pearson’s Chi square and independent t-tests. Multivariate logistic regression was used to determine the associated factors for poor control.

Variables with the result of *p*-value < 0.2 in bivariate analysis were included in multivariable logistic regression. To avoid over-adjusting for the model, the variable “presence of comorbidity” was not included in the model in view of its association with the variable “total number of medications taken.”

Results

The mean age of the patients was 65.9 years (SD 5.1 years). There were 225 (51.0%) men. The majority were Chinese (45.4%), followed by Malays (37.4%) and Indians (16.6%). The majority had secondary education level (40.8%) and were staying with others (88.4%).

A total of 51.7% (*n* = 228) of the patients had poor BP control. Majority (87.5%) of the patients had one or more comorbidities. Three common comorbidities reported were dyslipidaemia (72.1%), diabetes (45.4%) and obesity (25.4%). Approximately one-third of the patients had hypertension for more than 10 years. Approximately one-quarter of the patients were treated with three or more antihypertensive agents. Approximately 45% of the patients had been prescribed five or more types of medication. The common types of antihypertensive medications use included calcium channel blocker (53.5%), ACE inhibitors (50.8%), beta-blockers (44.2%) and diuretics (33.3%).

Education level (*p* = 0.003), presence of comorbidities (*p* = 0.015), number of antihypertensive agents (*p* = 0.001) and number of total medication use (*p* = 0.002) were associated with BP control status (Table 1). There was no significant difference between the mean scores of the good and poor BP-controlled groups for medication adherence [mean score = 3.75 (good BP-controlled group) vs. 3.72 (poor BP-controlled group), *p* = 0.342], salt intake adherence [mean score = 3.13 (good BP-controlled group) vs. 3.14 (poor BP-controlled group), *p* = 0.854], and appointment keeping [mean score = 3.44 (good BP-controlled group) vs. 3.54 (poor BP-controlled group), *p* = 0.092]. In the multivariate logistic regression analysis, patients with lower education (less than secondary education) were 1.7 times more likely to have poor BP control when compared with those who had secondary or higher education (OR = 1.7, *p* = 0.008). Patients who had been prescribed three or more antihypertensive agents were more likely to have poor BP control, compared with patients who had been prescribed single antihypertensive agent (OR = 2.0, *p* = 0.020) (Table 2).

Table 1. Association between poor blood pressure control status and sociodemographic and clinical parameters

Variables	Good blood pressure control, <i>n</i> (%)	Poor blood pressure control, <i>n</i> (%)	Chi-square	<i>p</i> value
Sociodemographic profile				
<i>Age (years)</i>				
60–64	110 (51.7)	110 (48.2)	0.537	0.970
65–69	58 (27.2)	67 (29.4)		
70–74	32 (15.0)	36 (15.8)		
75–79	9 (4.2)	10 (4.4)		
≥80	4 (1.9)	5 (2.2)		
<i>Gender</i>				
Male	103 (48.4)	122 (53.5)	1.170	0.279
Female	110 (51.6)	106 (46.5)		
<i>Ethnicity</i>				
Malay	86 (40.4)	79 (34.7)	5.297	1.151
Chinese	85 (39.9)	115 (50.4)		
Indian	40 (18.8)	33 (14.5)		
Others	2 (0.9)	1 (0.4)		
<i>Education level</i>				
Less than secondary education	94 (44.1)	133 (58.3)	8.892	0.003
Secondary or higher education	119 (55.9)	95 (41.7)		
<i>Staying alone</i>				
Yes	29 (13.6)	22 (9.6)	1.694	0.193
No	184 (86.4)	206 (90.4)		
Clinical parameters				
<i>Smoking status</i>				
Yes	12 (5.7)	22 (9.6)	2.407	0.121
No	199 (94.3)	206 (90.4)		
<i>Presence of comorbidities</i>				
Yes	178 (83.6)	208 (91.2)	5.919	0.015
No	35 (16.4)	20 (8.8)		
<i>Duration of hypertension</i>				
1–5 years	72 (33.8)	75 (32.9)	0.635	0.728
6–10 years	69 (32.4)	68 (29.8)		
>10 years	72 (33.8)	85 (37.3)		
<i>Number of antihypertensive agents</i>				
1	76 (35.7)	51 (22.4)	13.245	0.001
2	98 (46.0)	108 (47.3)		
≥3	39 (18.3)	69 (30.3)		
<i>Total number of medications taken</i>				
<5	134 (62.9)	110 (48.2)	9.582	0.002
≥5	79 (37.1)	118 (51.8)		

Table 2. Multivariate simultaneous logistic regression analysis of risk factors associated with poor blood pressure control in older persons with hypertension

Factors	OR	95% CI	p Value
<i>Education level</i>			
Less than secondary education	1.703	1.150, 2.521	0.008
Secondary or higher education	1		
<i>Number of anti-hypertensive agents</i>			
1	1		
2	1.480	0.929, 2.359	0.099
≥3	2.007	1.116, 3.608	0.020

Control for staying alone status, smoking status, group of hypertension duration, total number of medications group

Discussion

This study was set out to examine the BP control status among older people with hypertension treated in public primary care clinics. It was found that nearly half of the patients achieved the target control. Those with lower education level and using three or more anti-hypertensive agents were associated with poor BP control.

Following the Malaysian hypertension clinical practice guidelines, a target BP of <140/80 mm Hg was set for 45.5% of the patients with comorbid diabetes.¹⁶ This target level is recommended currently during the revision of the guideline 2013 as the previous recommended target level (BP <130/80 mm Hg), though stringent, it had not been supported by the recent large randomised control trials, especially in elderly for any additional benefits.^{17,18} Studies showed that the control of BP to a level of 140/90 mm Hg in people with diabetes can prevent or at least delay CVD and chronic kidney disease.^{17,18} Thus, the task force for the management of arterial hypertension of the European Society of Hypertension and of the European Society of Cardiology has recommended a single systolic BP target of 140 mm Hg for virtually all patients in their updated guideline.^{17,18} If the BP target of <140/90 mm Hg was used for all patients, then, slightly more than half (56.5%) of the studied patients would have achieved the target.

This study showed that higher number of antihypertensive agents was associated with odds of poor BP control. The relationship between the number of antihypertensive agents and BP control was complex. Most

hypertensive patients would need two or more antihypertensive agents to achieve their BP targets^{19–21} and the number of anti-hypertensive agents increases with disease severity and concomitant comorbidities. Therefore, the number of anti-hypertensive agents could be a surrogate marker for BP control. However, increasing the number of anti-hypertensive agents used should also lead to better BP control as physicians would titrate the medication to BP control. The majority of the participants in this study had comorbidities; hence, they could have difficulty in BP control and required more medications. On the other hand, higher number of antihypertensive agents invariably contributes to polypharmacy, which could affect adherence, thus resulting in poor BP control.

The present findings did not show an association between BP control and medication adherence. Logically, good BP control is associated with good adherence to medication,^{22,23} and adherence is associated with education level.²⁴ It was thought that the BP control could still be associated with adherence because from the multivariate logistic regression analysis, poor BP control was associated with lower education. The absence of association between medication adherence and BP control could be attributed to several explanations. The patients did not always report non-adherence behaviour. Patients could overestimate their adherence when reporting. The questionnaire used might not be valid enough to identify their adherence level. Hence, further examination on the validity of the questionnaire is warranted. On the other hand, education level was measured in a more objective way, hence, showing a positive association.

The strength of this study was that it was carried out in the public primary care clinics, which cater for the majority of the chronic disease care in this country.³ The limitations of this study include the cross-sectional design, which would not give the causal-effect relationship of poor BP control and its associated factors. Some of the factors such as doctors' knowledge and practice behaviour in hypertension management and patients' self-care management including physical activity and diet control were not studied and these could affect the BP control. In assessing appointment keeping, reviewing records might be a better way than the questionnaire; we faced challenges of missing documentation, as the follow-up plan was not clearly written in the records.

In conclusion, the BP control rate for older people treated in primary care clinics was

suboptimal. We hope that those with lower education level or using three or more antihypertensive agents would be given more attention during the consultation.

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How does this paper make a difference to general practice?

- Half of the older patients with hypertension treated in public primary care clinics did not achieve the target control.
- The older patients with lower education level or who are using three or more antihypertensive agents need to be given more attention during the consultation.

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Management of pulmonary tuberculosis in health clinics in the Gombak district: How are we doing so far?

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Abstract

This audit report assessed the structure, processes and outcome of the pulmonary tuberculosis (PTB) management in adults conducted at eight government health clinics within the high TB burden Gombak district. All newly diagnosed PTB patients from November 2012 to November 2013 were identified from the tuberculosis registry. Patients less than 18 years old, were transferred out or extrapulmonary tuberculosis was excluded from the study. The assessment criteria for PTB were defined according to the latest Malaysian TB clinical practice guidelines (TB CPG) 2012. A total of 117 patients were included in this report and data were extracted and analysed using SPSS version 20.0. The mean age of patients was 40.4 ± 14.4 SD. Majority was men (63.2%). Out of 117 patients, 82.1% were Malaysian citizens and 17.9% were foreigners. Malays were the majority (65%) followed by 7.7% Chinese, 10.3% Indian and 17.1% others. The most common clinical feature was cough (88.0%) followed by loss of weight (58.1%), loss of appetite (57.3%), fever (56.4%), night sweat (30.8%) and haemoptysis (32.5%). Acid-fast bacilli (AFB) smear was positive in 94% of cases. Chest X-ray and human immunodeficiency virus (HIV) screening results were available for 89.1 and 82.1% cases respectively. The results for the sputum culture were available in 27.4% of patients and 54.7% were documented as done but pending results. The clinics have a successful directly observed therapy (DOT) program with 94.0% patients documented under DOT. Out of 53 patients on maintenance phase, 47.2% were identified as cured. Cure rate for those completed treatment was 100%. The defaulter rate was 17.1%. This audit demonstrated the attempt made by the clinics to adhere to the recommended guidelines. However, improvements are to be made in the documentation of medical records, tracing of investigation results and reduction of the number of defaulters.

Introduction

Tuberculosis (TB) remains a major global health concern. Despite extensive control programs, there is a resurgence of the disease and a cause of global high mortality. In 2012, there were approximately 8.6 million incidences of TB cases globally and 1.3 million deaths among HIV-negative TB cases.¹

The stop TB strategy was recommended by the World Health Organization (WHO) in 2006 with the global target of 50% reduction in the 1990 prevalence and mortality rate by 2015.² Malaysia has a long history of combat with TB. Since the establishment of national TB control program (NTP) in 1961, it has been working hard to improve the TB outcome in Malaysia.³

Despite this commitment, incidence of TB in Malaysia is rising and has reached 81.4 per 100,000 population in 2010.⁴ The number of notified new TB cases increased from 15,000 in 2005 to 21,851 cases in 2012.¹ The state of Selangor has the highest incidence of TB within peninsular Malaysia with the Pulmonary TB (PTB) as the most common form.⁵

Malaysia faces various challenges in its attempt to tackle the problem of TB. HIV infection is on the rise and contributes to Malaysia's inability to reduce its TB burden.⁶ The rising rate of patients with diabetes mellitus and growing number of smokers pose a threat to the number of latent TB reservoir.⁷ This could lead to latent TB activation and cross-infection within the

general public. Incomplete treatment, high default rate and development of resistant strain also perpetuate the persistent TB transmission in the community.^{8,9} Lack of knowledge about the TB-causing organism and mode of transmission render the people at risk, unaware and unable to take measures to prevent transmission.¹⁰ There was also a problem of delay in diagnosis and start of treatment among TB patients.^{11,12}

In view of these challenges and the aim to combat TB, in November 2012, The Ministry of Health Malaysia (MOH) launched a revised 3rd edition tuberculosis clinical practice guideline (TB CPG) in order to standardise the management of TB at all levels and improve the patient care. Compared to the 2002 TB CPG, improvement was made in the collection of sputum smear for the diagnosis of sputum-positive PTB. The new recommendation requires two sputum smears with at least one of them being a morning sputum sample. Previously, clinics had to collect three sputum samples. The new CPG specified the diagnostic TB investigations for PTB to include sputum AFB smear, sputum culture for mycobacterium and chest X-ray. The tuberculin test (Mantoux) has been reserved for TB contact screening rather than for diagnostic purpose and erythrocyte sedimentation rate (ESR) was no longer mentioned as a useful investigation for PTB. The pharmacological treatment regime remains unchanged and the role of DOT clinic is emphasised in the new CPG to ensure better compliance and reduce the number of defaulters.

This audit aimed to assess the structure, processes including documentation of risk factors, clinical features, investigations and treatment, as well as outcome for the management of PTB within the health clinics in Gombak district that were set against the recommended criteria defined by the new Malaysian tuberculosis clinical practice guidelines.

Methodology

Study design and population

This was an audit, which was conducted in eight government healthcare clinics within the Gombak district, Selangor from 2012 to 2013. Selangor was chosen because it had

second highest number of new TB cases after Sabah.⁵ A total of eight government health clinics in Gombak were selected based on their known high TB burden with number of cases ranging from 3 to 10 new cases per month. These eight health clinics also shared similar characteristics in terms of infrastructure, facilities, healthcare services and staffing. Patients were selected from the TB registry in the respective health clinics.

Sampling method

All newly diagnosed PTB patients within a period of one year from 1st November 2012 to 1st November 2013 were identified from the tuberculosis registry. The audit period was purposefully chosen to coincide with the launching of the new CPG in November 2012. The inclusion criteria were adult patients (>18 years old) and those diagnosed with PTB who were seen and treated at the health clinics. Patients diagnosed with other forms of TB such as extra-pulmonary TB, those who were followed-up and treated outside the eight government clinics were excluded from the study.

Study tool and statistical analysis

The investigators prepared an audit protocol to assess the structure, processes and outcome of PTB management. The structure included the availability of TB registry and TB team within the clinics. The process included the practice of the clinics in delivering care for PTB including documentation for risk factors, clinical features, investigations and treatment. The outcome of PTB was measured by the cure rate and defaulter rates. 'Cure' was defined as a condition when the patient was smear-negative in the last month of treatment and on at least one previous occasion⁴. For monitoring, the AFB sputum smear was conducted at 2 months post starting treatment and at 4 and 6 months.⁴

A check list form was prepared and divided into seven itemised parts, which included patient's demographic details and diagnosis, TB risk factors, clinical features of PTB, investigation, treatment and outcome. The criterion for each item such as diagnosis, TB risk factors, clinical features, investigation, treatment and outcome were determined according to the Malaysian TB CPG.

Required information was obtained from the patients' medical records. The clinics use paper medical records and have no electronic medical records. Initially, patients' medical records were scrutinised to assess the documentation of each check list item performed by the clinic and identify whether the investigation results were available in the patients' notes. The items were documented as "done", "not done" or "not documented".

Following the 1991 World Health Assembly, Malaysia has set objectives of 85% cure rate and to detect 70% of sputum smear-positive TB cases.⁴ Data were entered and analysed using statistical package for social science (SPSS version 20.0 Chicago, IL, USA).

Results

There were 545 notified cases of TB within the Gombak district during the period of data collection. A total of 117 patients were included in the study based on the inclusion and exclusion criteria.

All of the health clinics had an identifiable TB structure in place, which included a TB registry, a named person in charge for TB who is either a nurse or a medical officer and a team that manages TB patients. All of the clinics were equipped with a laboratory, which was able to perform sputum AFP smear and baseline bloods investigation such as full blood count, liver function test, renal profile test and HIV rapid test. All clinics were also equipped with a radiological service to perform chest X-ray.

Table 1 contains the demographic details of patients. There was a male predominance compared to female. Most cases were reported amongst Malays and Malaysians.

Table 1. Demographic details

Variables	Frequency (%)	Mean (SD)
All subjects, <i>n</i> (%)	117 (100)	
Age		40.4 (14.4)
<i>^aGender</i>		
Male	74 (63.2)	
Female	43 (36.8)	
<i>^aRace</i>		
Malay	76 (65.0)	
Chinese	9 (7.7)	
Indian	12 (10.3)	
Others	20 (17.1)	
<i>^aNationality</i>		
Malaysian	96 (82.1)	
Non-Malaysian	21 (17.9)	
<i>^aDuration to start treatment from diagnosis</i>		
≤3 days	89 (76.1)	
3–7 days	16 (13.7)	
>7 days	12 (10.3)	

*^aNumbers not equal to *n* = 117 due to missing data.*

Table 2. Results of risk factors documented in the medical notes of the PTB patients

Risk factors for TB	Yes, <i>n</i> (%)	No, <i>n</i> (%)	Not documented, <i>n</i> (%)
Contact with TB	24 (20.5)	74 (63.2)	19 (16.2)
Diabetes mellitus	19 (16.2)	68 (58.1)	30 (25.6)
HIV	3 (2.6)	80 (68.4)	34 (29.1)
Drug abuse	2 (1.7)	69 (59.0)	46 (39.3)
Smoker	20 (17.1)	63 (53.8)	34 (29.1)

The results from Table 2 show that the majority of patients did not present with risk factors. Out of those who were identified with risk factors, the most common was contact with TB (20.5%) followed by the underlying diabetes mellitus (16.2%) and smoking (17.1%). Only 2.6% of patients had underlying HIV infection and 1.7% had a history of drug abuse. Non-documentation of risk factors was high. Non-documentation for HIV was 29.1%, drug abuse was 39%, smoking was 29.1% and presence of T2DM was 25%. The highest documentation was for contact with TB (83.8%).

The results from Table 3 demonstrate patients presenting with clinical features of PTB. The most common feature was cough (88%), followed by loss of weight (58.1%), loss of appetite (57.3%), fever (56.4%), night sweats (48.7%) and haemoptysis (32.5%). There was a high percentage of non-documentation. The most complete documentation was for clinical feature of cough (91.4%). Non-documentation was high for haemoptysis (28.2%), night sweats (30.8%), loss of weight (17.9%), loss of appetite (17.9%) and fever (23.1%).

Table 3. Results of clinical features documented in the medical notes of the PTB patients

Clinical features of TB	Yes, <i>n</i> (%)	No, <i>n</i> (%)	Not documented, <i>n</i> (%)
Cough	103 (88.0)	4 (3.4)	10 (8.5)
Haemoptysis	38 (32.5)	46 (39.3)	33 (28.2)
Night sweat	57 (48.7)	24 (20.5)	36 (30.8)
Loss of weight	68 (58.1)	28 (23.9)	21 (17.9)
Loss of appetite	67 (57.3)	29 (24.8)	21 (17.9)
Fever	66 (56.4)	24 (20.5)	27 (23.1)

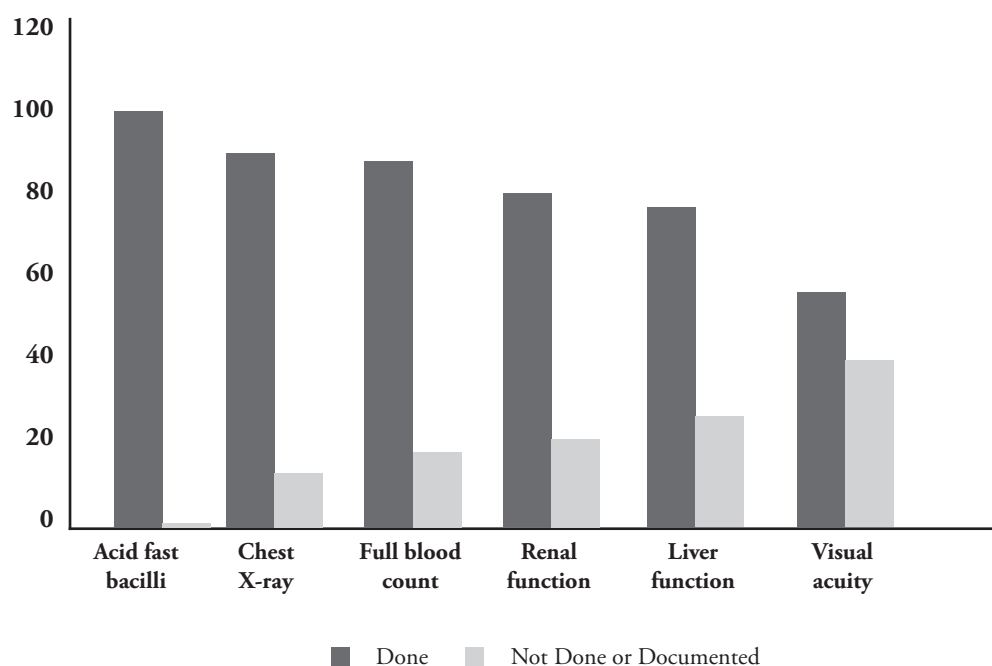


Figure 1. Percentage of investigations performed

Figure 1 demonstrates the percentage of basic investigation that was done for patients according to the recommendation of the CPG. AFB sputum smear test was conducted in almost all of the patients (99.1%) and positive sputum smear was identified in 94% of the cases, achieving above the national standard of 70%. Other investigations

performed and documented were chest X-ray (89.7%), full blood count (88%), renal function (78.6%) and liver function (75.2%). Visual acuity test was only documented in 54.7% of patients and was either not done or documented in 45.3% of patients.

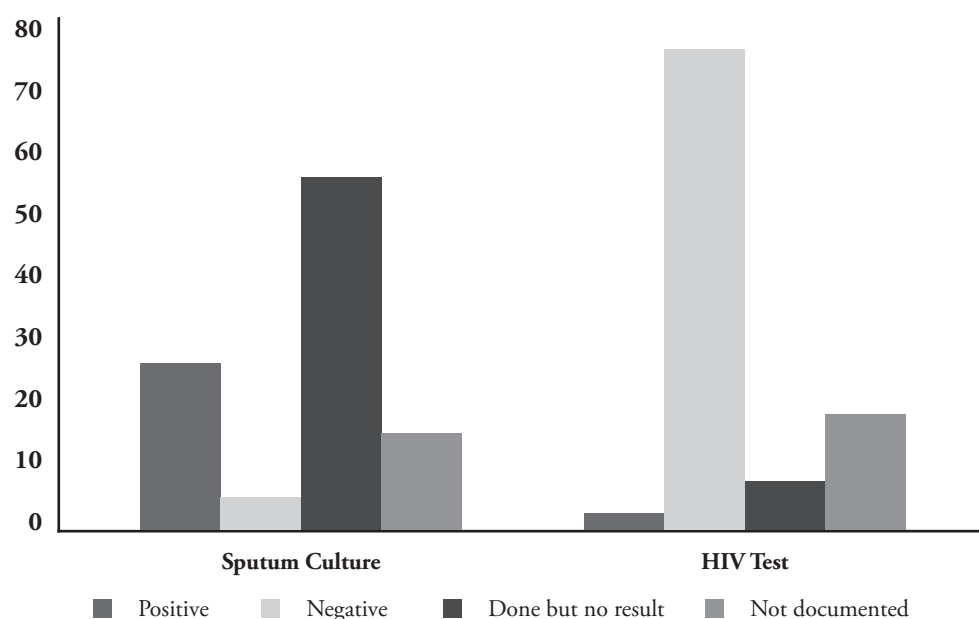


Figure 2. Percentage of patients with HIV and sputum culture performed and the results

Figure 2 demonstrates the percentage of patients with HIV and sputum culture test conducted. Although, in majority of patients (86.4%) sputum samples were collected for *Mycobacterium tuberculosis* detection, 54.7% of results were still unavailable in the patient's notes, 27.4% were culture -positive and 4.3% were culture -negative.

HIV test was conducted in 82.1% of patients and most patients had negative results (73.5%) and only 2.6% had positive results. HIV test was either not done or documented in 17.9% of patients.

Table 4. Association between stage of PTB treatment and cure rate

Treatment stage	Total number of patients (N)	Patients cured, n (%)	Patients not cured, n (%)	Chi-square test (p<0.01)
Initiation stage	31	0 (0.0)	31 (100)	0.001
Maintenance stage	53	25 (47.2)	28 (52.8)	
Completed treatment	33	33 (100)	0 (0.0)	
Total	117 (100)	58 (49.6)	59 (50.4)	

All patients were started on the initial recommended treatment regime. DOT was well established within the health clinics where 94% of patients were documented under DOT and only 7% were undocumented. The default rate was 17.1% (20 patients). Contact tracing was documented in 62.4% of patients and not done or documented in 37.6%. As shown in Table 4, all patients who completed treatment were cured hence, achieving the national standard of more than 85%.

Discussion

A particular area of concern highlighted from this audit report was the incomplete documentation

of patients' medical notes. TB is a notifiable disease and undergoes regular auditing, hence, requiring complete and concise documentation to ensure that the patients receive appropriate and optimum level of care as recommended by the national TB CPG. Incomplete documentation could be due to the use of paper-based record as a study had shown that the use of electronic medical record was more complete and accurate compared to paper based record.¹³ The use of check list items as well as regular training of clinical staff may improve documentation. Measures to improve documentation are necessary to ensure and maintain high standards of patient care.

There were more men with PTB compared to women and this finding was similar to other Malaysian studies.^{14,15} Social, biological and behavioural factors had been postulated as causes for higher TB incidence in men.¹⁶ In general, there is often a delay in seeking medical help following the onset of TB symptoms and women tend to delay longer as compared to men.^{17,18} The number of undiagnosed women may contribute to this gender discrepancy.¹⁷ More public health education in recognising clinical features of TB is needed to improve health seeking behaviour among the public.

The risk factors associated with PTB are well known. Compared to TB contact studies¹⁹ and another audit conducted in Ipoh, Perak (another state in Malaysia),¹⁵ the presence of risk factors and co-morbidities in these patients were low. This was most likely due to under-reporting and non-documentation. Close contacts are determined by proximity and persistence of the contact between the person infected with TB and those who are at risk (19). Patients with active TB and smear-positive are more infectious compared to those with latent or smear-negative TB²⁰ hence, documentation and rigorous contact tracing is important to prevent the spread of this disease. Risk factors such as HIV,²¹ drug use,²² smoking²³ and Diabetes⁷ are associated with higher risk of developing TB and were identified in this audit.

Productive cough is the most common clinical presentation in PTB cases although it is known that patients with PTB may present with non-PTB symptoms.²⁴ The investigations recommended by the TB CPG should be properly adhered as a part of patient assessment and monitoring. In general, most investigations were reasonably conducted and adhered by the clinics except for visual acuity test which was only recorded in 50% of cases. The first line recommended treatment for PTB is the combination of ethambutol, isoniazid, rifampicin and pyrazinamide.⁴ Optic neuritis is a well-known complication of ethambutol and isoniazid treatment.^{24,25} The TB CPG recommends routine screening for visual acuity prior to starting treatment and documentation of this procedure is essential in order to detect this complication.

This audit found that although laboratory confirmation for sputum culture was sent in majority of the patients but results were unavailable in the medical notes. The sputum culture taken for mycobacterium tuberculosis at the health clinic was sent to a centralised

laboratory and results become available after 8 weeks. This delay might affect the initiation of treatment in smear-negative TB patients leading to further transmission.²⁶ Laboratory bacteriological confirmation is important because positive culture have been identified in smear-negative cases.²⁷ A systematic tracing system is required to ensure that results of the culture and sensitivity are tracked down and recorded in the patient's notes.

The cure rate within Gombak district was commendable. However, defaulters were still posing a challenge to the district. This could be due to population fluidity where there was a constant influx and exodus of patients. Malaysia has a robust DOTS program to trace and refer patients from different parts of the country and has been practiced since the late 1990s.²⁸ However, the implementation of this system requires a dedicated and experienced team and is dependent upon the adequate staffing of the clinics.

Limitations

This study was based on a retrospective scrutiny of patient's medical records and was conducted to reflect practices within the health clinics with regards to PTB management. The main limitation was the absence of data due to non-documentation. The study was also timed to immediately coincide with the launching of the new TB CPG and there might be insufficient time for the dissemination of information in order to implement the changes.

Conclusion

The management of PTB in assessing risk factors, clinical presentation, investigation, treatment and outcome of PTB within government health clinics in Gombak adhered to the recommended criteria set by the Malaysian TB CPG 2012. However, gaps were identified in the documentation of patient's medical records within each items assessed. Improvements in documentation are crucial to ensure fair assessment can be conducted and appropriate clinical care can be given to patients. Tracing of investigation results, especially for sputum culture is recommended to ensure diagnostic confirmation. The clinics should be commended for their implementation of DOT and a high cure rate. Defaulter tracing can be improved as a measure in reducing treatment failure and complications such as multi-resistant drug TB (MDR-TB).

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Conflict of interest

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Social support and self-care activities among the elderly patients with diabetes in Kelantan

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Abstract

Introduction: Diabetes is common among the elderly and can significantly affect their lives including the issues related with social support and diabetic self-care activities.

Objectives: The objective of this study was to examine the social support and self-care activities among the elderly patients with diabetes.

Methods: A survey involving 200 patients was conducted from March 2013 to May 2013 in three hospitals in Kelantan. Data were obtained through self-administered questionnaires and clinical characteristics were acquired from the patients' records.

Results: The scores for social support (mean = 19.26; SD = 2.63) and self-care activities (mean = 14.83; SD = 4.92) were moderate. Higher social support was associated with high levels of glycated haemoglobin (HbA1c), fasting blood sugar (FBS) level, the duration of diabetes and a decrease in body mass index (BMI) ($p < 0.05$). It was observed that the patients with low educational, Hb1Ac and FBS level, with other chronic diseases and who have had diabetes for some time had low self-care activities ($p < 0.05$). There was a significant negative relationship between an increase in social support and decrease in self-care activity ($p < 0.05$).

Conclusion: Healthcare providers, family and friends have to strengthen their relationship with the elderly patients with diabetes to provide more social support and promote the compliance with diabetic self-care activities to improve clinical outcomes.

Introduction

Globally, the number of patients affected by diabetes has seen sustained increase in terms of incidence and prevalence. Diabetes is widely known as the most complex disease to manage,¹ especially in its final stages. It is defined by the level of hyperglycaemia that escalates the risk of microvascular damage, macrovascular complications and diminishes the quality of life.²

Globally, the total number of people with diabetes is estimated to rise from 171 million in 2000 to 366 million in 2030.³ Recent statistics have found that globally 346 million people suffer from diabetes.⁴ According to the International Diabetes Federation,⁵ a total of 25.8 million people from all age groups have been affected by diabetes, which account for 8.3% of the total population of the United States; out of which, 1.8 million people were

diagnosed with diabetes while 7.0 million were left undiagnosed.

The prevalence of diabetes among elderly population is increasing due to extended human life span.⁶ The elderly population with diabetes are more at risk of developing hypoglycaemia than the adult population. This is due to the high prevalence of comorbidities, polypharmacy, cognitive impairment and the use of agents that interfere with glucose metabolism.⁷

In Malaysia, the elderly is defined as a person who is 60 years old and more and it is estimated that Malaysia has approximately 17 million (1,691,000) people aged more than 65 years.⁸ The increasing number of diabetics in developing countries has been attributed to urbanisation and unhealthy lifestyles.⁹ The prevalence of diabetes in Malaysia has risen by 31.0% in a period of 5 years, from 11.6%

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in 2006 to 15.2% in 2011 and it is projected to increase to 21.6% by 2020.¹⁰

Since diabetes is significantly related with the aged population,¹¹ the increasing number of the elderly people in Malaysia and globally has made it a real challenge for healthcare providers to meet demands. Keeping this in mind, in terms of taking care of the elderly patients with diabetes, it is crucial to focus on the correlation between social support and self-care activities. This is because social support has been identified as the most important influential factor that affects diabetes management among the elderly population.¹²

There is a lack of adequate strategies related documentation to promote social support among the elderly patients with diabetes in Malaysia.¹³ The current management of incurable diabetes includes regular blood glucose monitoring, medications, dietary regulation of carbohydrate intake and regular exercise to control the amount of glucose in the bloodstream. Due to the complexity and demand of managing the illness, daily motivation and self-care activities are required to maintain optimal metabolic (blood glucose level) control.⁵ Diabetics' self-care activities should comprise diet intake, glucose level monitoring, foot care, exercise and medication. Direct or active patient participation for their diabetic self-care activities could be a turning point in the healthcare system to efficiently and effectively manage diabetes.

However, despite symptoms management and control of the disease, still there is a need to examine other factors that may impede patients' self-care activities. This paper discusses these factors in order to improve the health status of the patients.

Methods***Design, setting and sample selection***

A cross-sectional study was conducted from March to May 2013 to collect data from medical and diabetic clinics in three government hospitals in Kelantan, Malaysia (Gua Musang Hospital, Kuala Krai Hospital and Machang Hospital). Respondents were selected through convenience sampling. The

study population consisted of elderly patients with diabetes.

The estimated number of the elderly patients with diabetes registered in the three hospitals was 550 patients per year. A total of 200 elderly diabetics were selected from the sample, which represents 36% of the total population. The selection criteria were: patients having type 2 diabetes within 3 months and more and aged 60 years and more. Poor glycaemic control and glycated haemoglobin (HbA1c) greater than 7.5% during the last 6 months were also considered.

Instrument

A questionnaire was used to collect data, which consisted of four sections: demographic characteristics, clinical data, questions related to social support and questions related to diabetic self-care activities.

The medical outcomes study (MOS) social support survey includes 19 items to assess the kinds of support available to the elderly people. The five subscales measuring social support comprised emotional/informational support, tangible support, affectionate support, positive social interaction and additional items. The questionnaire was used to measure the respondents using a five-point Likert scale, reading 1 for never to 5 for all of the time. Higher scores represented good social support whereas, lower scores represented poor social support. Scores were rescored out of 100 using the following formula: $[100 \times ((\text{Observed score} - \text{minimum possible score}) / (\text{maximum possible score} - \text{minimum possible score}))]$.¹⁴

The diabetic self-care activity scale (SDSCA) questionnaire includes 11 items to assess diabetic self-care 7 days before the survey. It has five subscales measuring the following dimensions: diet, exercise, blood sugar testing, medications and foot care. The questionnaire measured the self-care activities taken just 7 days before the survey using seven-point Likert scale that ranged from 0 for never done to 7 for done 7 days per week. Higher scores represent good compliance with diabetic self-care, whereas lower scores represent poor compliance.¹⁵

Ethical considerations

Ethical approval was obtained from the Research and Ethics Committee, Universiti Teknologi MARA and the Ministry of Health (NMRR-12-1342-14274). Permission from the Director of the hospitals was also obtained.

A written consent was obtained from each of the respondents and all respondents were given the information prior to their participation. This was done by providing a written informed consent form, signed and dated by the respondent, researcher and a witness. A copy of the form was given to the respondents while the original signed copy was retained by the researcher.

Statistical analysis

Data were analysed using the statistical package for social science (SPSS) version 17. Variables were described using frequency distribution for categorical variables and the mean and standard deviation for continuous variables. The Kruskal–Wallis test and Mann–Whitney U test were used to evaluate the association between demographic variables with social support and self-care activities. Regression analysis was performed to evaluate the relationship between demographic and clinical variables with social support and self-care activities. Correlation analysis was used to evaluate the relationship between social support and self-care activities and also for the relationship between clinical

data with social support and self-care activities. A p -value less than 0.05 was considered statistically significant.

Results

Two hundred and fifty (250) elderly patients with diabetes were asked to participate in the study. Out of these, 50 patients did not complete the study for the following reasons: 43 patients did not have an HbA1c value within 6 months and seven did not complete the questionnaire. This means that 80% or 200 respondents' data were analysed from the three hospitals.

The Cronbach's alpha for social support questionnaire was 0.96, which indicated a high level of internal consistency for our scale with this particular sample. For diabetic self-care activities, the Cronbach's alpha was 0.70. The results of Kolmogorov–Smirnov and Shapiro–Wilk for both scales showed that all scales failed to reach the normality value.

Patients' characteristics

Table 1 shows that the mean age of the respondents was 67.9 (SD 5.7) years and the majority of the respondents (74%) were 60–70 years old. Approximately 59.5% of the respondents were men; 41% were illiterate and only 12.5% had received secondary education. The majority of the respondents were Malay (92%).

Table 1. Demographic characteristics ($n = 200$)

Variable	Status	<i>n</i>	%
<i>Age (mean age = 67.9; SD = 5.7)</i>			
	60–70	148	74.0
	71–80	43	21.5
	≥81	9	4.5
<i>Sex</i>			
	Male	119	59.5
	Female	81	40.5
<i>Education level</i>			
	Illiterate	82	41.0
	Primary	93	46.5
	Secondary	25	12.5
<i>Ethnicity</i>			
	Malay	184	92.0
	Chinese	14	7.0
	Indian	2	1.0

As shown in the Table 2, the majority of the respondents in this study were on oral medication (75.5%), 64% of patients had other chronic diseases, 80.5% of respondents did not have any complications related to diabetes

and 76.5% had received health education on diabetes. The mean for HbA1c, fasting blood sugar (FBS), body mass index (BMI) and length of diabetes of the respondents were 9.94, 9.08, 26.11 and 8.22 respectively (Table 2).

Table 2. Clinical data ($n = 200$)

Clinical data	<i>n</i>	%
<i>Types of treatment</i>		
Oral medication	151	75.5
Insulin	34	17.0
Oral medication and insulin	15	7.5
<i>Have other chronic diseases</i>		
No	72	36.0
Yes	128	64.0
<i>Have complication</i>		
No	161	80.5
Yes	39	19.5
<i>Receive health education</i>		
No	47	23.5
Yes	153	76.5
<i>HbA1c</i>		
Mean (SD)	9.94	1.64
<i>FBS</i>		
Mean (SD)	9.08	2.06
<i>BMI</i>		
Mean (SD)	26.11	3.05
<i>Duration of diabetes</i>		
Mean (SD)	8.22	4.14

Table 3. Social support among the elderly patients with diabetes

Variable	Score out of 100	Mean (SD)	Median (IQR)	Minimum	Maximum
Social support		19.26 (2.63)	20.00 (4.63)	14.42	24.38
<i>Subscale</i>					
Tangible	73.8	3.95 (0.63)	4.00 (0.50)	1.00	5.00
Affectionate	62.7	3.88 (0.68)	4.00 (1.00)	2.00	5.00
Positive social interaction	60.7	3.82 (0.67)	4.00 (1.00)	2.00	5.00
Emotional/informational	55.5	3.74 (0.52)	4.00 (0.75)	2.63	4.63

Social support among the elderly patients with diabetes

Table 3 shows that the overall mean of social support scale was moderate (mean = 19.26; SD = 2.63). Tangible support scored

highest (mean = 3.95; SD = 0.63), followed by affectionate support (mean = 3.88; SD = 0.68), positive social interaction support (mean = 3.82; SD = 0.67) and the lowest scale was emotional/informational support (mean = 3.74; SD = 0.52).

Self-care activities among the elderly patients with diabetes

The mean total score of the self-care activity scale was moderate (mean = 14.83; SD = 4.92). Medication compliance scored the highest (mean = 5.66; SD = 2.50), followed by diet (mean = 4.43; SD = 0.99), foot care (mean = 1.92; SD = 1.81), exercise (mean = 1.64; SD = 1.83) and blood sugar testing (mean = 1.18; SD = 1.16) (see Table 4).

The relationship between self-care activities and patient characteristics (demographic and clinical data)

The result showed that respondents who attended secondary education had higher self-care activities than those who were illiterate and had received only primary education ($p = 0.007$). Other relations did not result in any significant difference (Table 5).

Table 4. Self-care activities among the elderly patients with diabetes

Variable	Mean (SD)	Median (IQR)	Min	Max
Self-care activities	14.83 (4.92)	15.75 (7.25)	3.75	30.50
Subscale				
Medication	5.66 (2.50)	7.00 (0.0)	0.0	7.00
Diet	4.43 (0.99)	4.50 (1.50)	1.5	6.50
Foot care	1.92 (1.81)	1.50 (3.00)	0.0	7.00
Exercise	1.64 (1.83)	1.00 (3.00)	0.0	5.50
Blood sugar level testing	1.18 (1.16)	1.00 (2.00)	0.0	7.00

Table 5. The relationship between self-care activities and demographic characteristics

Variable	Status	Median	IQR	p value
<i>Age^a</i>	60–70	15.75	7.25	0.149
	71–80	17.75	5.25	
	≥ 81	19.50	8.63	
<i>Sex^b</i>	Male	15.75	6.75	0.545
	Female	15.75	7.60	
<i>Education level^a</i>	Illiterate	15.25	7.50	0.007*
	Primary	15.00	7.25	
	Secondary	18.50	3.25	
<i>Ethnicity^a</i>	Malay	15.38	7.25	0.329
	Chinese	18.50	6.38	
	Indian	17.13		

* $p < 0.05$

^aKruskal–Wallis test

^bMann–Whitney U test

The results of our regression analysis (Table 6) showed that there was a negative significant linear relationship between self-care activities and HbA1c ($p = 0.0001$), patients with other chronic diseases ($p = 0.001$) and primary level of education ($p = 0.014$). Those variables explained 28% of the variance in self-care activities ($R^2 = 28$). Other variables did not show significant results such as demographic variables (age, gender and ethnicity), and clinical data (FBS, BMI, type of treatment, length of diabetic, complication of diabetes and health education).

The association between social support and diabetic self-care activities

Table 7 shows there was a significant negative weak relation between both scales ($r_s = -0.21$,

$p = 0.003$). Hence, if social support increases the self-care activity decreases.

The correlation between clinical variables and social support level indicated that there was a positive significant difference between the level of HbA1c, FBS and duration of diabetes with the level of social support with p values of 0.0001, 0.023, and 0.0001 respectively. The significant difference between social support and BMI was negative ($r_s = -0.26$, $p = 0.0001$). On the other hand, the self-care activity scale showed a highly negative significant difference ($p = 0.0001$) with HbA1c, FBS and length of diabetes (Table 8).

Table 6. Multiple linear regression analysis of variables associated with self-care activities ($n = 200$)

Independent Variable	MLR	(95% CI)	t-stat	p value
Adj. b				
<i>Constant</i>				
	21.60	(14.75, 28.42)	6.23	0.0001
<i>Clinical Data</i>				
Hb1Ac	-1.32	(-1.73, -0.90)	-6.28	0.0001
Have other chronic diseases	-2.21	(-3.45, -0.96)	-3.50	0.001
<i>Educational Level</i>				
Never				
Primary	-1.46	(-2.63, -0.30)	-2.47	0.014

R^2 adj. = 0.28

Adj. b = Adjusted regression coefficient

Prediction model = $21.60 - 1.32(\text{Hb1Ac}) - 2.21(\text{Comorbid}) - 1.46(\text{Primary})$

Table 7. Spearman's rho correlation between social support and self-care activities ($n = 200$)

Self-care activities		
	Correlation	p value
Social support	$r_s = -0.21$	0.003

Table 8. Spearman's rho correlation of social support and self-care activities with clinical data ($n = 200$)

	Social Support		Self-care activities	
	Correlation (rs)	p value	Correlation (rs)	p value
HbA1c	0.41	0.0001	-0.52	0.0001
FBS	0.16	0.023	-0.25	0.0001
BMI	-0.26	0.0001	0.03	0.682
Length of diabetes	0.32	0.0001	-0.35	0.0001

Discussion

Social support among the elderly patients with diabetes

In this study, the overall social support was moderate. However, Amin's research, found that the majority of the elderly patients with diabetes had good social support.¹³ Yet in Akiyama's study, it was found that the social support was less among their sample.¹⁶ This highlights how the social support received by elderly patients with diabetes differed based on population. Further studies may be needed to understand this phenomenon.

Current study revealed that tangible social support was the highest followed by the affectionate, positive social interaction and lastly by emotional/informational support. Similarly, tangible support reported the highest score in Chew's study conducted among diabetic patients in Kuala Lumpur.¹⁷ The emotional because from the data obtained, most patients claimed that they had limited time to talk about their concerns with family or healthcare providers.

Patients with diabetes need to make extensive changes in self-care activities. The adjustments in these activities may be accompanied by the psychological issues including frustration and emotional distress.¹⁸ Social support is a psychological source related to better mental functioning with the ability to reduce depression in patients with diabetes.¹⁹ Social support can influence patients' motivation to self-care and may possibly affect the ways in which diabetes is managed, especially among the elderly patients.²⁰ This is important since social support is crucial in helping the elderly people to cope with diabetes and indirectly comply with the allocated treatment.

The contributions of better quality of life among diabetic patients are obtained through the acceptance and knowledge of diabetes, together with social support by family and friends.²¹ Besides, family members and friends also influence health management to effect greater compliance to recommended behavioural modification.^{22,23}

For that reason, all stakeholders, family and friends are responsible to overcome the lack of motivation to comply with the prescribed treatment.²⁴ Healthcare providers must have

interpersonal skills to ensure patients are motivated to comply with the treatment.²⁵ In order to overcome these problems, a diabetic support group should be formed so that elderly patients with diabetes are able to get personal advice from the healthcare providers and receive positive encouragement from other patients with diabetes. This will make patients feel that they have someone who exhibits love and concern for them thereby making them feel needed and appreciated.

Self-care activities among the elderly patients with diabetes

Overall, the self-care activities among the elderly patients with diabetes are at a moderate level. The findings are relatively parallel with Gallagher's study that reported self-care as being moderate to high among the elderly patients with chronic diseases.²⁶

The subscale in the self-care activities showed that medication scored the highest. Similar to previous studies, the majority of the participants adhered to their medication schedule.^{27,28} Diet had the second highest score, which had been supported by Mahfouz's study.²⁸

This study has also found that patients had poor compliance with foot care activity. The majority of the elderly patients with diabetes had various problems due to aging such as memory problems, impaired cognitive functions and poor awareness regarding administering foot care.²⁹ Furthermore, in Malaysian diabetic foot problems occur mostly among the elderly patients.³⁰

In this study, the respondents were not doing enough exercise. This finding was similar to Ploypathrpinyo's study where physical exercise was insufficient in respect to self-care activities.³¹ Other barriers to exercise were physical, environmental, psychological and time limitations.³² Patients who had many health conditions and complications such as retinopathy, neuropathy, nephropathy, hypertension and cardiovascular disease were also less able to follow regular physical exercise as chronic diseases have a stronger relationship with functional impairment.³³

Most of the respondents in this study did not check their glucose level periodically. This study is similar to Mahfouz and Awadalla study on blood glucose level monitoring which was poor among

patients with diabetes.²⁸ Some respondents stated that blood glucose level testing was expensive. Blood glucose level testing was one of the most expensive aspects of diabetes care.³⁴

The relationship between self-care activities and patients' characteristics (demographic and clinical data)

This study found that patients with low educational level, low HbA1c, other chronic diseases, low FBS, and longer length of diabetes showed low levels of self-care activities.

This finding was in line with the other studies that also found that self-care activities were poor among diabetic patients with poor education.^{35,36} It can be expected that the illiterate elderly patients with diabetes might have difficulty to follow instructions regarding self-care activities.

Similarly, self-care activities had a significant relationship with HbA1c in many studies,^{37,38–40} FBS, BMI and the duration of diabetes.⁴¹ O'Shea et al. also supported that comorbid patients with diabetes had been associated with self-care activities.⁴²

Therefore, the elderly patients with diabetes who have low educational levels, a poor HbA1c value, low FBS level and other chronic conditions and long-term diabetes need to improve their self-care. As healthcare providers, serious attention must be awarded to these issues. This vulnerable population needs to be adequately aware and instructed about proper self-care activities.

The association between social support and diabetes self-care activities

According to the results, the patients' self-care activities will decrease with an increase in social support. In the local culture, the parent-child bond is strong where the majority of the elderly people live together and receive support from their children. Elderly patients who live with family have a high level of dependence on their family for social and medical support.⁴³ Nevertheless, the elderly patients with diabetes need to be more responsible for their self-care to improve their abilities in managing the disease.

The association between social support and clinical data

This study found that social support increases with an increase of HbA1c, FBS and duration of diabetes. Social support also increases with decrease in BMI.

However, these results contradict other studies, which found that social support was most frequently associated with reduced HbA1c,⁴⁴ FBS²² and patients with less duration of diabetes have more social support.⁴⁵ The result of this study suggested that patients who had received good social support might have poor glucose management (high level of HbA1c and FBS), whereas patients with longer duration of diabetes might receive good social support. It can be expected that the elderly patients with longer duration of diabetes might have some physical limitations such as not being able to control their own blood glucose level and receiving more attention and social support from their family members.

Likewise, other studies revealed that higher BMIs were associated with significantly lower levels of social support.⁴⁶ Hence, collaboration with healthcare providers and family members is needed to provide good social support whilst at the same time improving the levels of HbA1c and FBS of the elderly patients with diabetes.

Limitations of the Study

The results of this study were limited by the following factors. The study included patients from only government hospitals. Some physical disabilities related to aging might have affected the cooperation of participants, such as hearing problems and the inability to understand the question. The number of patients who visited the hospital was not consistent across the years and the convenience sampling might not represent the whole population. Possible individual biases in answering the questionnaires might also have influenced the results. The cause and effect in this research could not be established by the factors studied using a cross-sectional study design.

Conclusion

Healthcare providers need to promote compliance with the self-care activities among elderly patients with diabetes. Other than that, the expected diabetic treatment and further

complication by promoting health education should be done to create awareness and exposure. The involvement of close family members during health education sessions is important to gain social support and reinforce more information regarding self-care activities for the elderly patients with diabetes.

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Conflict of interest

We declare there is no conflict of interest in the publication of this study.

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A case study of human immunodeficiency virus with positive seroconversion to negative

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Abstract

This case study demonstrates a 36-year-old ex-intravenous drug user (IVDU) who had been initially tested positive for human immunodeficiency virus (HIV) twice using Enzyme Immunoassay (EIA) method (Particle agglutination, PA done), but a year later he was tested HIV-negative. The patient was asymptomatic for HIV and T helper cells (CD4) count remained stable throughout this period.

In light of this case, there may be a need to retest by molecular methods for high risk category patients who were initially diagnosed HIV-positive, but later showing an unexpected clinical course, such as a rising or stable CD4 titre over the years.

Introduction

Combination of antiretroviral therapy has led to a major reduction in Human immunodeficiency virus-related (HIV-related) mortality and morbidity. However, HIV still cannot be cured.¹

This case illustrates a 36-year-old man who was initially tested HIV-positive twice according to the Joint United Nations Programme on HIV and AIDS (UNAIDS) and World Health Organization (WHO) HIV testing strategies II,² but a year later he was tested HIV-negative. This may have implications in future for blood test models for such patients.

Case report

A 36-year-old single man had been using illicit drugs since 2000 including ganja (cannabis) and heroin through inhalation and sharing needles. He was enrolled for methadone maintenance therapy (MMT) at a health clinic A in mid-2008. On entry to the MMT, he was tested positive for both HIV and Hepatitis C (Table 1). He was asymptomatic, with no signs of opportunistic infections.

On urine drug screening, he was tested positive for morphine in 2008 prior to MMT, but since then it remained negative. The client is currently on MMT. In early 2010 he was transferred out to clinic B for employment purposes elsewhere but returned in 2011 to clinic A. On entry to clinic B for continuation of MMT, patient was retested for

HIV according to local protocol. The tests done at clinic B showed a negative result for HIV but Hepatitis C remains positive.

The laboratory test results are shown below in Table 1.

Discussion

Serology testing has been the cornerstone in detection of HIV infection.⁵ The traditional confirmatory tests, Western blot (WB), line immunoassay (LIA) and indirect immunofluorescence assay are highly specific and have played a central role in diagnostic algorithms.⁶ However, studies have shown that combinations using enzyme-linked immunosorbent assays (ELISA) and Simple/Rapid (S/R) assays can provide results as reliable as the WB or LIA at a lower cost and are easier to perform and interpret with fewer indeterminate results.⁷ Therefore, WHO and UNAIDS have recommended testing strategies, which include a combination of ELISAs and/or S/R assays for HIV antibody detection, especially in settings with limited resources. Confirmatory testing with methods such as WB/LIA is not done in initial diagnosis.²

In this patient, the initial diagnosis of HIV was made after two separate reactive serology tests in the year 2008, in accordance with WHO/UNAIDS HIV testing strategies II.² A third HIV serology testing after 2 years in October 2010 showed weakly reactive result.

Table 1. Laboratory results

Date (Month/year)	Laboratory results	Place
August 2008	Anti-HIV 1 and 2 (ELISA): ^a Reactive Serology PA test for HIV 1 and 2: ^b HIV 1 Detected HBs antigen (EIA): Non reactive Anti-HCV (EIA): Reactive HCV test for LIA: Positive Liver function test: ALT: 69 (NR: 30–65) Other parameters: Normal	Clinic A
September 2008	Repeated with new serology sample Anti-HIV 1 and 2 (ELISA): ^a Reactive PA test for HIV 1 and 2: ^b HIV 1 detected	Clinic A
September 2008	T helper cells (CD4): 609 cells/ μ L	Clinic A
May 2009	T helper cells (CD4): 816 cells/ μ L	Clinic A
September 2009	T helper cells (CD4): 1193 cells/ μ L	Clinic A
October 2010	Anti-HIV 1 and 2 (ELISA): Weak reactive	Clinic B
November 2010	PA test for HIV 1 and 2: Not detected HIV viral load result : Target not detected Line immunoassay (LIA) method HIV 1 and 2: Not detected	Clinic B
November 2011	Anti-HIV 1 and 2 (ELISA): Non reactive HBs antigen (EIA): Non reactive Anti-HCV (EIA): Reactive HCV test for LIA: Positive	Clinic A
December 2011	Anti-HIV 1 and 2 (ELISA): Non reactive PA test for HIV 1 and 2: Non reactive	Clinic A
January 2012	Line immunoassay (LIA) method HIV 1 and 2: Not detected	Clinic A

^aELISA AxSYM HIV 1/2 G.O test Manufacturer: Abbott Laboratory, Germany. Sensitivity: 100%, Specificity: 99.94%³

^bPA Serodia HIV 1/2 test manufacturer: Fujirebio, Japan. Sensitivity: 100%, Specificity: 99.97%⁴

In view of the conflicting lab results, a HIV viral load test was requested by the doctor in clinic B in November 2010, which showed the results as HIV-negative. An algorithm issued by the Ministry of Health Malaysia for screening and confirmation of HIV recommends this approach.⁸ The initial T helper Cells (CD4) count at diagnosis was 609 cells/ μ L with an increasing trend over the next 1 year.

In June 2014, Centers for Disease Control and Prevention (CDC) updated their recommendations to state that initial testing for HIV should be conducted with an FDA-approved antigen/antibody combination immunoassay that detects HIV-1 and HIV-2 antibodies with HIV-1 p24 antigen.⁹ In our local setting it was not done in accordance with guidelines at that particular time.

There were several implications with these results: Most likely, it was an initial false-positive result due to serological cross-reactivity, in which antibody produced by immature immune response, other infections or autoimmune disorders, bind to the antigen in the test reagent.^{10,11} This patient was tested positive for Hepatitis C with an initial slightly elevated levels of liver enzyme which may be due to a transient hepatitis at the time of diagnosis. His liver functions subsequently normalised when he was tested HIV-negative. There were some weak evidences linking Hepatitis B but not Hepatitis C infection with false-positive HIV result.¹²

Another common reason for false-positive was administrative errors such as patient's blood mix up, but it was not likely because the second testing was done with a fresh serology sample.

Other less likely causes such as overinterpretation of weak reactivity, genetics and contamination¹² were unable to be verified.

The least possible scenario was a true cure whence the patient had seroconverted from a HIV-positive to -negative status. The case report of a German patient with acute myeloid leukaemia, who received a bone marrow transplant from a donor, was the only known example of a sterilising cure.¹³ Without genetic testing performed for this patient, there cannot be any certainty about this issue.

A false-positive HIV result could have severe negative impacts on patient in terms of emotional, social and economical aspects. Patient might be subjected to unnecessary emotional stress and social stigma, leading to breakdown in relationship and loss of employment. It would also incur higher healthcare cost due to unnecessary investigations and treatment.¹⁴ As the current incidence and impact of false-positives in Malaysia was unknown, it was hoped that this paper would stimulate more research in this area.

This patient was initially upset with the false diagnosis and being subjected to multiple tests repeatedly. However, he eventually accepted the fact after an honest, empathetic and reassuring pre and post test counselling session while addressing the possible causes of false-positive results.

Conclusion and recommendation

This case study highlights the need to retest high-risk category patients who are diagnosed with HIV initially, but later showing an unexpected clinical course, such as a rising or stable CD4 titre over the years. The latest CDC recommendations on the diagnostic algorithm in June 2014 may help to avoid false-positive diagnosis which can be devastating to the patient. Appropriate counselling strategies to handle this type of scenarios will be useful.

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Night market contact lens-related corneal ulcer: Should we increase public awareness?

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Case report

Case 1

A 21-year-old Malay woman presented with a 4-day history of left eye progressive painful blurring of vision due to cosmetic CL wear. She had always bought her CLs from a night market and disposed it after every 3-4 months. She had a very poor CL hygiene regime and continuously wore the lenses for more than 8 hours daily. Prior to the presentation, she had been using a combination of steroid and antibiotic eye drop as prescribed by a general practitioner whom she had consulted earlier for similar complaints of eye redness and pain associated with reduced vision. Her condition and vision deteriorated after 2 days of medication instillation.

At presentation, visual acuity of the left eye was counting fingers. There was a large central corneal abscess obscuring the visual axis associated with central stromal melting (Figure 1). Also, there was significant anterior chamber cells inflammation with hypopyon level.

Culture and sensitivity of the cornea scraping revealed *Pseudomonas aeruginosa* infection. The patient was admitted for intensive treatment with a combination of intensive topical antibiotics, comprising topical ceftazidime 5% and topical gentamicin 1.4%. Oral ciprofloxacin 500 mg BD was added as a prophylaxis for sclera abscess due to the close proximity of the original ulcer to the sclera.

The ulcer eventually healed with a large central dense scar following 3 weeks of inpatient stay. Final visual acuity was 6/60 and corneal graft was offered in a view of poor vision.

Case 2

A 19-year-old woman presented with a 3-day history of left eye painful blurring of vision associated with whitish discoloration of the cornea. She had slept overnight while having the cosmetic CL bought from a night market a few days back.

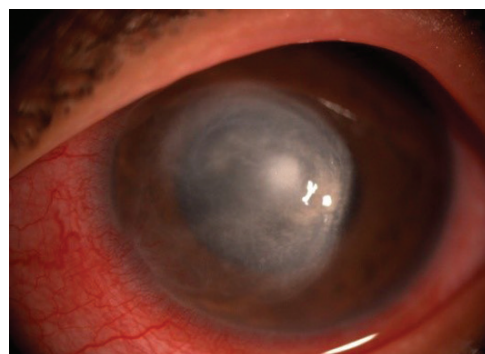
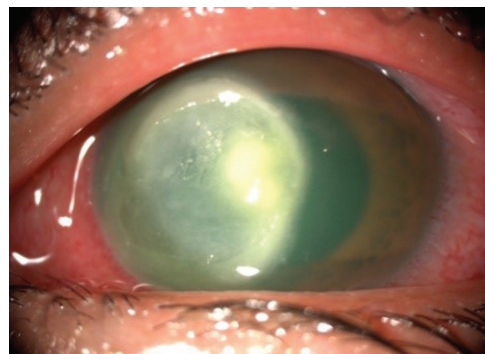


Figure 1. Large central corneal ulcer encroaching limbus nasally with dense stromal infiltrates (*top*), resulting in dense scar once healed (*bottom*)

On examination, the left eye vision acuity was counting fingers due to a central corneal ulcer with dense stromal abscess. Anterior chamber activity was intense with hypopyon level (Figure 2). Other ocular examinations were normal.

She was treated for bacterial keratitis using the similar combination of topical antibiotics. The ulcer gradually improved and the patient was allowed to discharge after 4 weeks of inpatient treatment. The final visual acuity was 6/24.

Discussion

Worldwide, approximately 85 million of people are using CL either for optical or cosmetic purposes. In Malaysia, the popularity of cosmetic CL use is also increasing, largely among the

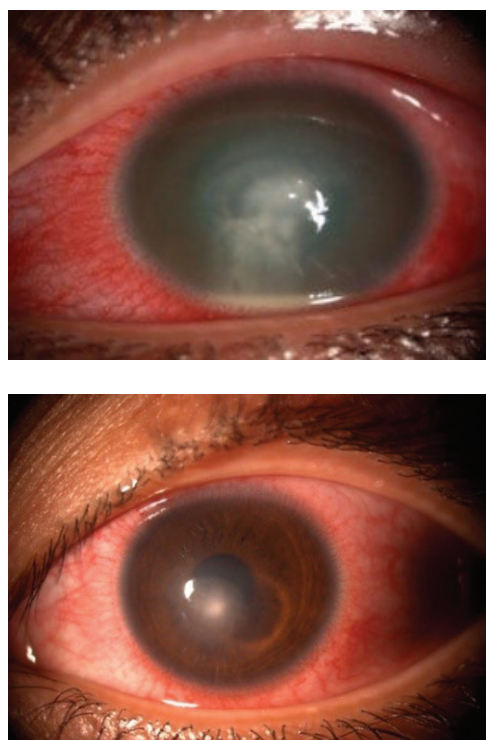


Figure 2. Central corneal ulcer with dense infiltrates and hypopyon (*top*), which healed with paracentral scar (*bottom*)

younger age group. Therefore, it is not surprising that the incidence of contact lens-related ulcer (CLRU) is also on the rise due to poor CL care and hygiene regime. Approximately 80% of CLRU patients are culture-positive, and more than 75% of these resulted in colonisation by gram-negative bacteria.¹ An alarming trend of cosmetic CLs bought at night or flea market is on the rise due to lack of awareness among the public and its much cheaper price. The multiple lens selection 'over-the-counter' is also appealing to the public as these lenses appear similar to the more expensive options available in the optical shops.

In Malaysia, cosmetic CLs are being dispensed by unlicensed vendors and are rampantly sold at flea market. Patients who acquire lenses from unauthorised providers are less likely to be informed about appropriate lens use and care. In a case series of reported 13 patients with severe coloured contact lens-related microbial keratitis, the users had no significant refractive error.² They acquired the lenses from unlicensed optical shop or had shared lenses with relatives or friends.² Furthermore, CL solutions and casings were usually kept in bathroom, where microorganism lurking and possibility of contamination was very high. Most optician and sellers do not advice on

CL hygiene and proper care and cleaning of the lens and the lens casings. Consequently, the risk of suffering from debilitating sequelae and sight-threatening consequences are higher.³

Cosmetic CL use is most popular among college students. A study on regular CL users among this group of population showed that contamination with microorganism was up to approximately 21% with lens casings being the most frequently contaminated item.⁴ *Pseudomonas aeruginosa*, *Klebsiella* sp. and *E. coli* were among the most common organisms isolated from the cultures from either lens casings, solutions or the lens itself.⁴ These gram-negative bacteria are usually sensitive to aminoglycosides in our local setting. Topical gentamicin is effective and safe for the eye and the solution is also available in multiple concentrations; hence, it is used as first-line empirical treatment against CLRU. Resistance to antibiotic is a significant concern among ophthalmologist,⁵ therefore, a second antibiotic is advocated. Furthermore, aminoglycosides largely cover gram-negative bacteria and another antimicrobial agent against gram-positive bacteria should be added. More importantly, topical steroid must always be used with caution in infective corneal cases. This medication helps to reduce the associated inflammation and scarring, but the infection may worsen drastically and corneal melt may also ensue.

Corneal ulcer from CL use typically arises from bacterial contamination of the lenses, either from the lid margin or from environment. Tap water is a notorious source of microbial infection and people usually use tap water to rinse the casings. Microbial adherence to CLs and corneal epithelium depends on its virulence and the material of the CL. Lenses with higher water contents tend to cause inoculation of *Pseudomonas aeruginosa*,³ which probably explains the high number of infection cultured from CLRU.

Proper CL care and hygiene are one of the most important modifiable risk factor for CLRU.⁶ In some countries, proper licensing and thorough information of CL care is mandatory. Furthermore, CL should only be available through prescription, and definitely should not be freely available at flea market.

In the United States, the FDA provides thorough information on purchasing CL including health warnings when CL are purchased without a prescription and worn incorrectly. It is illegal to sell

CL at a flea market or beauty shop. Vendors can only sell CL to buyers who have prescription from an ophthalmologist or optometrist. Although, appropriate lens care and hygiene does not fully eliminate the risk of developing corneal infection,⁶ to a large extent these measures are important to protect the ocular surface. Hence, primary care physicians, opticians and medical personnel should be familiar with proper hygiene and CL care. In the event of corneal infection, especially from CL use, urgent ophthalmology referral will be vision saving.

Conclusion

CLRU or microbial keratitis is an important cause of ocular surface morbidity. Readily available CL sold at night or flea market poses a major issue and may possibly cause more CLRU. Hence, people, especially the younger age group should be educated and informed on proper technique of CL care and hygiene. In an era of cosmetic CL becoming a fashionable trend more than an optical device, users must be warned against possible visual-threatening sequelae from improper CL use and care.

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TEST YOUR KNOWLEDGE

A boy with bluish neck swelling on screaming

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Case summary

A 5-year-old Malay boy was presented with a history of swelling on the right side of the neck for 6-month duration. It was noticeable everytime when the child screamed (Figures 1 and 2). There was no other associated symptom.

Questions

1. Describe the clinical manoeuver(s) that can help bring out the mass or swelling during examination.
2. What is the differential diagnosis?
3. What is the appropriate investigation?
4. Outline the treatment choice in this patient.



Figure 2. During manoeuver, the mass appeared with bluish discoloration of the overlying skin (*in circle*). Prominent external jugular vein also appeared (*black arrow*)



Figure 1. The mass was not visible at rest

Answers

1. We can ask the patient to do Valsalva manoeuver. If the patient is a small child, the sign can be observed while the patient is crying. The effect can also be seen if the patient is straining, screaming, coughing or sneezing. This is attributed to the presence of valve in the jugular vein that is directed towards the heart, which would increase the venous pressure whenever there is an increase in the intrathoracic pressure.¹
2. The source of the content can be blood vessel (phlebectesia or abnormality of the jugular veins) or can be air from the airway (external laryngocoele). A soft cystic mass at the lateral side of the neck, which does not change with Valsalva manoeuver, includes pharyngeal pouch/pharyngocoele,

branchial cyst, cystic hygroma or solid tumour.¹ However, in this case, as the mass appeared bluish and demonstrated only with Valsalva manoeuvre, the blood vessel anomaly should be considered first. Besides internal jugular vein, anterior jugular and external jugular veins can be affected. There is a marked preponderance to occur on the right side.^{1,2}

3. Ultrasonography (USG) with Doppler study of the neck will be very useful to diagnose the condition, although contrast-enhanced computed tomography (CECT) scan has been shown to give better delineation and relation of the mass with the adjacent structures.³ However,

in a primary care setting, Doppler USG is more practical. In this case, it confirms the presence of ectatic right jugular vein (Figure 3). No filling defect was seen. The expanding ration is calculated by dividing the diameter during Valsalva manoeuvre by diameter at the resting state as a percentage.⁴

4. In majority of cases, the treatment is conservative, especially for bilateral cases or in the absence of complication.^{2,4,5} Referral to a vascular surgeon may be warranted if the mass is extensive or there is marked discomfort,⁶ or complicated by respiratory compromise such as upper airway obstruction as a result of external compression.

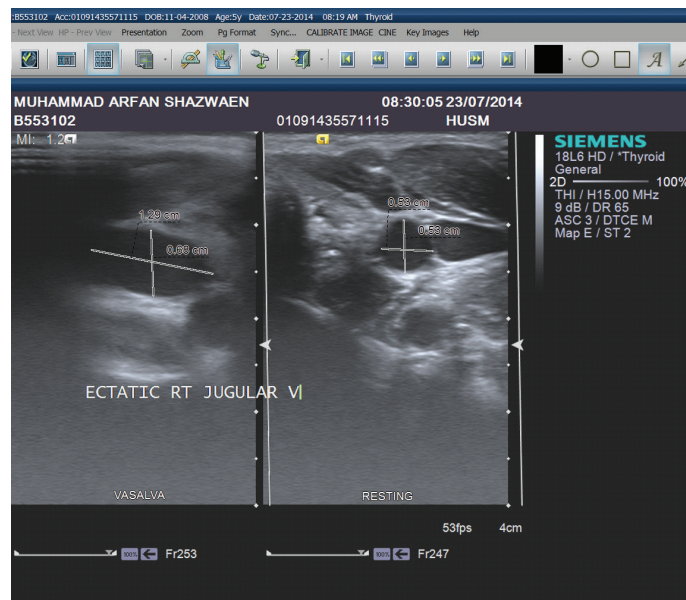


Figure 3. USG images of the expanded IJV during Valsalva as compared to the resting diameter. Expanding ration (Anteroposterior): $(0.68/0.53) = 28.3\%$, (Width): $(1.29/0.53) = 143.4\%$

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A boy with blue sclera and recurrent fractures

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Case summary

A 5-year-old boy was presented with a recurrent history of fractures since the age of 3 years. He had 2–3 admissions per year due to fall and had a history of fractures at his right ankle, left femur and three times at his left elbow. On further questioning, it was found that he was born via spontaneous vaginal delivery. Antenatal and postnatal periods were uneventful and neonatal and development histories were similar to other siblings. No similar illnesses, history of osteoporosis, recurrent fractures or eye problem were found in the family. Examination showed that he was a thin-built boy with a normal gait, vision, speech and hearing. It was noted he had an eye abnormality (Figure 1), but the ear, nose, throat and dentition were normal. The cranial nerve and other neurological tests were also normal. There was no joint hypermobility and the other systems and pure tone audiogram were normal.



Questions

1. What is the likely diagnosis?
 2. Which is the most important condition to be ruled out?
 3. What is the inheritance in the patient described?
 4. What is the treatment?
2. One of the most important diagnosis need to be ruled out in a boy with recurrent fall is non-accidental injury (NAI). Presence of multiple fractures in various degrees of healing states should trigger a possibility of NAI.⁴
 3. The inheritance pattern of Type I OI is autosomal dominant in which 50% of its defect is due to reduction in the amount of collagen Type I.⁵
 4. Management will require a multidisciplinary team consisting of orthopaedic specialists (fracture), otorhinolaryngologists (hearing loss), physicians and dental surgeons.⁶ Besides surgery, treatment can involve the use of pharmacological agents, psychological support and preventive medicine. Oral and intravenous bisphosphonate are commonly prescribed for all types of OI.⁷ Regular surveillance for hearing impairment every 3–5 years is recommended for all types of OI after adolescence as disease progression is invariable.⁶

Answers

1. The presentation is typical of osteogenesis imperfecta (OI). It is a genetic disease with a defect in Type I collagen.¹ This can be caused either by a reduction in the synthesis of Type I collagen or the production of structurally abnormal forms of the collagen or both. The mildest form is Type I.² The other types of OI are Type II, III and IV. As for Type V and VI, it is due to the absence of COL1A1/2 allele mutation.² Type VII and VIII are newly discovered forms and inherited in recessive manner.³

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