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CONTENTS

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EDITORIAL

Lessons We Learned from the COVID-19 Outbreak

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The emergence of coronavirus disease 2019 (COVID-19) did not only cause a devastating effect on every corner of society but also taught us many important lessons. One of the lessons is on the importance of the principles of public health. We have seen this repeatedly in recent years during the emergence of SARS, Ebola, MARS and Nipah (Ahmed et al., 2019). The principles of public health have been effective in controlling these infections and we are confident that COVID-19 will be under control using these simple measures. As health professionals, we must set examples by following preventive measures, i.e. wearing mask properly, safe distancing and washing hands, to prevent and control the spread of COVID-19. Unfortunately, there is an erroneous concept in these measures however, therefore, cooperation of everybody in the community is necessary to overcome them.

The COVID-19 outbreak also taught us that central testing is indeed not easy, like in many places, we in Sabah also felt that universities can complement the efforts of health authorities to address this challenge. Universiti Malaysia Sabah (UMS) has contributed considerably to testing samples during this outbreak. This small step is very important. If we continue this cooperation, we are confident that it will also assist in testing other diseases effectively. In Sabah, UMS and the Sabah State Health Department are cooperating in several health issues for a long time. This cooperation will be more effective if we can disseminate the knowledge

gained through the Borneo Journal of Medical Sciences (BJMS). This journal can be a vehicle to transmit the knowledge from Sabah to other parts of Borneo and beyond. This year BJMS is in its 10th year of publication. This may not be considered a long journey for some, but it is significant to us. This 10-year journey is possible with the support of authors, reviewers and editors who contributed generously without any personal gain. We, from the editorial board, would like to congratulate all for the success and thank you for the contributions. I am deeply honoured and excited to serve as the new Editor-in-Chief of BJMS starting from this year, together with a new Editorial Board consists of renowned researchers from Malaysia and all four corners of the world. I also take this opportunity to thank the higher management of UMS for putting their trust in me to bring this journal forward. I sincerely hope that with our new team, we will be able to advance this journal to a higher level.

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REVIEW ARTICLE

Olfactory Dysfunction: A Diagnostic Symptom of COVID-19

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ABSTRACT

Besides the common respiratory symptoms or viral pneumonia, COVID-19 is also presented with different neurological symptoms. Olfactory dysfunction (OD) or impairment of the sense of smell is one of the common neurological symptoms being reported in infection caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The severity varies from anosmia to microsmia or hyposmia. OD could have a potential early screening and diagnostic value besides other neurological and common respiratory symptoms. In our descriptive concise review, we aimed to elicit the manifestation of olfactory dysfunction as an early predictor of SARS-CoV-2 infection. We are also aiming to establish, OD as a quick and reliable assessment tool of COVID-19 risk, among the healthcare workers and contact tracers, which can justify self-quarantine of the person as well as recommendation for testing on a priority basis. We have also focused on, any effect to produce this symptom by the drug used for treatment in COVID-19, and if the old age of the patient showing any extra influence to develop OD in COVID-19.

INTRODUCTION

Drugs Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), a novel member of the coronavirus family, responsible for devastating pandemic Corona Virus Disease 2019 (COVID-19) worldwide. The first case was officially claimed to be found in Wuhan, China on 18 December 2019, which rapidly spread all over the world. The world has seen 1.082 million deaths and 37.802 million positive

cases until 12 October 2020. Many countries have started experiencing a second wave of the pandemic.

In the beginning, according to the World Health Organization (WHO), tiredness, fever, cough and breathing difficulty, were the presenting symptoms in COVID-19 patients (Moein et al., 2020). Almost every organ of the human body could be involved with the damaging effects of COVID-19 besides the most common respiratory symptoms (White-Dzuro et al., 2021). The percentage of the patients who recover spontaneously is 85% to 95% while 5% to 14% may become seriously ill (Grasselli et al., 2020; Eastin & Eastin, 2020; Richardson et al., 2020).

Sudden loss of smell and taste were reported as cardinal signs in many publications (Paderno et al., 2020; Giacomelli et al., 2020; Yan et al., 2020; Lechien et al., 2020; Moein et al., 2020; Hornuss et al., 2020; Parma et al., 2020). These potential specific symptoms of COVID-19 patients were reported even in otherwise asymptomatic patients (Menni et al., 2020; Walsh-Messinger et al., 2020; Hopkins et al., 2020).

Pathophysiology of Olfactory Dysfunction

The pathophysiology of olfactory dysfunction (OD) is still hypothetical even though it is an established fact that olfactory neuroepithelium can be damaged by any viral infection (Doty, 2008). This disruption may cause inflammatory changes which affect the function of olfactory receptor neuron. Later it may cause damage to the olfactory receptor neuron, and/ or impair subsequent neurogenesis. This is how the cause of temporary OD of different severity level and/ or duration, can be explained (Netland et al., 2008).

It is also known that several viruses can enter the brain through olfactory neuroepithelium by cellular and pericellular transport mechanisms (Doty, 2008). The older work regarding the intracranial entry of SARS-CoV in transgenic animal models suggested that the olfactory bulb could be the entry point (Netland et al., 2008). So, it can be speculated that the intracranial penetration of SARS-CoV-2 is possible with downstream effects on the olfactory region as well as non-olfactory regions of the brain, by which the olfactory function may be adversely affected.

Most of the study reported that SARS-CoV-2 can reach the central nervous system from the bloodstream or olfactory pathway by binding the angiotensin-converting enzyme 2 (ACE2) receptor and the spike protein transmembrane protease serine 2 (TMPRSS2) (Brouwer et al., 2020). The SARS-CoV-2 enters the nasal epithelial cell by directly binding with ACE2 protein in the cell wall (Qi et al., 2020). Olfactory receptor cells neither have expressions of the ACE2 nor TMPRSS2. Possibly the involvement of another gene, most likely the epithelial sustentacular cell and stem cells are responsible for SARS-CoV-2 (Brann et al., 2020). So, the olfactory receptors may be indirectly damaged by the uptake of SARS-CoV2 into nasal epithelial cells. At this point, a rapid immune response in the host may be initiated by the olfactory receptor neurons and the olfactory dysfunction may be manifested (Butowt & Bilinska, 2020).

Regarding regeneration of olfactory neuroepithelium, it is suggested that there is a considerable propensity, if the stem cell layer is not significantly damaged, spontaneous improvement of OD is observed over time (Chang & Glezer, 2018; Choi & Goldstein, 2018; Joiner et al., 2015; London et al., 2008).

OD as Diagnostic Symptom of COVID-19

About 37.802 million people all over the world got infected until 12 October 2020, with the novel SARS-CoV-2 virus since the first case was officially announced in Wuhan, China on 18 December 2019. The total number of deaths reported to date is 1.082 million.

Scientists all over the world are trying their best to explore the disease and regularly reporting in the clinical presentation, pathophysiology, and treatment outcomes (Eastin & Eastin, 2020; Goyal et al., 2020). Another group of scientists are trying to come out with a safe vaccine against this devastating disease. Few of the vaccines are in the 3rd stage of the trial.

In the initial days, the most focused characteristics of COVID-19 were reported as pulmonary symptoms. Within a short time, it was observed that the disease had started showing non-pulmonary presentations. A significant quantity of virus was detected in the kidney, liver, heart, and brain by autopsy examination (Puelles et al., 2020). It was scientifically proven that there is a massive activation of the coagulation system in response to severe inflammation (Jose & Manuel, 2020). This results in cerebral infraction besides deep venous thrombosis, pulmonary embolisms, and renal failure (Lodigiani et al., 2020). Numerous publication reports and reviews, about neurological complications of COVID-19, with a significant number of stroke cases (Brouwer et al., 2020). We are aiming to summarise some findings. Two studies suggest that SARS-CoV-2 can reach the central nervous system from the bloodstream or olfactory pathway by binding ACE2 receptor and the spike protein protease TMPRSS2, but the clinical relevance of such brain invasion is unclear. An experimental model of SARS-CoV-1 infection did not report brain inflammation (Ng Kee Kwong et al., 2020; Baig et al., 2020; Netland et al., 2008). Direct infection of the central nervous system by SARS-CoV-2 is considered unlikely since cerebrospinal fluid (CSF) analysis is often normal (Brouwer et al., 2020). No case was tested positive for SARS-CoV-2 by PCR on cerebrospinal fluid and all patients had a positive nasopharyngeal PCR test and chest imaging characteristic of COVID-19 (Brouwer et al., 2020).

A typical finding of COVID-19 is the loss of smell (or anosmia), which has been described in 40% of cases in a Spanish case-control study and 34% in an Italian study (Beltrán-Corbellini et al., 2020; Giacomelli et al., (2020). Generally, loss of smell is most noticeable to the patient when it is marked, such as anosmia (Doty et al., 1988). Another study claimed that out of 60 COVID-19 positive patients, 59 showed some level of olfactory dysfunction. Among them 58% were anosmic or severe microsmic, 33% moderate and 13% showed mild microsmia and only 1 patient (2%) with normal olfactory function. Almost everyone was free from severe nasal congestion or inflammation (Moein et al., 2020). The demographic and clinical data of their study resembles the reported complication of 43 studies involving 3,600 COVID-19 positive patients (Fu et al., 2020). Some article suggested that the severity of the disease can be indicated by OD in COVID-19 (Lüers et al., 2020). Patients with negative COVID-19 test having idiopathic OD needed to be prioritized to repeat the test. OD in COVID-19 along with or without other neurological symptoms has a strong predictive value where the resource for testing is not available or is limited. Around 50% of the participants in other studies showed that the recovery period of OD is within 40 days (Yan et al., 2020; Rawal et al. 2016). Few studies suggested that the number of patients with OD and other chemosensory disorder will greatly increase in COVID-19 and the quality of life will be significantly affected (Smeets et al., 2009; Croy et al., 2014) and endangered especially patients with other neurological comorbidities like Alzheimer's disease (AD) and Parkinson's disease (PD) (Balin & Hudson, 2018; Olsen et al., 2019).

In another study, the researchers were observing for drug-induced OD, while COVID-19 positive participants were under treatment with different drugs, but no significant relationship was found (Moein et al., 2020). Drugs like hydroxychloroquine, lopinavir/ritonavir, or intravenous immunoglobulin (IVIg) used for

COVID-19 treatment was reported to have mild taste alterations as side effects but affecting the smell function are relatively rare (Schiffman, 2018). Usually, the degenerative olfactory dysfunction started to appear after the age of 65 years. Smell test among the COVID-19 patient under 65 years of age showed strong sensitivity and specificity which is the same as a normal person (Doty et al., 1984).

Even though the real-time reverse transcription-polymerase chain reaction (rRT-PCR) test is the gold standard to diagnose COVID-19, the false-negative result of 15% of cases is always kept under consideration (Li et al., 2020; Jing-Wen et al., 2020; Liang et al., 2020). In a large population where resources are limited for the COVID-19 test, a quantitative smell test can be considered as an alternative inexpensive diagnostic screening test (Moein et al., 2020).

CONCLUSION

Neurological symptoms are common in COVID-19 patient, but no evidence was found regarding direct inflammation of the brain by SARS CoV-2. Smell dysfunction is found to be one of the common neurological symptoms which could be the one determining symptoms of COVID-19 and a test of olfaction can be helpful where diagnostic resources are expensive and not easily available. Sometimes it can be only presenting symptoms. Quality of life is markedly affected especially in regards to the taste of food. There is no evidence of the age of the patient, and the drug used for the treatment in the COVID-19 patient, causing olfactory disfunction. Further research is required on the onset, duration, and severity of OD in relation to the severity of COVID-19.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

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ORIGINAL ARTICLE

Subtypes, Risk Factors and Site of Stenosis of Ischaemic Stroke in a University Hospital in Bangladesh

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ABSTRACT

Stoke is the second most common cause of death and the most common cause of adult disability. To plan an efficient evaluation and treatment of an individual patient with ischaemic stroke, the clinician should be familiar with the subtyping of ischaemic stroke patients and the risk factors analysis of different aetiology. Eight hundred seventy-seven (877) patients have been selected for this cross-sectional study conducted in a university hospital of Bangladesh from 2014 to 2018, to whom brain imaging [Computed Tomography (CT)/ Magnetic Resonance Imaging (MRI)], vascular imaging [Magnetic Resonance Angiogram (MRA), Digital Subtraction Angiogram (DSA)], ECG and echocardiography have been done. We did subtyping according to TOAST criteria. The mean age of patients was 60.5 ± 11 years. Most patients (29.33%) belonged to the age group 51 – 60, where 70.47% of subjects were male and 29.53% were female. In this study, 43.87% of patients were in the large artery atherosclerosis group, 23.83.% in the small vessel occlusion group, 8.46% in the cardiac embolism group, 19.30% in the undetermined aetiology group and 4.54% in other determined aetiology. Among risk factors hypertension, diabetes mellitus, dyslipidaemia was present in 58.15%, 38.42%, and 38.88% of patients, respectively. In ischaemic stroke patients, large artery atherosclerosis was the most common subtype and hypertension was significant in this group. Extracranial stenosis was more common in ischaemic stroke.

INTRODUCTION

Worldwide stroke is the second most common cause of death (Katan & Luft, 2018) and the most known cause of severe disability (Adamson et al., 2004). Worldwide 5.7 million people died in 2005 and projected to rise to 7.8 million in the year 2030. According to Global burden of disease (GBD) 2016, death due to stroke in South Asia has increased from 15% to 21% and the mean global lifetime risk of stroke has increased from 22.8% to 24.9%. Strokes can be classified into ischaemic and haemorrhagic types (Donkor, 2018). Worldwide about 69% of stroke, 71% of stroke-related death and 78% of DALYs (disability-adjusted life years) lost occurred in low-income and middle-income countries. Over the last forty years, the stroke incidence in low- and middle-income countries has become more than doubled. During this time, stroke incidence has declined by 42% in high-income countries. Globally there was a 25% increase in the incidence of people ranging from 20 – 64 years of age, a 23% increase in prevalence in high-income countries, increase in mortality rate in South Asia from 1990 to 2010 (Feigin et al., 2010).

Stroke is the third leading cause of death in Bangladesh after heart disease and infectious disease. The mortality rate of stroke was 6% in 2006 and 8.57% in 2011. The prevalence rate of stroke in Bangladesh is around 0.3% until the year 2010 (Islam et al., 2013).

Ischaemic stroke is a heterogeneous disorder and there are multiple mechanisms for it (Ay et al., 2007). Pathophysiologically ischaemic stroke may occur due to thrombosis of large or small vessels, emboli from the heart or artery, hypoperfusion in the watershed area or border zone (Deb et al.,2010). In the western population, cardioembolic stroke is the dominant cause; in India, large artery atherosclerosis and Pakistan, lacunar stroke is the most common cause of ischaemic stroke (Assad et al., 2018). The important risk factors are uncontrolled hypertension, dyslipidaemia, diabetes mellitus, coronary artery disease, atrial fibrillation, smoking and those vary with stroke subtypes (Beg et al., 2015). Various aetiologies often result in variation in outcome, treatment, and likelihood of recurrence in ischaemic stroke. Large infarct resulting from occlusion of the internal carotid artery or proximal middle cerebral artery has the worst prognosis. Mortality is higher among patients with large-artery atherosclerotic lesions than lacunar stroke. Recurrent strokes are more common in patients with cardioembolic stroke. Anticoagulants may be prescribed to prevent recurrent cardio-embolic stroke. Carotid stenting and carotid endarterectomy are useful in preventing recurrent stroke with large artery atherosclerosis. Thus, determining the cause of stroke does influence the outcome and choice of treatment.

It is difficult to include all stroke subtypes within a single classification system. The TOAST classification of subtypes was introduced to produce uniformity. The TOAST classification was the first classification system based on stroke mechanisms, vascular risk factors, early and long-term recurrence and survival were found to be different among the ischaemic stroke subtypes classified by TOAST. The Trial of Org 10172 in Acute Stroke Treatment (TOAST) classification was introduced in 1993. It is divided into 5 groups: Large Artery Atherosclerosis (LAA), Cardio-embolism (CE), Small Vessel Occlusion (SVO), Stroke of Other Determined Etiology (SODE), Stroke of Undetermined Etiology (SUDE) (Adams et al., 1993). In a retrospective study, TOAST classification had been proven as valid and reliable (Fure et al., 2005).

Several studies had been done to identify the risk factors in each subtype in a different community. Data is scarce regarding ischaemic stroke subtypes and their risk factors in Bangladeshi people. We wanted to know the common aetiology, subtypes, and risk factors of each subtype in ischaemic stroke.

MATERIALS AND METHODS

This was a cross-sectional study conducted in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka which is a tertiary care hospital and postgraduate institute. Here patients get admitted through outdoor patient department service and no emergency admission was available. In this institute, interventional neurology works that include cerebral DSA, carotid stenting, vertebral stenting, endovascular coiling, and embolization are done by a neurologist.

This study was done in the Neurology Department of BSMMU from March 2014 to November 2018. After the approval from Institutional Review Board (NO. BSMMU/2014/3938), informed written consent was taken from all patients. Stroke was defined according to WHO criteria as features of focal and global cerebral dysfunction that lasts for more than 24 hours with no other than vascular cause. Any ischaemic stroke patients of more than 18 years of age and within 10 days of symptom onset, willing to be included were enrolled in this study. Any TIA, venous stroke or haemorrhagic stroke patients were excluded from enrollment.

A purposive non-random sampling method had been used in this study. The patients were diagnosed with ischaemic stroke by history, clinical examinations, and brain imaging. A total of 1,978 ischaemic stroke patients were enrolled in this study. Among them, 877 patients had been selected for subtyping of ischaemic stroke, to whom vascular imaging (MRA, CTA, DSA), ECG, echocardiography and other relevant biochemical tests had been done. All patients could not do the necessary investigations for subtyping due to financial constraints.

Demographic data and information about risk factors (hypertension, diabetes, dyslipidaemia, history of the previous stroke, and cardiac disease) were documented.

Subtyping of the ischaemic stroke into 5 categories was done according to the TOAST criteria (Adams et al., 1993). It is a commonly used classification system that uses the clinical feature, brain imaging findings, and vascular imaging along with some ancillary test.

1. Large Artery Atherosclerosis (LAA) diagnosed by clinical features of cortical dysfunction and criteria of vascular imaging that is > 50% stenosis or occlusion of the major artery or cortical artery.
2. Cardio-embolism (CE) diagnosed by major risk factors for embolism at least one and no apparent evidence of other subtypes.
3. Small Vessel Occlusion (SVO) diagnosed by clinical features of lacunar syndrome with no cortical features and lesion in brain imaging should be <1.5 cm.
4. Stroke of Other Determined Etiology (SODE) diagnosed by other evidence of stroke risk factors as hypercoagulability, evidence of vasculitis, dissection, and Moyamoya found in vascular imaging.
5. Stroke of Undetermined Etiology (SUDE) diagnosed by when two or more causes were identified. Subtyping was done after all documents were available to the patient.

Statistical analysis was performed using software SPSS 20 for windows. Numerical data are presented as mean ± standard deviation (SD) and risk factors and subtyping are presented as percentages.

RESULTS

Of all 877 patients, 606 (69.10%) were male and 271 (30.90%) were female (Table 1).

Table 1 Distribution of gender among the subtypes (*n* = 877)

Subtype	Male	Female	Total
Large Artery Atherosclerosis (LAA)	273	112	385
Cardio-embolism (CE)	22	52	74
Small Vessel Occlusion (SVO)	153	56	209
Stroke of Other determined Etiology (SODE)	24	16	40
Stroke of Undetermined Etiology (SUDE)	134	35	169
Total	606 (69.10%)	271 (30.90%)	877 (100%)

The mean age of patients was 60.5 ± 11 years. Most patients (32.27%) belonged to the age group 51 – 60 years, followed by 26.11% from 61 – 70 years age groups. A total of 67.5% was above the age of 50 years (Table 2).

Table 2 Distribution of age among the subtypes (*n* = 877)

Subtype	<30 yrs	31 – 40 yrs	41 – 50 yrs	51 – 60 yrs	61 – 70 yrs	>70 yrs	Total
Large Artery Atherosclerosis (LAA)	4	9	64	165	106	37	385
Cardio-embolism (CE)	11	11	34	7	6	5	74
Small Vessel Occlusion (SVO)	0	10	66	57	60	16	209
Stroke of Other determined Etiology (SODE)	10	17	3	7	3	0	40
Stroke of Undetermined Etiology (SUDE)	7	14	25	47	54	22	169
Total	32	61	192	283	229	80	877
Percentage	3.65	6.95	21.90	32.27	26.11	9.12	100

The most common stroke subtypes were Large Artery Atherosclerosis LAA (43.87%), followed by Small Vessel Occlusion SVO (23.83%), Stroke of Undetermined Etiology SUDE (19.30%), Cardio-embolism CE (8.46%), and Stroke of Other Determined Etiology SODE (4.54%) (Table 3).

Table 3 Distribution of the subtypes of ischaemic stroke among the participants (*n* = 877)

Subtype	Number of patients	Percentage
Large Artery Atherosclerosis (LAA)	385	43.87
Cardio-embolism (CE)	74	8.46
Small Vessel Occlusion (SVO)	209	23.83
Stroke of Other Determined Etiology (SODE)	40	4.54
Stroke of Undetermined Etiology (SUDE)	169	19.30
Total	877	100

Regarding risk factors, hypertension was found in 58.15% of patients followed by dyslipidaemia and diabetes mellitus at 38.88% and 38.42% respectively. Among the risk factors, hypertension was significantly high (82.59% of 385) in the large artery atherosclerosis group which was statistically significant. Diabetes mellitus was also high in the large artery atherosclerosis group (46.23% of 385), followed by small vessel occlusion (43.06% of 209) (Table 4).

Table 4 Distribution of risk factors of different etiology (*n* = 877)

Category	Previous H/O stroke	DM	HTN	DL
Large Artery Atherosclerosis (LAA)	53 (13.77%)	178 (46.23%)	318 (82.59%)	189 (49.09%)
Cardio-embolism (CE)	6 (8.1%	3 (4.05%)	10 (13.51%)	9 (12.16%)
Small Vessel Occlusion (SVO)	12 (5.74%)	90 (43.06%)	87 (41.62%)	77 (36.84%)
Stroke of Other Determined Etiology (SODE)	3 (7.5%)	5 (12.5%)	4 (10%)	7 (17.5%)
Stroke of Undetermined Etiology (SUDE)	17 (10.09%)	61 (36.09%)	91 (53.84%)	59 (34.92%)
Total	94 (10.37%)	337 (38.42%)	510 (58.15%)	341 (38.88%)
***p*-value**	0.962	0.201	0.005*	0.201

HTN: Hypertension, DM: Diabetes Mellitus, DL: Dyslipidaemia

Among the large artery atherosclerosis group, 189 patients (49.09%) had 70 – 99% stenosis followed by 116 (30.12%) patients who had complete occlusion (Table 5). Also, 75.56% of stenosis was extracranial and 24.44% was intracranial (Figure 1).

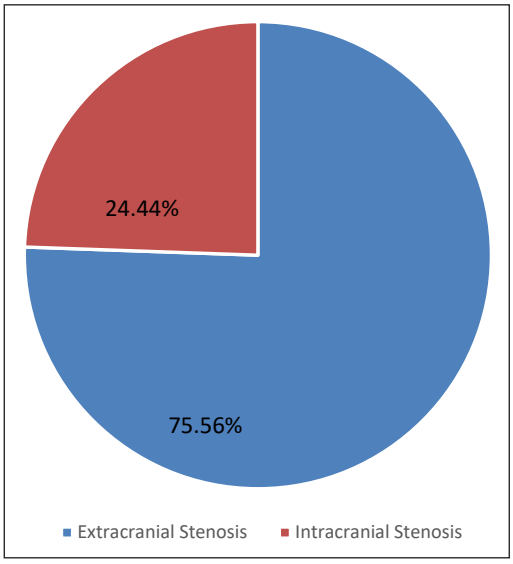

Figure 1 Distribution of site of significant (>50% stenosis) vascular pathology

Table 5 Degree of stenosis among different aetiology (*n* = 877)

Degree of stenosis	Large Artery Atherosclerosis (LAA)	Stroke of Other Determined Etiology (SODE)	Stroke of Undetermined Etiology (SUDE)
<50%	0	17 (42.50%)	74 (43.79%)
50 – 69%	80 (20.79%)	4 (10.00%)	39 (23.07%)
70 – 99%	189 (49.09%)	3 (7.50%)	43 (25.45%)
100%	116 (30.12%)	16 (40.00%)	13 (7.69%)
Total	385	40	169

DISCUSSION

The goal of this study was to analyze and evaluate the subtyping of ischaemic stroke and the risk factor of each subtype according to TOAST criteria. A total of 69.10% of respondents of this study was male, and it showed male predominance than female in ischaemic stroke and almost two-thirds of patients are above the age of 50. Beg et al. (2015) found in India that the number of males is greater than that of female, Bhowmik et al. (2016) found 67.7% in Bangladesh, Shakya et al. (2019) found 51.1% in Nepal. The finding is also similar in developed countries. A study of 1,136 patients done by Caso et al. (2010) found that the number of females was lower (46%) than that of the male. Bender et al. (2017) found female dominance (52%) in their study, but they took both ischaemic and haemorrhagic stroke including SAH in their study.

The mean age of this present study was 60.5 ± 11 years which was comparable to the study done by (Beg et al., 2015). A study done by Cotter et al. (2011) found that the mean age was 63.2, and another study of 679 patients done by Bhowmik et al. (2016) found the mean age to be 60.4 years. In Nepal, Shakya et al. (2019) conducted a study where the mean age was 63.2 years. However, in Europe, Caso et al. (2010) found the mean age as 72.68 (±13.27).

This study revealed that with 43.67% (*n* = 385), Large Artery Atherosclerosis (LAA) is the most common subtype. Kaul et al. (2018) found 37.6% as LAA in India of 2,072 total patients like our findings. Again, a study conducted in Singapore by De Silva et al. (2007) within the South Asian population found 41% as LAA. Harris et al. (2018) in Indonesia found 59.6%, as LAA. Also, in the Chinese population, the result was similar to 37.4% which was done by Tan et al. (2018). In India, a similar study was done by Kannan et al. (2017). In LAA, imaging finding of infarction should be more than 1.5 cm in the cortical, subcortical, cerebellar or brain stem region (Figures 2 and 3). Supporting evidence by angiography of stenosis of more than 50% in extracranial (Figure 4) or intracranial (Figure 5) was evident.

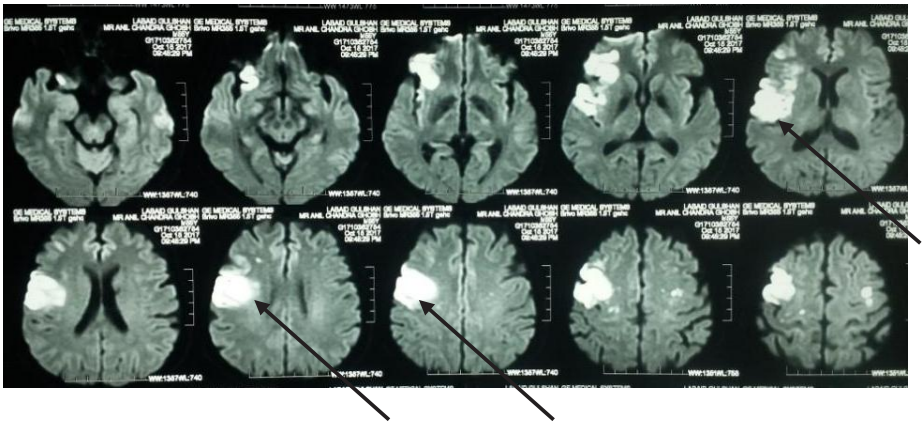

Figure 2 MRI of a patient of LAA (arrow showed infarction in both cortical and subcortical area which was >1.5 cm)

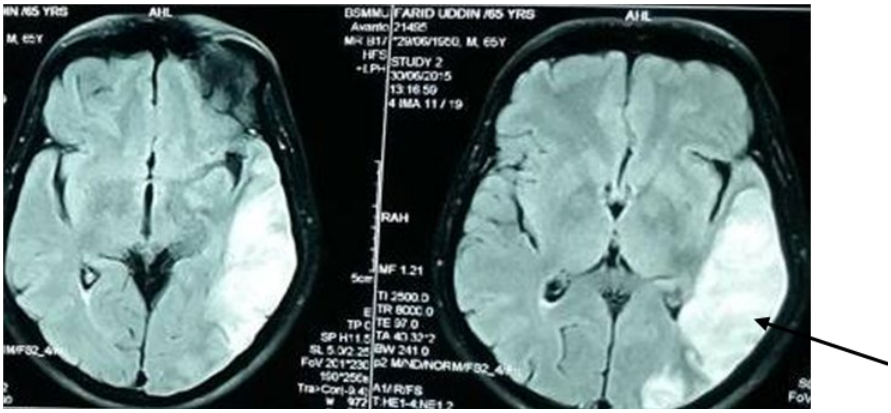

Figure 3 Large infarction in MCA territory (arrow showed infarction in left MCA territory, this is in favour of large artery atherosclerosis)

Contrary, Kang et al. (2003); Kolominsky-Rabas et al. (2001); Tian and Fan (2018) found 15.3%, 16.28%, and 31% of ischaemic stroke patients as LAA respectively. This variation could be due to ethnic origin. The use of cerebral DSA was more in our study because our department has more facility for it and MRA or CTA is more expensive than DSA. This may be a cause for finding more LAA in this study.

Figure 4 Severe Stenosis of ICA Origin (Arrow showed severe stenosis at the origin of Internal Carotid Artery, it\s in favor of large artery atherosclerosis)

Figure 5 Left MCA severe stenosis (arrow showed severe stenosis of the left middle cerebral artery after the bifurcation of internal carotid artery)

In this research, Small Vessel Occlusion (SVO) was 23.83% which was the second most common subtype. Most of the studies done in this sub-continent and South Asia found the comparable result to this study. Kaul et al. (2018) and Kannan et al. (2017) in India, Assad et al. (2018) in Pakistan, Harris et al. (2018) in Indonesia found 19.9%, 17.24%, and 27.7% respectively. Kannan et al. (2017) and Kaul et al. (2018) also found a similar result in their study with 23.4% and 18% respectively. In developed countries, the percentage of SVO is somewhat higher compared to our study. Jacková (2017) in the Crez Republic, Lee et al. (2010) in Taiwan, De Silva et al. (2007) in Singapore found 45.2%, 31.4%, 39.4%, and 35% respectively.

We found 8.46% of total ischaemic stroke patients as Cardio-embolism (CE) like another study done like Tian et al. (2018) as 8% and, Kaul et al. (2018) in India as 10%. In contrast, Kolominsky-Rabas et al. (2001) found CE as 27%, Kang et al. (2003) as 40.59%. This may be due to different population origin and the increased rate of cardiac disease, more extensive work like ECG, Echocardiography, Holter monitoring, Transesophageal echocardiography, and less cerebral angiography for evaluation of ischaemic stroke patients.

In this study, hypertension was the most common risk factor (58.15%) followed by dyslipidaemia (38.88%) and diabetes (38.42%). This is consistent with the other study in this subcontinent. In Pakistan, Assad et al. (2018), Manosalva and Jeerakathil (2016), Taj et al. (2010) and in India, Pathak et al. (2018) found hypertension 62.7%, 71%, 78% and 65% respectively. This finding is also consistent with a study in the Middle East, Korea as Kim et al. (2003), Rukn et al. (2019) found hypertension as 66% and 61.1% respectively. Assad et al. (2018) also found diabetes mellitus as 36.6% which was also comparable to this study.

In this study, hypertension was significantly present in large artery atherosclerosis which is also comparable with Assad et al. (2018). In our study, 75.56% of stenosis was extracranial. This finding is also comparable to the findings of Flaherty et al. (2013) and Barnett et al. (2010) which was 78.63% and 78.4% respectively.

Some limitations exist in this study as it was a hospital-based study and cardiac evaluation was limited only to ECG and echocardiography.

CONCLUSION

The most common subtype of ischaemic stroke in this study was the large artery atherosclerosis group and extracranial stenosis was more common than intracranial stenosis. This finding will lead to a future study that can identify the pathophysiology of LAA in this ethnic group. There were differences in risk factors between the subtypes of ischaemic stroke. Hypertension was significantly high in the large artery atherosclerosis group.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

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ORIGINAL ARTICLE

Occupational Performance of the Primary Schoolchildren with Special Education Needs in Malaysia: Exploring the Needs of School-based Therapy Service

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ABSTRACT

Children's occupational performance are activities of daily living, play/ leisure, social participation, education, and work. In developed countries, school-based therapy services are being provided for schoolchildren with special needs. The importance of these services in Malaysia is timely to be explored. This exploratory cross-sectional study identified occupational performance levels of primary schoolchildren with special needs in integrated special education programmes in Malaysia; children with intellectual disability, autism, attention deficit hyperactive disorder, Down syndrome, speech impairment, visual impairment, hearing impairment, and specific learning disorder. Researchers conducted Motor-Free Visual Perceptual Test Third Edition (MVPT-3), Beery-Buktenica Developmental Test of Visual-Motor Integration Fifth Edition (Beery-VMI), Test of Gross Motor Development – 2 (TGMD-2), Test of Hand Writing Skills-Revised (THS-R), and School Function Assessment (SFA) for 121 students. Results showed that 69.5% of the students scored very low to low average in MVPT-3 (median standard score = 70.0, Std. IQR = 37); 69.4% were very low to below average in Beery-VMI (mean standard score = 78.8, Std. deviation = 20.5); 73% were below age level raw score in TGMD-2; 72.8% were below average in THS-R (median standard score = 74.0, Std. IQR = 27.0); and 81% were below the criterion cut-off in school function. The children with below-normal MVPT, VMI, TGMD2, and THS scores, compared to the children with normal scores for these tests had significantly lower scores ($p < 0.001$). All the students had impairment in occupation performance at least in one area. This study recommends school-based occupational therapy and other rehabilitation services in the school system in Malaysia.

INTRODUCTION

Occupational performance means the action of doing and achieving an activity or occupation and it is the outcome from the dynamic transaction among the individual, the context, and the activity (Roley et al., 2008).

Swinth et al. (2003) stated that children's occupational performance includes activities of daily living, play/ leisure, social participation, education, and work activities. Their performance depends on visual perception, visual integration, and gross motor and fine motor skills (Whalen, 2002). It could be impaired by physical, developmental, sensory, attention, and or learning challenge (Whalen, 2003). It is also influenced by factors such as classroom culture, implicit and explicit rules established by the teacher or education system, specific requirements of the task which is assigned by the teacher, the location of tools and materials, and types of the tools and materials they use (Munkholm, 2010).

This project defines children with special needs as those children who need special education in integrated special education programs in Malaysia. They are children with intellectual disabilities, autism spectrum disorder (ASD), attention deficit hyperactive disorder (ADHD), Down syndrome, specific speech and language impairments, speech delay, visual impairment, hearing impairment, and specific learning disorders.

Schools for students with special needs provide school-based therapy services in the United States of America, the United Kingdom, and Canada (Whalen, 2003).

Occupational Therapy (OT) emphasizes assisting the children to participate in the occupational areas particularly in activities of daily living, education, work, play/ leisure, and social participation (Swinth et al., 2003). OT intervention aims to support their school performance in the areas of reading, writing, mathematics, manipulation of tools, performance in physical education, independence with self-care tasks, and social integration (Whalen, 2002).

Children with special needs in Malaysia receive OT and other rehabilitation services in the health care system and some of the welfare facilities. However, when they reach school age, they have to spend most of their time in school, and their opportunity to obtain rehabilitation services become limited. The children may not be able to go regularly for receiving therapy or they discontinue going to the health centre for the therapy appointment. In a study by Teoh et al. (2008), 62.6% of the teachers responded that they need the cooperation of health professions including psychologists, paediatricians, speech therapists, and occupational therapists regularly to deal with learning disorders and 27.1% responded that their needs are sometimes.

In Malaysia, special education service is provided to school-aged children with visual impairment, hearing impairment, children with a learning disability (intellectual disability, autism, attention deficit hyperactive disorder, Down syndrome, speech impairment, visual impairment, hearing impairment, and specific learning disorder) and the children who need remedial education (Shah, 2005).

Special education was introduced in Malaysia in 1954. It has been developing by the provision of many special education programmes, training the special education teachers, providing good physical facilities by the federal government, and collaborating with social resources such as non-government organizations, corporate sectors, and international organizations (Nadhir et al., 2016). However, the provision of school based-therapy (e.g. occupational therapy and others), which serve as a related service in the school system should be the special attention of the Malaysia Ministry of Education.

There is no school-based OT service in Malaysia. Lack of emphasis to develop school-based OT in Malaysia may be due to limited information on OT roles in the school system especially in special education programs and the absence of published papers in Malaysia stating the needs for school-based therapy.

Swinth et al. (2003) stated that OT focus on helping students to engage in meaningful and purposeful daily school occupations. OT helps to improve their performance for the completion of functional activities, effectively engage in routine tasks and roles, and support families, caregivers, school staff with appropriate modifications or adaptations of materials and environments (Asher et al., 2010).

Children with special needs may have perceptual problems, sensory problems, gross-motor difficulties, fine-motor problems, difficulty with daily living activities, organizational problems, attention span difficulties, and interpersonal problems (Pierangelo & Giuliani, 2002).

The evidence for this service requirement in Malaysia is timely to be explored. The exploration of the occupational performance of children with special education needs in the school context reveals the needs of school-based therapy services.

In this study visual perception, visual-motor integration, gross motor skills, handwriting skills, and school function were assessed.

Visual Perception

Dumont and Willis (2008) stated visual perception is most likely to be defined as the interpretation of visual stimuli, the intermediate step between simple visual sensation and cognition. It is not visual acuity or sensation. Moreover, it is not reading or other cognitive meanings.

Visual-motor Skills

Visual-motor skills are the ability to use vision to direct hand and body movements. It is reliant on adequate visual tracking, coordination of eye-head movements, and coordination of eye-hand movements. It is an important component for participation in school activities, as well as sports and plays activities (Schaaf et al., 2010)

Gross Motor Skills

Gross motor skills are defined as "motor skills that involve the large, force-producing muscles of the trunk, arms, and legs" (Ulrich, 2000). The fundamental motor skills include locomotor skills, non-locomotor actions, and object control (Williams & Monsma, 2017).

Handwriting Skills

Handwriting requires complex physical behaviour and needs the integration of cognitive, visual, and motor skills (Milone, 2007). Approximately 30 – 60% of class time in primary school is spent in fine motor and writing activities (McHale & Cermak, 1992). Handwriting difficulties can have implications for a child's successful participation in school and play activities, potentially leading to problems in academic performance and lowered self-esteem (Bumin & Kavak, 2010).

School Function

School function refers to a student's ability to perform important functional activities that support or enable participation in the academic and related social aspects of an educational programme. It mainly referred to the non-academic aspects of a school programme such as manipulating materials, responding to questions, moving about the classroom and school, addressing personal needs and interacting with peers, etc. (Coster et al., 1998).

The purpose of this research is to investigate the occupational performance levels among primary schoolchildren with special needs in the field of visual perception, visual-motor integration, gross motor skills, handwriting skills, and school function performances. This research will explore students' specific performance problems and recommend rehabilitation service requirements.

MATERIALS AND METHODS

This is an exploratory cross-sectional study with six months of data collection time in two years-study. The study included 121 students with special education needs (aged 6 – 12 years) from all Integrated Special Education Programme (ISEP) classes from all four primary schools in Penampang, Kota Kinabalu. The Universiti Malaysia Sabah Medical Ethics Committee approved this research with reference number UMS/SPU6.13/100-6/1/95. This research project was also approved by the Ministry of Education, Malaysia, and the Sabah State Education Department. Parents or caregivers provided informed consent for participating students, and all data were kept confidential. This project excluded students who cannot follow instructions and/ or did not have consent.

This study uses standardized assessments of visual perception, visual-motor integration (VMI), gross motor skills, handwriting skills, and school functions. Researchers personally reviewed the students' disability registration forms, kept on file in the school offices, to obtain medical reports with demographic data and disability types present in the study population.

The senior occupational therapist who was trained for all the tests used in this study conducted all assessment tests, assessed each child for one test per day, and conducted the tests in the early part of the school day. Each test took about 20 to 30 minutes. The occupational therapist administered visual perception, VMI, and handwriting skills tests in a quiet room free from visual distractions (e.g., pictures, writing examples on the wall). All students used No.2 standard pencils without erasers for copying and writing in the VMI and handwriting skill tests. The occupational therapist conducted gross motor development skills outdoors in the school compound.

Motor-Free Visual Perceptual Test Third Edition (MVPT-3)

The occupational therapist conducted the MVPT-3 test individually to assess overall visual perceptual ability through spatial relationships, visual discrimination, figure-ground, visual closure, and visual memory. Performance in these areas provided a single score that represents the individual's general visual perceptual ability. The median reliability coefficient for ages 4 – 10 is 0.80, 11, and above is 0.89 (Reynolds, 2008).

Beery-Buktenica Developmental Test of Visual-Motor Integration (Beery-VMI) Fifth Edition

Visual-motor skills are the ability to use vision to direct hand and body movements. It relies on adequate visual tracking, coordinated eye-head movements, and coordinated eye-hand movements. It is an important component for participation in school activities, as well as sports and plays activities (Schaaf et al., 2010). The test comprises a developmental sequence of 30 geometric forms, which need to be copied with paper and pencil. It is designed to assess the extent to which individuals can integrate their visual and motor abilities. The overall average reliability is 0.92 (Dumont & Willis, 2008).

Test of Gross Motor Development – 2 (TGMD-2)

Gross motor skills are motor skills that involve the large, force-producing muscles of the trunk, arms, and legs (Ulrich, 2000). This test

is a norm-referenced measure of common gross motor skills for identifying children who are significantly behind their peers in gross motor skill development, and who should be eligible for special education services in physical education. Although the TGMD-2 is a norm-referenced test for children aged 3 to 10 years old, the test has been used frequently in older children with disabilities (Woodard & Surburg, 2001).

The test categories are locomotor and object control, consisting of 12 skills. Locomotor skills include running, galloping, hopping, leaping, horizontal jumping, and sliding. Object control skills are striking a stationary ball, stationary dribbling, kicking, catching, overhand throwing, and underhand rolling. The coefficient alphas for both subtests are above 0.85 (Ulrich, 2000).

Test of Hand Writing Skills-Revised (THS-R)

Handwriting requires complex physical behaviour as well as the integration of cognitive, visual, and motor skills. The THS-R tests if neurosensory integration difficulties are contributing to students' learning problems. Assessment results can inform instruction in regular or special education settings, as well as in rehabilitation practices. An internal consistency reliability coefficient has a median of 0.61 to 0.85 (Milone, 2007)

School Function Assessment (SFA)

SFA refers to the non-academic aspects of a school programme such as manipulating materials, responding to questions, moving about the classroom and school, addressing personal needs, and interacting with peers. SFA is a type of criterion-referenced instrument, a judgment-based questionnaire for students with disabilities, which identifies their strengths and needs in important nonacademic functional tasks. School personnel who are familiar with the student's typical performance completed the SFA. The test uses three scales for evaluating students – Participation, Task Supports, and Activity Performance. The internal consistency reliability coefficient was 0.92 to 0.98 and the test-retest reliability (standardization version) was 0.80 to 0.99 (Coster et al., 1998).

Data Analysis

The researchers used SPSS version 22 for MVPT-3, Beery-VMI, TGMD-2, and THS-R standard score descriptive analysis, and converted score frequency to classification shown as an ordinal achievement. SFA results were calculated by the frequency of student achievement on criterion cut-off scores for each scale of the overall SFA.

RESULTS

Out of 135 students, we received consent from the parents and caregivers of 124 students, and three students dropped out of the study for a total of 121 students who completed all five assessments. The reason for dropping out of three students was the inability to perform all five tests because of frequent absence from school. The sample mean age was 9.2 years (SD = 1.5). Males were 78.5% (n = 95) and females were 21.5% (n = 26). Intellectual disability was 43%, ADHD 24%, ASD 20.7%, Down syndrome 5%, speech impairment and speech delay 2.5%, specific learning disorder 2.4%, hearing impairment 1.7% and visual impairment was 0.8%.

Researchers used Cronbach's Coefficient Alpha method to test instrument reliability for the study population and found all five tests were highly reliable. The MVPT-3 and visual perception in VMI subtests consisted of 2 items (α = 0.803), Beery VMI consisted of 3 items (α = 0.875), TGMD-2 consisted of 2 items (α = 0.903), THS-R consisted of 10 items (α = 0.926), and SFA consisted of 25 items (α = 0.981).

This study identified the study population's occupational performance levels. Ordinal classification and descriptive test scores are shown in Tables 1, 2, 3, and 4.

MVPT-3 results in Table 1 showed that the students who obtained low average to very low were 69.5% (*n* = 84) while those with average to very superior were 30.6% (*n* = 37).

Table 1 MVPT-3 ordinal results by classification and descriptive results (*n* = 121)

Variable	Very low % (*n*)	Low % (*n*)	Low average % (*n*)	Average % (*n*)	High average % (*n*)	Superior % (*n*)
MVPT	49.6 (60)	8.3 (10)	11.6 (14)	19 (23)	9.9 (12)	1.7 (2)

Notes: MVPT-3 = Motor-Free Visual Perceptual Test-3
Median standard score = 70.0, Std. IQR = 37

Beery VMI results demonstrated that the students who achieved Beery VMI below average to very low were 69.4% (*n* = 84) and average to very high were 30.5% (*n* = 37) (Table 2).

Table 2 Beery-VMI and subtest ordinal results by classification and descriptive results (*n* = 121)

Variable	Very low % (*n*)	Low % (*n*)	Below average % (*n*)	Average % (*n*)	Above average % (*n*)	High % (*n*)	Very high % (*n*)
VMI	33.1 (40)	22.3 (27)	14 (17)	23.1 (28)	3.3 (4)	4.1 (5)	–
Visual perception	27.3 (33)	14 (17)	20.7 (25)	32.2 (39)	4.1 (5)	–	1.7 (2)
Motor coordination	38 (46)	16.5 (20)	21.5 (26)	19 (23)	4.1 (5)	0.8 (1)	–

Notes: Beery-VMI = Beery Buktenica Visual Motor Integration
Mean standard score Beery-VMI = 78.8, Std. Deviation = 20.5
Mean standard score Visual perceptual = 81.2, Std. Deviation = 21.1
Mean standard score Motor coordination = 75.5, Std. Deviation = 19.2

TGMD-2 results were interpreted for two age group (age 6 to 10 years and age 11 to 12 years).

TGMD results revealed that the students who obtained TGMD-2 results below average to very poor were 66.0% (*n* = 60) and average to very superior were 34.1% (*n* = 31) (Table 3).

Table 3 *TGMD-2* Ordinal results by classification and descriptive results (ages 6 to 10 years) (*n* = 91)

Variable	Very poor % (n)	Poor % (n)	Below average % (n)	Average % (n)	Above average % (n)	Superior % (n)	Very superior % (n)
TGMD-2	42.9 (39)	15.4 (14)	7.7 (7)	22 (20)	8.8 (8)	2.2 (2)	1.1 (1)
Locomotor	34.1 (31)	15.4 (14)	17.6 (16)	23.1 (21)	9.9 (9)	–	–
Object control	35.2 (32)	12.1 (11)	17.6 (16)	25.3 (23)	5.5 (5)	3.3 (3)	1.1 (1)

Notes: TGMD-2 = Test of Gross Motor Development-2
Mean standard score TGMD= 76.6, Std. Deviation = 24.2
Mean standard score Loco-motor = 6.0, Std. Deviation = 4.0
Mean standard score Object control= 6.2, Std. Deviation = 4.4

Gross motor development of the students aged over ten years, were interpreted in raw score to determine whether they could achieve the ceiling score at ten years old. If they could not achieve the ceiling raw score it meant that they were behind their peers in gross motor skill development. Figure 1 revealed that 29 students (96.7%) over 10 years old could not obtain TGMD ceiling raw score. Retarded locomotor and object control development were in 96.7% of the student (*n* = 29) and in 83.3% (*n* = 25) respectively. The students who achieved TGMD ceiling raw score were 3.3% (*n* = 1), subtest locomotor were also 3.3% (*n* = 1) and subtest object control were nearly 17% (*n* = 5).

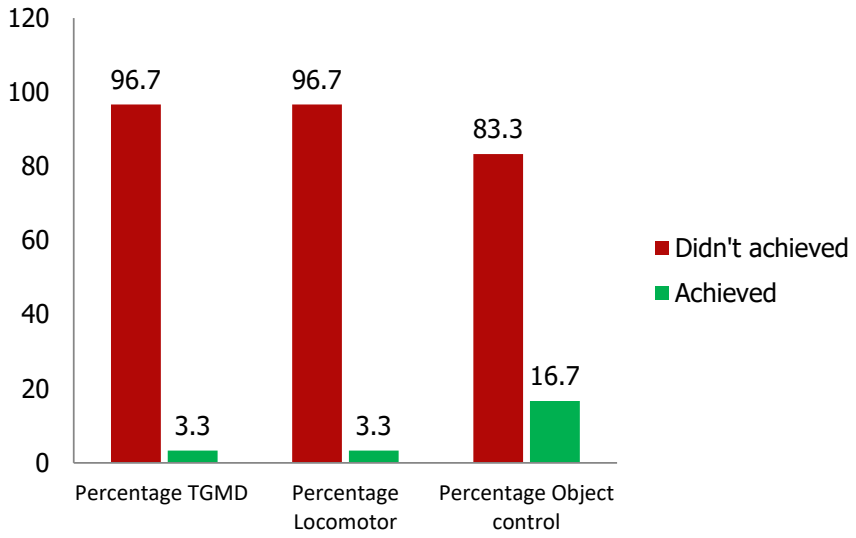

Figure 1 TGMD-2 results of percentage of TGMD, locomotor and object control for students aged 11 to 12 years old (*n* = 30)

The total students who were unable to achieve age level raw score in gross motor development, locomotor and object control skills were 73.6% (*n* = 89), 75.21% (*n* = 90) and 69.42% (*n* = 84) respectively.

THS-R results in Table 4 showed that the students who obtained an ordinal score below average to very low were 72.8% (*n* = 88) while average and above average were 27.3% (*n* = 33).

Table 4 THS ordinal results by classification and descriptive results (*n* = 121)

Variable	Very low % (*n*)	Below average % (*n*)	Average % (*n*)
THS	39.7 (48)	33.1 (40)	27.3 (33)

Notes: THS = Test of Hand Writing skills
Median standard score = 74.0, Std. IQR = 27.0

The children with below-normal MVPT scores, VMI scores, TGMD2 scores and THS-R scores compared to the children with normal MVPT scores, VMI scores, TGMD2 scores and THS-R scores demonstrated significantly lower scores in MVPT, VMI, TGMD2 and THS-R (p <0.001) (Table 5).

Table 5 Comparing means of below normal and normal scores

	Group (*n*)	Mean (SD)	Mean difference (95% CI)	*t*-statistics[a](df)	*p*-value
MVPT	Below Normal (84) Normal (37)	62.75 (11.03) 103.70 (10.47)	40.95 (36.71, 45.20)	19.11 (119)	<0.001
VMI	Below Normal (84) Normal (37)	68.08 (12.97) 103.03 (11.81)	34.94 (30.01, 39.88)	14.03 (119)	<0.001
TGMD2	Below Normal (60) Normal (31)	61.70 (13.22) 105.42 (10.69)	43.72 (38.26, 49.18)	15.91 (89)	<0.001
THS-R	Below Normal (88) Normal (33)	66.72 (9.80) 95.36 (9.14)	28.65 (24.76,32.54)	14.58 (119)	<0.001

SFA Results

The frequency of the students who obtained below the criterion cut-off score for Part I participation in special education classroom functional activities and school-related activities was 81% (*n* = 98). Part II for the task support scales found that nearly 67% (*n* = 81) needed physical assistance while 60% (*n* = 73) required physical adaptation. Cognitive/ behavioural assistance was necessary for 64% (*n* = 78) of the students and 83% (*n* = 100) demanded cognitive/ behavioral adaptation (Table 6).

Table 6 SFA criterion cut-off score achievement: Part I (Participation) and Part II (Task support)

Assessment scales	Achieved criterion cut-off score % (*n*)	Below criterion cut-off score % (*n*)
Part I (Participation) Special education classroom	19.00 (23)	81.00 (98)
Part II Task supports		
Physical task – Assistance	33.06 (40)	66.94 (81)
Physical task – Adaptation	39.67 (48)	60.33 (73)
Cognitive/ Behavioral tasks – Assistance	35.53 (43)	64.47 (78)
Cognitive/ Behavioral tasks – Adaptations	17.36 (21)	82.64 (100)

In SFA Part III, the frequencies of students who obtained below criterion cut-off scores in activity performance (physical task) ranged from 34% to 73%. Regarding activity performance (cognitive/ behavioural tasks) the frequencies of students who obtained below criterion cut-off scores ranged from 66% to 87% (Table 7).

Table 7 SFA criterion cut-off score achievement: Part III (Activity performance)

Assessment scales	Achieved criterion cut-off score % (*n*)	Below criterion cut-off score % (*n*)
Part III Activity performance (physical tasks)		
Travel	27.27 (33)	72.73 (88)
Maintaining and changing positions	66.11 (80)	33.89 (41)
Recreational movement	38.02 (46)	61.98 (75)
Manipulation with movement	38.02 (46)	61.98 (75)
Using materials	40.50 (49)	59.50 (72)
Setup and clean up	43.80 (53)	56.2 (68)
Eating and drinking	38.84 (47)	61.16 (74)
Hygiene	42.98 (52)	57.02 (69)
Clothing management	44.63 (54)	55.37 (67)
Up/ down stairs	50.41 (61)	49.59 (60)
Written work	42.15 (51)	57.85 (70)
Part III Activity performance (cognitive/ behavioural tasks)		
Functional communication	24.80 (30)	75.2 (91)
Memory and understanding	32.23 (39)	67.77 (82)
Following social conventions	24.80 (30)	75.2 (91)
Compliance with adult directions and school rules	30.58 (37)	69.42 (84)
Task behaviour/ completion	23.14 (28)	76.86 (93)
Positive interaction	13.22 (16)	86.78 (105)
Behaviour regulation	18.18 (22)	82.82 (99)
Personal care awareness	33.88 (41)	66.12 (80)
Safety	22.31 (27)	77.69 (94)

DISCUSSION

The findings revealed that children with special needs in the study population had performance problems regarding visual perception, visual-motor integration, gross motor development, handwriting skills, and school function. These results were consistent with other studies among various types of children with special needs.

Demographic data

The study's demographic data indicated that three-quarters of the students were male, similar to statistics in the U.S. wherein approximately two-third of the students in special education programme were male, highlighting strong evidence of gender imbalance in the incidence of disabilities in special education enrollments exists (Tschantz & Markowitz, 2003).

Visual Perception

Almost 75% of the students had visual perceptual skill impairment. This finding supported previous studies that found that children with hemiplegic cerebral palsy (CP), children with psychiatry disorders, dyslexia, and clumsiness children with Learning Disabilities (LD), scored significantly lower in visual perceptual skills (Ahmetoglu et al., 2008; Burtner et al., 2006; Daniels & Ryley, 1991; Griffin et al., 1993; O'Brien et al., 1988).

Visual-Motor Integration

Nearly 75% of students showed visual-motor integration (VMI) impairment. This is consistent with previous findings stating that children with psychiatry disorder, clumsiness children with LD, traumatic brain injury (TBI), Attention Deficits Hyperactive Disorder (ADHD), and hemiplegic CP performed lower score in VMI assessment (Burtner et al., 2006; Daniels & Ryley, 1991; O'Brien et al., 1988; Sutton et al., 2011).

Gross Motor development

Seventy-five per cent of students performed below the age level in gross motor development skills. This finding supported previous studies reporting that children with disabilities, ASD, ADHD, children with emotional, behavioural, and pervasive developmental disorders and intellectual disability (ID) exhibited lower scores in gross motor skills performance, locomotor and object control skills (Emck et al., 2009; Pan et al., 2009; Staples & Reid, 2010; Tseng et al., 2004; Westendorp et al., 2011; Woodard & Surburg, 2001).

Handwriting Skills

Seventy-five per cent of students have problems with handwriting skills. The THS result for this exploratory study was compatible with previous studies in which children with special needs who suffered from ASD, ADHD, and left hemiplegic, had difficulties in handwriting skills (Bumin & Kavak, 2010; Kushki et al., 2011; Racine et al., 2008).

School Function

A substantial number of students performed below the level expected for same-grade peers in the three parts of the SFA. Cognitive behaviour tasks in the activity performance displayed higher occurrences of problems when compared to physical tasks.

This may be related to a higher number of children with ID in this population.

This study results corresponded to previous literature showing that children with various types of disabilities, including motor impairment, ID, ADHD, visual impairment, Asperger's syndrome, hemiplegic CP, high functioning autism, and those who only have physical disabilities, and other health or neurological impairments, have school function problems compared to their same-age peers (Burtner et al., 2006; Coster & Haltiwanger, 2004; Eriksson et al., 2007; Potvin et al., 2013).

Comparing Means of Below Normal and Normal Scores

The children with special education needs who have below-normal scores for motor-free visual perception, visual-motor integration, gross motor skills, and handwriting skills, compared to the children with special education needs who have normal scores for these assessments had significantly lower scores. This finding demands the need for school-based occupational therapy in this population.

Recommendations and Clinical Implications

Students' inability to achieve functionality levels in physical and cognitive/ behavioural performance indicates the need for occupational therapists and other related health professionals' involvement to enhance students' school activity participation.

Some studies proved that intervention involving sensory integration, specific handwriting activities, and multisensory writing programmes with high levels of collaboration with teachers could improve the children's gross motor and fine motor abilities, visual-motor integration, visual-perceptual, and writing skills (Case-Smith, 2002; King, 2014; Lockhart & Law, 1994; Palisano, 1989; Reid et al., 2006; Whalen, 2002).

Study Limitations

This study used purposive sampling by using a homogenous sampling technique because the target group was children with disabilities from special education classes in public primary schools, who share the same (or very similar) characteristics or traits (e.g. age, gender, race, and disability type).

Future Research

It is suggested that future research projects will benefit from a random sampling of bigger sample sizes from various geographical areas to represent Malaysian children with these types of disabilities. Additionally, further projects could be the intervention studies of occupational therapies for children with occupational performance impairment in this population, as there is no Malaysian study yet to our knowledge.

CONCLUSION

The results, when considered clinically, supported the finding that primary school students with special education needs have impairments in their occupational performance. Children with special needs in integrated special education programs need school-based occupational therapy and other related rehabilitation services to enhance their quality of life, and to make it possible for these children to develop to their full potential. They will become empowered to contribute productively to the country, instead of being dependent on physical assistance and financial support. Moreover, regular school-based therapy implementation will provide effective services to parents or caregivers, since students will not need to go to hospitals for therapy appointments with significant absences from school.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

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ORIGINAL ARTICLE

A Rapid Rural Appraisal of a Remote Village in Lahad Datu, Sabah

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ABSTRACT

Rapid rural appraisal (RRA) is a systematic but semi-structured study used to gain new insight into rural life in a quick manner. The current article describes the RRA conducted in a remote village in Lahad Datu, Sabah. The RRA aimed to address the background of the rural community and identify public health issues. Collection of secondary data, key informants' interview, field observation and a structured interview with the villagers selected via convenience sampling were applied to obtain necessary data. Findings from informal approaches were summarised. Descriptive analysis was carried out for data collected from structured interview. Water sanitation, sanitation facility, food safety, air pollution, zoonosis and non-communicable diseases were among the potential public health issues identified within the village. A total of 188 villagers participated in the structured interview. The median age was 28.0 (IQR 30.8). The percentage for manual workers were 21.3% while 13.8% were white collars. The illiteracy rate was 12.2% and the poverty rate at 48.9%. A total of 22.3% of respondents reported overcrowded households. The household environment and take-up rate of basic amenities were suboptimal. The highest self-reported chronic disease was hypertension, recording 13 cases. The foremost priority is to fill up the flaws in the public health needs of the villagers. Those challenges require participation from relevant authorities as well as individual empowerment.

INTRODUCTION

Rapid rural appraisal (RRA) is a systematic but semi-structured study designed to gain new insight into rural life in a quick manner to

enable decision making and problem-solving. RRA, which was once popular in agricultural research has been applied widely in public health given its key characteristic – action-oriented (McCracken et al., 1998).

RRA is a different entity compared to a more time-consuming conventional study. Being recognised as "quick and dirty", RRA is relevant for learning knowledge considering time and cost constraint. Perhaps, RRA plays a role as preliminary enquiry specifically for those outsiders to learn more contextual idea and to gain critical thoughts. To achieve the goals, there are a variety of techniques of data collection (Chamber, 1981), including key informants' interview, focus group discussion, collection of pre-existing information, learning indigenous technical knowledge, field observation, etc. Nevertheless, every credit of RRA carries a potential pitfall (Gibbs, 1985). For instance, key informants can deliver useful idea on the one hand, but on the other, they can voice a biased opinion. The indiscriminate application of RRA makes no difference to anecdotes.

The current article describes the RRA conducted in a remote village in Lahad Datu, Sabah called Kampung Tambisan Darat (KTD) to fulfil the Health Promotion Programme, a compulsory module under the Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah. KTD was among the villages shortlisted for such an annual outreach project by the Local Health District Officer. The assignment intended to benefit the locals in terms of their physical health (Tha et al., 2014).

KTD is located on the east coast of Sabah, sandwiched between *Felda Sahabat* palm oil estate and the Sulu Sea. It was founded in the late 1800s and underwent German and British colonisation. The village was inhabited predominantly by the indigenous Suluk. Until 2000, the nearest town was Sandakan where the villagers had to travel by sea northbound. However, the rapid development of *Felda*'s palm oil project led to concurrent road development and land travel was made possible to get to the Lahad Datu town. Since then, it is under the administration of Lahad Datu District Council with gazetted land up to 1,500 hectares and a population of more than 1,200 villagers up to the year 2010 (Karim, 2012).

The RRA aimed to address the background of the rural community and identify the public health issues. The major issue can then be intervened through health promotion.

MATERIALS AND METHODS

Study Location and Study Design

The RRA was conducted in Kampung Tambisan Darat which is one of the remote villages in Lahad Datu, Sabah. RRA was chosen as the study design due to the 5-day allowance for the field study. The period of study started on 27 August and ended on 31 August 2012. KTD is located deep into *Felda Sahabat*, an allotment scheme for the resettled poor rural native developed by the federal government in Malaysia. Permission for field study was granted from the District Health Office of Lahad Datu in cooperation with Universiti Malaysia Sabah.

Four techniques in compliance with the principle of RRA were applied: a collection of secondary data, key informants' interview, field observation – the informal approaches and structured interview with the villagers – the formal approach. The RRA framework is summarised in Figure 1. A total of 188 villagers was involved in this RRA during the period of study.

Collection of Secondary Data

Secondary data was collected from various sources to provide first-hand information before entering the field. Brief village profile and development was reviewed from an online

database. Health statistics were obtained from the local health office to ascertain the contemporary annual birth and death numbers. Performance in maternal and child health was extracted from local clinic record and annual report.

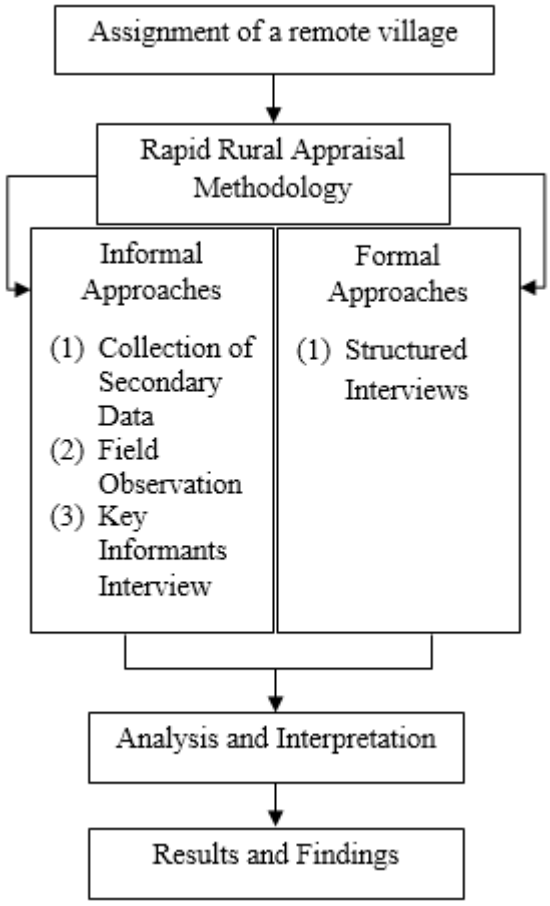

Figure 1 Rapid rural appraisal framework

Key Informants' Interview

Key informants were local figures who understand the village and villagers well in most aspects. Community leader, head of village managing committee and local healthcare provider were enlisted. Information gathered from the key informants included but not limited to socioeconomic background, infrastructures, village growth and development and public health issues. The contents of the interview were recorded for later reference.

Field Observation

Field observation was to explore village dynamics and the villagers' interaction with their environment and resources. A social map was sketched to elaborate graphically the sociocultural and religious behaviours of the villagers. The map was also useful for the arrangement of a subsequent structured interview.

Structured Interview with Villagers

A structured interview was carried out with the villagers using a standardised questionnaire. Opportunistic sampling was chosen to conform to this rural setting. The respondents included local villagers of all ages and those household visitors or outsiders were excluded. Socio-demographic data were collected including age, gender, ethnicity, marital status, religion, literacy, occupation, and monthly household income. Literacy was defined as an individual without formal education. Poverty was defined by using poverty line income per capita (Department of Statistics Malaysia, 2012) as the indicator due to variable household size.

The household environment and basic amenities were enquired about. Variables included the number of bedrooms and occupants, types of cookstove, refrigerator and television availability, latrine type and animal exposure defined by proximity with domestic livestock or pet. Household overcrowding was defined as more than 3 people in an inhabitable room. Self-reported chronic diseases were documented during a structured interview, in which the respondents were either on active follow-up or on medications. The self-diagnosed disease was excluded.

Data Analysis

Data collected from informal approaches were summarised. Descriptive analysis was used for variables gathered from structured interview, by means of frequency and percentage, using the Statistical Package for the Social Science version 17 (SPSS Inc, Chicago, IL, USA).

RESULTS

Findings from Informal Approach (Collection of Secondary Data, Key Informant Interview and Field Observation)

A social map (Figure 2) was sketched. The houses were distributed rather haphazardly.

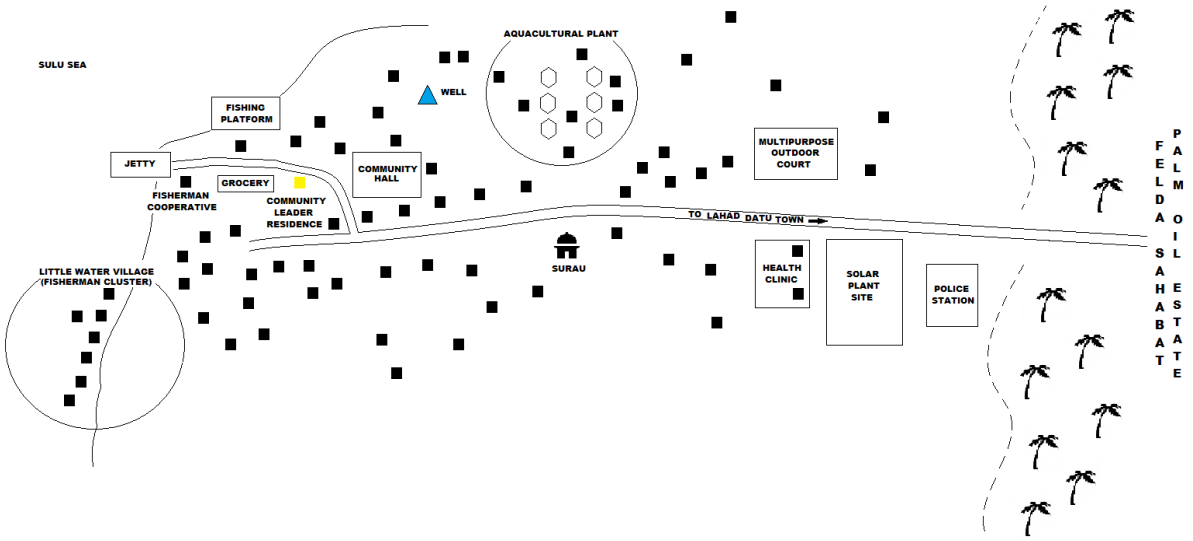

Figure 2 Social map of Kampung Tambisan Darat

An open well was located near the residency area and water was delivered to respective houses via polyvinyl chloride pipe with a pumping system. Surau for public worship and religious assembly was established. Most fishermen stay on the water in a cluster, resembling a little water village. Small scale aquaculture was operated in the village compound for commercial purpose. Most houses were wooden made, well ventilated and built on stilts to avoid flooding. Drainage ditches took convergence at the sea. A fishing platform was provided for amateur fishing in which the catch was served for meal. Jetty was built for fishermen to offload their seafood harvest. Grocery existed in the region to retail manufactured or processed products rather than raw, fresh food items.

Local electricity was supplied via hybrid solar power provided by Sabah Electricity Company. The telecommunication network was poor which did not allow a distant connection. The villagers took water from either underground or rainwater which was untreated. Cholera outbreak and diarrhoeal diseases were once prevalent in the 1990s but they were no longer endemic nowadays. Other basic infrastructures including school, health clinic, community hall and police station were set up. The only gravel road was provided which gave off-road dust or particulates by travelling vehicles, especially at dry day.

Garbage was routinely disposed of using open burning and litter by villagers. Livestock especially poultry, cattle and goats were free-roaming and droppings were deposited along the path. Rodents and cockroaches were common household pests. Snakes were occasionally seen but snake bite was infrequent.

Poultry, eggs and fish were the major protein source while rice was the main carbohydrate option. Some proportion of villagers was noticed producing homemade salted fish for preservation. The supply of

vegetables and fruits were restricted because the nearest food market would be a three-hour drive away. Some villagers grew self-sufficient crops like leafy vegetables, tomatoes, corns, brinjals. Natural gas was made available by a grocery shop. Demand for mineral water was high among the villagers. Smoking was prevalent at about 80% and especially among men and elderly women. Alcohol consumption was not observed.

The annual number of live births in 2011 was 66. No death was reported in the said year. In fact, the population has been shrinking due to the emigration of the young to urban for better employment opportunity. Local healthcare service was provided by a government health clinic with 2 in-house medical assistants and 2 community nurses. Maternal and child health were prioritised. However, outpatient services were available for endemic tropical infections like tuberculosis and screening for hypertension and diabetes mellitus were offered. The immunisation programme was well established with high coverage of more than 95%. The nearest district hospital is about 150 kilometres away. Most women got married at an earlier age but teen pregnancy was rare in the community. The family size was on average 6 – 7 per household. Clinic attendance for family planning has been seen increasing in trend, with the achievement of a 38.2% rise in 2011.

Findings from Formal Approach (Structured Interview)

Sociodemographic Background

A total of 188 respondents participated in the interview. The median age was 28.0 with the 1st quartile and 3rd quartile being 15.3 and 46.0 respectively (IQR 30.8). There was a near-equal gender distribution and more than two-third aged 40 and below. The majority were Suluk (60.1%) followed by Bajau (14.4%) and Bugis (3.7%). Other minorities include Cocos, Jawa, Kadayan, Idahan, and Dusun. All were Muslim. The majority of the respondents was either married (48.4%) or single (48.9%) and the rest was widowed. More than half (53.7%) were students and housewives; 13.8% were white collars. The remaining respondents were manual workers, consisted of 12.8% odd-job men, 4.8% fishermen, 1.6% farmers and 2.1% palm oil workers; 11.2% of respondents were unemployed, retired or dependant. The illiteracy rate was 12.2% among the respondents. Poverty was rated at 48.9% (Table 1).

Table 1 Distributions of sociodemographic characteristics of the respondents (*n* = 188)

Variable	*n* (188)	%
Gender		
Male	95	50.5
Female	93	49.5
Age		
< 19	61	32.4
19 – 40	72	38.3
41 – 64	46	24.5
> 64	9	4.8
Ethnic		
Suluk	113	60.1
Bajau	27	14.4
Bugis	7	3.7
Others (Cocos, Jawa, Idahan, Kadayan, Dusun, etc.)	41	21.8
Religion		
Islam	188	100
Marital status		
Married	91	48.4
Single	92	48.9
Widow/ widower	5	2.7

Occupation		
Student	54	28.7
Housewife	47	25.0
Clerical	26	13.8
Odd-job men	24	12.8
Farmer	3	1.6
Palm oil worker	4	2.1
Fisherman	9	4.8
Retired/ unemployed/ dependant	21	11.2
Literacy		
Literate	151	80.3
Illiterate	23	12.2
Monthly income (per capita)		
≤ RM240	92	48.9
> RM240	96	51.1

Household Environment and Basic Amenities

Household overcrowding occurred in 22.3% of households, where 4.8% burned solid fuel for cooking indoor while the rest used natural gas, 68.1% reported refrigerator use and 88.8% owned a television. Hanging latrines were found in 27.1% of households, while others practised improved system: a flush latrine with a septic tank, 26.6% and a pit latrine with slab, 46.3%. Cats (26.1%) were the most reared pets, followed by dogs, 2.7% and parrots, 2.1% (Figure 3). Among the domestic livestock, goat took up 23.4% and 13.3% were cattle. Poultry (chickens and ducks) stood at 14.4% (Table 2).

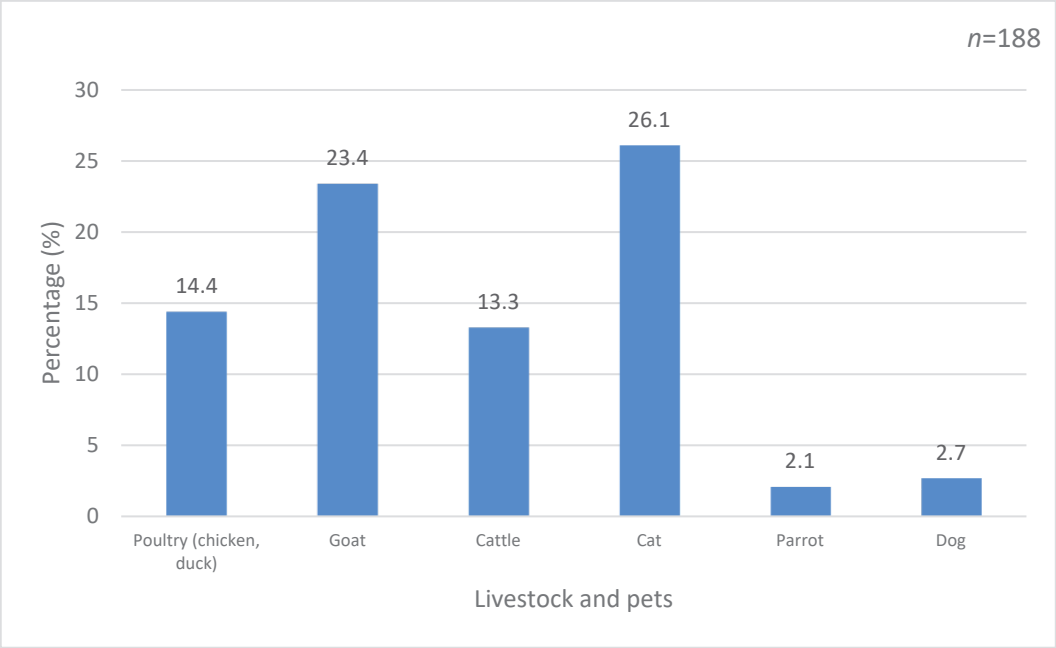

Figure 3 Percentage distribution of livestock and pets

Table 2 Distributions of household environment variables and basic amenities (*n* = 188)

Variables	***n* (188)**	**%**
Household overcrowding		
Yes	42	22.3
No	146	77.7
Cook stove		
Natural gas	179	95.2
Solid fuel (wood, charcoal)	9	4.8
Refrigerator		
Present	128	68.1
Absent	60	31.9
Television		
present	167	88.8
absent	21	11.2
Latrine		
Flush latrine with septic tank	50	26.6
Pit latrine with slab	87	46.3
Hanging latrine	51	27.1

Prevalence of Non-communicable Diseases (NCD)

The majority of NCD reported were cardiovascular and metabolic diseases. Thirteen individuals reported hypertension, five each for degenerative joint disease and chronic respiratory diseases (bronchial asthma or COPD), 4 each for diabetes mellitus and gout followed by 3 for congenital illnesses. Dyslipidaemia, ischaemia heart disease and chronic kidney disease were reported by one individual each (Figure 4).

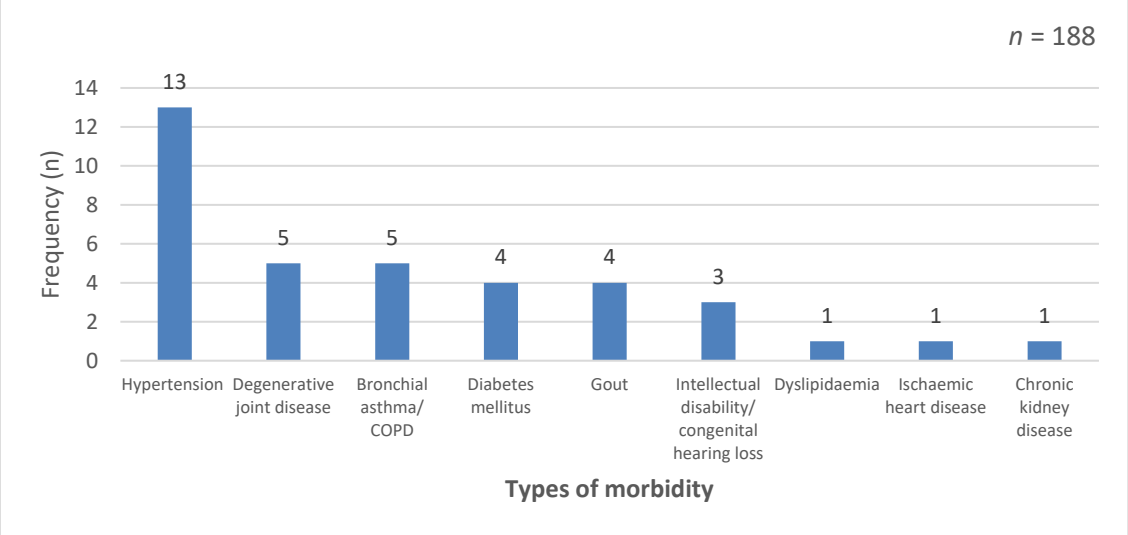

Figure 4 Frequency distribution of non-communicable diseases

DISCUSSION

The current study describes the RRA conducted in a remote village of Lahad Datu called Kampung Tambisan Darat. KTD is a multi-ethnic village with a very basic infrastructural set-up, resembling most remote villages within the Sabah (Chua et al., 2013; Wong et al., 2017). KTD is relatively small in size and the population is young based on the demographic pyramid and positive growth rate. Setting up a local health clinic in the vicinity was an effort by the Malaysian government to uphold the principle of universal healthcare but the facility ought to be upgraded according to the local needs. Contemporary low socio-economic standing indicated by the triad of education, income and occupation linked the villagers to poor health outcome (Amiri et al., 2014; Mohd Ghazali et al., 2015). Furthermore, few public health concerns in KTD are worth to be highlighted.

Water sanitation has been a great challenge in the remote villages in Sabah (Zin et al., 2015). Untreated water was unsafe for the villagers because the contamination risk especially by *Vibrio cholerae* or *Escherichia coli* was high. Improper human waste management in KTD with the unimproved sanitation facility further aggravated the problem. In 2012, 4 outbreaks of cholera were reported in Lahad Datu (Sabah Department of Health, 2012) but none were notified from KTD. It is believed that preventive measures like boiling water before use, good hand hygiene and purchase of mineral water are practised by the villagers. Contaminated food was more likely the source of cholera outbreak in Sabah (Jikal et al., 2019).

Food safety remains a potential issue in KTD. The provision of electricity encouraged the use of refrigerator to maintain food freshness but the take-up rate was suboptimal. On the other hand, seafood catch inshore might get contaminated by human coliforms due to direct discharge of sewage into the sea from the little water village. Common faecal coliforms contamination from human sewage (Iwamoto et al., 2010) include *Salmonella*, *Shigella*, *Norovirus* and *Hepatitis A virus*, which can cause acute diarrhoea with or without complications. Food poisoning or acute diarrhoeal cases appeared rare in KTD (Health Department of Sabah, 2012), possibly because raw, uncooked food consumption was not a local eating culture. This was reflected in the cholera outbreak in northern Sabah by Sea Gypsy who practise eating raw seafood (Jikal et al., 2019).

Outdoor air pollution was generated by open burning and road dust in KTD. The utilisation of solid fuel for cooking in certain households and second-hand smoke led to indoor air pollution. Interestingly, sea breeze might impact negatively the air quality in the coastal region (Papanastasiou et al., 2009). For those with airway hypersensitivity, especially children will be susceptible to these air pollutants. Air pollution by burning activity should not be overlooked in the rural area to cause respiratory symptoms despite lower traffic emissions (Zainal Abidin et al., 2014). Household crowding in KTD provided a hotbed for respiratory infections like tuberculosis. Having said that, only 294 or 6.7% of tuberculosis cases in Sabah (Health Department of Sabah, 2012) was reported in Lahad Datu [population density (Department of Statistics Malaysia, 2010): 30.8 per squared kilometre], after Kota Kinabalu (1294.1 per squared kilometre), Sandakan (175.4 per squared kilometre), Tawau (65.1 per squared kilometre), Semporna (117.0 per squared kilometre) and Keningau (48.8 per squared kilometre). Apparently, high tuberculosis cases seem to attribute to crowding and population density.

Zoonosis is another prospective problem. Among the zoonotic infections, leptospirosis and *Plasmodium knowlesi* malaria are endemic in Sabah. In 2012, Lahad Datu alone registered the second largest proportion of malaria cases (10.4%) after Tawau and only

3.4% for leptospirosis cases, the lowest on the east coast of Sabah (Health Department of Sabah, 2012). Palm oil field, fragmented forest and low lying terrain (Kimberly et al., 2019) were just the right pre-requisites described in KTD. The incidence rate of malaria was estimated at 106.5 per 100,000 population (Department of Statistics Malaysia, 2010) which translated into 1.3 cases in KTD. The bright side was that most local health facility provides trained personnel to smear and exam for malaria parasite. Therefore, the infection could be diagnosed earlier and notified for public health intervention. Lack of partition between domestic livestock and villagers in addition to improper management of animal wastes gave an opportunity for cross-contamination via animal excreta (Delahoy et al., 2018). Excreta of household rodents and dogs, in particular, could expose villagers in KTD to leptospirosis.

NCDs especially cardiovascular disease was seen widespread in a rural setting. In 2011, Sabah registered 29.1% hypertension burden in the state and 37.4% of them were rural population (Institute of Public Health, 2011). In KTD, hypertension recorded the highest counts among the NCDs, being equivalent to 10.2% of adults aged more than 19. Looking to villages inland, hypertension reported at 13.2% in the nearby township of Kinabatangan (Chua et al., 2013) and 24.3% in the north, Kudat (Wong et al., 2017). Comparatively lower prevalence of hypertension in KTD might be explained by opportunist high consumption of fish in KTD as demonstrated by a population-based study in rural coastal Ecuadorian village (Brutto et al., 2016). Despite practising salting as a food preservation method still, the provision of electricity had slowly transformed the villagers to the use of refrigerator. The power supply can make revolutionary changes in terms of health outcome when Begossi et al. (2013) found a difference in the prevalence of hypertension in two fishing communities in Southeast Brazil.

Progress in KTD was observed 8 years beyond the RRA. Domestic connectivity and network coverage have become available which is capable of transforming the local community in terms of health benefits. From the perspective of public health, the delivery of services like health promotion or public health messages is no longer hindered by the geographical challenge. Perhaps, positive perception within the rural community of Sarawak toward the dissemination of health information through the online platform could be encouraging (Nor et al., 2013). Upgrade of the existing health facility is undergoing stepwise in KTD to tailor for the local needs from time to time. A new health clinic building was set up in KTD to serve the local more efficiently. With the introduction of telemedicine in Sabah, any clinical referral can be made without clients being asked to travel out to distant district or tertiary hospitals (Lee, 2020).

CONCLUSION

Rural development is a manifestation of Millennium Development Goals and the closing disparity is the ultimate goal. The foremost priority is to fill up the flaws in the public health needs particularly clean water supply and sanitation facility which is lacking, not forgetting healthcare quality and strategy against non-communicable diseases. Those challenges require participation from relevant authorities as well as individual empowerment.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

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CASE REPORT

Meningioma: An Important Stroke Mimic

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ABSTRACT

Rapid Stroke is a common clinical problem. Stroke can be broadly divided into ischaemic and haemorrhagic stroke. Ischaemic stroke can be further classified by TOAST classification into large-artery atherosclerosis, cardioembolism, small vessel occlusion, the stroke of other determined aetiology and stroke of undetermined aetiology. Importantly, we need to be wary of important stroke mimics such as brain tumour, demyelination, intoxication as they can lead to changes in clinical management. Here, we would like to illustrate a case of meningioma which clinically mimics a stroke. This patient is a 78-year-old lady who initially presented with sudden onset right-sided body weakness associated with slurred speech and facial asymmetry. An urgent plain computed tomography (CT) of the brain showed hypodensities at the left middle cerebral artery territory. However, re-evaluation noted her to have a normal Glasgow Coma Scale without any cortical signs, cerebellar sign or dysphasia. In view of these, stroke mimics was suspected. A contrasted CT brain was done which confirmed the diagnosis of meningioma. She was offered surgical intervention for meningioma but she was not keen on it. In conclusion, this case highlighted the importance of clinical evaluation in recognising stroke mimics.

INTRODUCTION

Stroke is one of the leading causes of long-term disability throughout the world (Caruso et al., 2016). In recent years, there is a breakthrough in the treatment of acute ischaemic stroke (AIS), resulting in changes

in the treatment algorithm. With the introduction of thrombolytic therapy and mechanical thrombectomy, it results in better functional outcome (Graeme, 2017). Ischaemic stroke can be further classified by TOAST classification into large-artery atherosclerosis, cardioembolism, small vessel occlusion, a stroke of other determined aetiology and stroke of undetermined aetiology. However, it is important to diagnose stroke correctly as the treatment is different from other stroke mimics. Administering thrombolytic therapy to a stroke mimic will not bring benefits to the patient. Important stroke mimics that we need to remember including demyelinating disease, cerebral abscess, Todd's paralysis, hemiplegic migraine, conversion disorder or brain tumour (Segal et al., 2012; Vilela, 2017). To differentiate these stroke mimics from stroke, we need to systematically examine and evaluate our patients by clinical examination and neuroimaging. In this present case report, we would like to illustrate a case of meningioma, mimicking acute ischaemic stroke.

CASE PRESENTATION

A 78-years-old lady with a background history of diabetes mellitus, hypertension, dyslipidaemia and complete heart block on a permanent pacemaker presented with sudden onset of right-sided body weakness 7 hours prior to admission. It was associated with facial asymmetry, drooling of saliva, slurred speech and difficulty in swallowing. Otherwise, there was no fever, headache, blurring of vision, dizziness, nausea, vomiting, loss of consciousness and seizure.

On examination, her blood pressure was 163/55 mm Hg, heart rate was 86 beats per minutes, afebrile with Spo2 99% under room air. Initial neurological examination revealed upper motor neuron of right facial nerve palsy with reduced power of 3/5 for the right upper and lower limb. Her BE-FAST (Balance, Eye, Face, Arm, Speech, Time) score was 2, ROSIER (Recognition of Stroke in the Emergency Room) score was 3 and NIHSS (National Institutes of Health Stroke Scale) score was 6. Stroke was suspected based on acute onset of neurological deficits and the patient's risk factors. An urgent plain computed tomography (CT) of the brain showed hypodensity at the left middle cerebral artery (MCA) territory (Figure 1). She was then admitted with the diagnosis of acute ischaemic stroke.

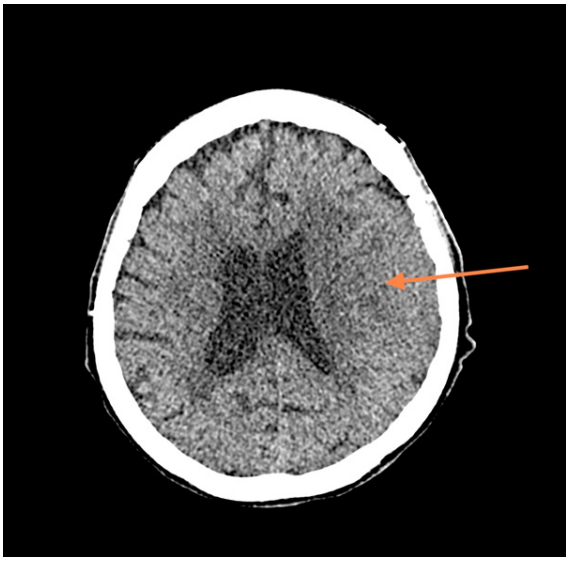

Figure 1 Non-enhanced CT brain showing hypodensities at left MCA territory (arrow)

After admission to the ward, she was reassessed again. Upon reassessment, it was noted that the constellation of signs and symptoms were not consistent with acute left MCA infarction. She has a normal Glasgow Coma Scale (GCS) without any cortical signs, cerebellar sign or dysphasia. She also did not have gaze palsy on examination and she has a normal visual field. Stroke mimics was suspected and a contrasted CT scan of the brain was done (Figure 2).

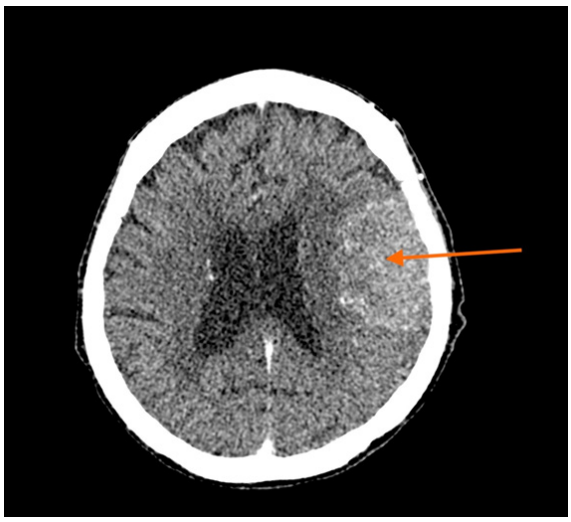

Figure 2 Contrast-enhanced CT brain showing solitary enhancing extra-axial brain parenchymal lesion at frontoparietal region measuring 5.3 × 3.8 × 5 cm (arrow), suggestive of meningioma

Her contrast-enhanced CT brain showed a solitary enhancing extra-axial brain parenchymal lesion at the frontoparietal region measuring 5.3 × 3.8 × 5 cm with no significant perilesional oedema, suggestive of meningioma. She was then referred to the neurosurgical team for further evaluation. She was counselled by the neurosurgical team for excision of meningioma but she refused surgical intervention. She was then followed up on regular basis. On follow up, she remains well with no new symptoms apart from right-sided body weakness.

DISCUSSION

Stroke is a clinical syndrome whereby there are acute onset neurological deficits attributable to acute focal injury of the central nervous system by a vascular cause (Sacco et al., 2013). It can be either ischaemic or haemorrhagic in origin. Ischaemic stroke can be further classified by TOAST classification into large-artery atherosclerosis, cardioembolism, small vessel occlusion, the stroke of other determined aetiology and stroke of undetermined aetiology. Knowledge of neuroanatomy and vascular anatomy is important in the clinical diagnosis of stroke.

Diagnosis of stroke can be achieved by careful clinical evaluation paired with neuroimaging tools. A stroke is a vascular event in the brain. The constellation of signs and symptoms of a patient should correlate with the certain vascular territory (Vachha et al., 2014). The patient will present differently according to the affected vessels. Various tools have also been developed to aid in identifying stroke. BE-FAST (Balance, Eye, Face, Arm, Speech, Time) and ROSIER (Recognition of Stroke in the Emergency Room) scale can be useful (Anathhanam et al., 2017). Importantly, we also need to consider the patient's risk factors for a vascular event and the National Institutes of Health Stroke Scale (NIHSS) score. Most reported cases of stroke mimics were characterised by low vascular risk factors and low NIHSS score (Okano et al., 2018).

Non-enhanced computed tomography (CT) of the brain is the first line neuroimaging tools for suspected AIS. In the early stage of stroke, the CT brain may be normal (Moulin et al., 1996). The typical CT features of stroke include hypodensities in the vascular territory with occasionally mass effect. However, we must always correlate neuroimaging findings clinically. Other additional neuroimaging tools include contrast-enhanced CT, magnetic resonance imaging (MRI) and MR angiography (Winkler et al., 2009). These will help exclude brain tumour, abscess or demyelinating disease.

In this patient, she presented with acute onset neurological deficits. However, she does not have any cortical sign, no dysphasia and she has a normal conscious level. This is not typical of a large vessel stroke. Hence, a contrasted scan was done and it confirmed the diagnosis of meningioma. This case highlighted the importance of careful clinical evaluation and clinical correlation with neuroimaging in approaching acute neurological deficits.

On the other hand, meningioma is the most common benign intracranial tumour (Marchand et al., 2014). It is a tumour that originates from arachnoid cells, granulations, the stroma of the perivascular space and the choroid plexus. It accounts for 13 – 20% of all intracranial tumours (Koech et al., 2013). It commonly affects adult more than 65 years old with female preponderance. Exposure to ionizing radiation, sex hormones and predisposing genetic condition are known risk factors for meningioma (Fogh et al., 2016). Clinically, a patient may complain of headache, visual disturbances, anosmia, hemiparesis and seizures. Computed tomography of the brain can diagnose meningioma and MRI brain will help on best surgical approach (Koech et al., 2013). The mainstay of treatment for meningioma is surgical resection of the tumour. Complete surgical resection of the tumour is preferred when the tumour is in an accessible location. Depending on histological grade and extent of resection, some patients may adjuvant radiosurgery or radiotherapy (Euskirchen et al., 2018).

CONCLUSION

Though stroke is a common clinical problem, it is important to identify stroke correctly as the treatment algorithm is different. Good clinical evaluation coupled with neuroimaging tools is pivotal in excluding stroke mimics. Important stroke mimics are seizures, hypoglycaemia, migraine, tumour, abscess and conversion disorders.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written consent was obtained from the patient to publish this case report. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

A Case Report of Silicosis: Culprit of Progressive Massive Fibrosis

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ABSTRACT

Silicosis is a fibronodular lung disease secondary to the inhalation of crystalline silica dust. It had continued to cause significant morbidity and mortality worldwide. Here is a case of a 63-year-old woman, a lifelong non-smoker who complained of intermittent wheezing since retired 8 years ago. She had worked in the clay and piping industry for more than a decade. She wore only a simple 3-ply face mask at work without other protective devices. She had multiple hospital admissions for acute exacerbation of chronic lung disease for the past several years. Respiratory examinations revealed bilateral fine crepitations and occasional rhonchi on auscultation. Chest radiograph revealed ground glass changes. Pulmonary function testing showed an irreversible severe obstruction picture with an FEV1 of 45%. High resolution computed tomography thorax demonstrated hyperinflated lungs with emphysematous changes and multiple nodules over subpleural region, conglomerate mass with calcifications over bilateral lungs. Her imaging findings combined with a significant occupational history were suggestive of progressive massive fibrosis (PMF) due to silicosis. She is currently being treated with several inhalers and does not require home oxygen therapy. She is suffering from accelerated silicosis which may potentially progress to radiological deterioration, altered respiratory function and premature death. Therefore, it is essential to avoid any potential hazards that may predispose to silicosis.

INTRODUCTION

Silicosis is a disabling and irreversible lung disease causing progressive massive fibrosis. It takes a toll on occupational health diseases.

The causative agent is the crystalline silica dust presents in concrete, sandstone, rock and other abrasives. Workers at risk are those who use machines to remove paint or rust, who grind mortar, crush, haul, chip and drill concrete or rock, and who perform a variety of construction jobs. In high-risk industries, the high biological reactivity of inhaled freshly crushed silica dust (concentration as high as 99%) can cause accelerated progression of the disease because of its greater respiratory burst and cytotoxic effects on alveolar cellular membrane integrity (Bhattacharya et al., 2016). Prevention is better than cure. For this reason, National Institute for Occupational Safety and Health has advocated routine chest radiographs to United States coal miners aiming for early detection of coal workers' pneumoconiosis (National Safety Council, 2015). Despite this, silicosis still can occur in the absence of further exposure and this has increased the incidence of Tuberculosis or atypical mycobacterium diseases, resulting in an increasing healthcare burden. This case report aims to highlight the significance of relating chronic progressive lung disease with occupational hazards and the importance of exploring a detailed occupational history.

CASE PRESENTATION

A 63-year-old woman, who is a lifelong non-smoker, had been complaining of wheezing and dyspnoea since retiring from her work 8 years ago. She was diagnosed to have hypertension for the past 10 years. She has no childhood asthma and has no significant family history of asthma or atopy. She had worked in the clay and piping industry for more than a decade without any personal protective device. On further questioning, she admitted that she wore only a simple 3-ply face mask at work without any other protective respirator, gown or clothing. She did not separate her working attire from normal clothing during laundry. Ever since she has retired 8 years ago, she experienced progressive worsening dyspnoea and wheezing leading to multiple hospital admissions. Respiratory examinations revealed bilateral fine crepitations and occasional rhonchi on auscultation, cardiovascular examination did not show any evidence of pulmonary hypertension, while other systemic examinations were unremarkable. Chest radiograph (Figure 1) showed ground-glass appearance over her bilateral lung mid-zones which mimics the typical 'angel's wings' appearance.

Figure 1 Chest X-ray P/A view shows reticulonodular shadows and multiple mass-like lesions with irregular margins over right upper to mid-zones and left mid-zone with background ground glass appearance in both hyperinflated lung fields causing an 'angel's wings' appearance (indicated by red arrows). The lateral interfaces of the mass lesions parallel with the lateral chest wall.

High-Resolution Computed Tomography (HRCT) of the thorax (Figure 2 and Figure 3) demonstrated hyperinflated lungs with emphysematous changes with multiple nodules over the subpleural region and conglomerate mass with calcifications over bilateral lungs (both upper and lower lobes) with a fibrotic band and adjacent pleural thickening.

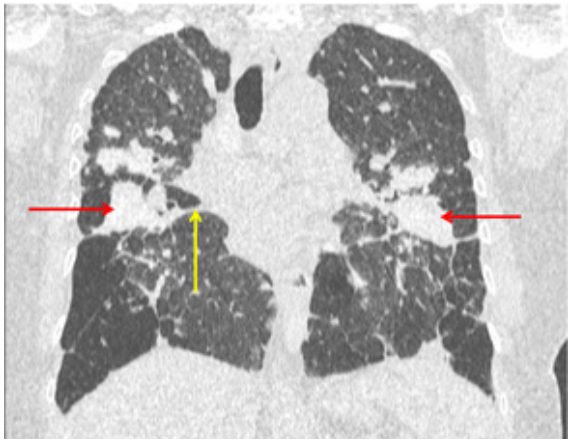

Figure 2 HRCT thorax axial view shows hyper-inflated lungs with multiple calcified mass (conglomerate mass indicated by red arrows) in both perihilar regions with surrounding fibrosis and adjacent pleural thickening (indicated by the yellow arrow)

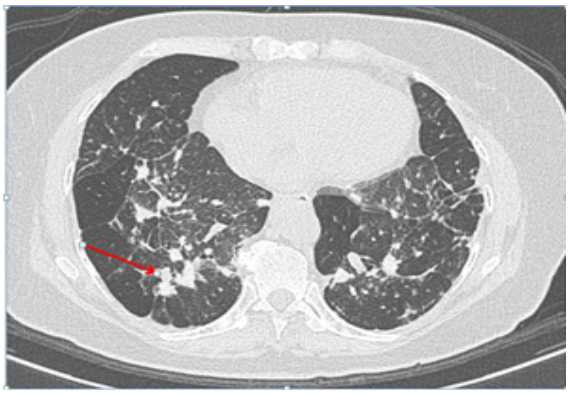

Figure 3 HRCT thorax coronal view shows scattered multiple small nodules (indicated by the red arrow)

These findings were in keeping with progressive massive fibrosis. Pulmonary function testing was suggestive of irreversible severe obstruction with an FEV1 of 45% and FEV1/FVC of 49% which is shown in Figure 4. Initially, she was discharged with MDI Berodual (short-acting muscarinic agonist), MDI Budesonide (inhaled corticosteroids) and MDI Salbutamol (short-acting bronchodilator). In view of persistent cough with wheezing, Ultibro Breezhaler (long-acting beta-agonist/ long-acting muscarinic agonist combination) was added to her current therapy. Her condition is currently controlled with much-reduced exacerbation's frequency and saturating well without the need for home oxygen therapy. She was referred to the occupational health division for potential compensation for her silicosis under the Employee's Social Security Act 1969.

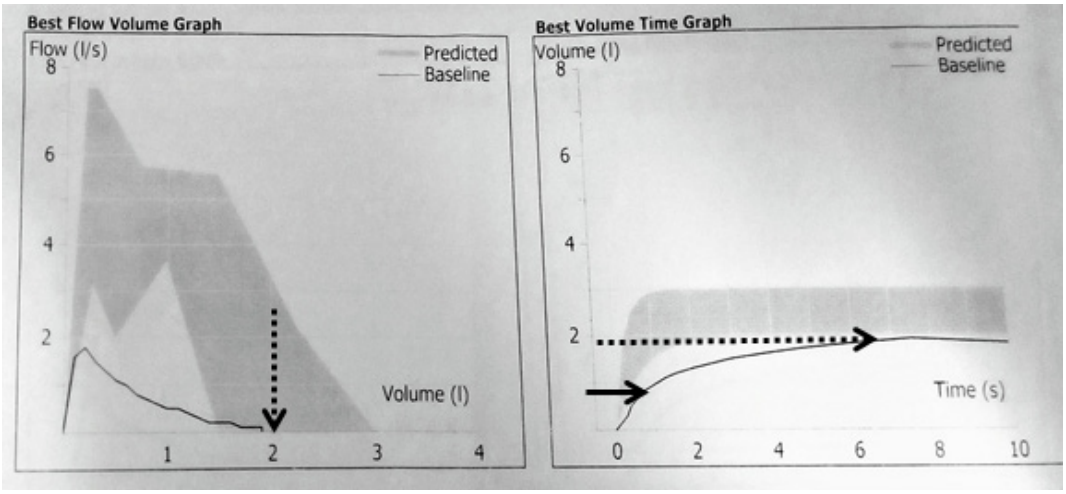

Figure 4 Flow volume graph and volume time graph show obstructive pattern with FEV1 of 45% (indicated by the solid arrow) and FEV1/FVC of 49% (FVC indicated by the dotted arrow).

DISCUSSIONS

There are 3 types of silicosis that existed. Type 1 (chronic silicosis) is the most common and generally develops after 10 years exposing to low levels of crystalline silica. Type 2 is accelerated silicosis developed 5 to 10 years after exposure to higher levels of crystalline silica. Type 3 is acute silicosis which occurs months or weeks after exposure to a very high concentration of crystalline silica, usually leading to death in months (National Safety Council, 2015). Silicosis is associated with multiple lung comorbidities including lung cancer, autoimmune diseases and tuberculosis which are also known as 'silicotuberculosis' (Ali et al., 2010).

The formation of silicotic nodules is the primary pathology of silicosis. Govindaraj et al. (2016) described continuous exposure results in continuous release of inflammatory cytokines which promotes collagen synthesis and produces anti-collagen antibodies, stimulating the production of more collagen which eventually leading to silicotic nodule formation. A silicotic nodule has a central zone of hyalinized fibrous tissue, a middle zone of concentrical collagen fibres and an outer zone of random collagen fibres combining with macrophages and lymphoid cells (Mossman et al., 1998).

Ali et al. (2010) outlined the approach to diagnose silicosis which encompassed exposure to sufficient silica dust, radiographic features of silicosis and exclusion of other illnesses causing similar abnormalities. Pulmonary Function Tests may be normal or obstructive and/ or restrictive abnormalities may be present. A chest radiograph reveals nodules, especially in upper lung zones. In 5 – 10% of cases, calcified hilar nodes which are also known as 'eggshell' calcification, is strongly suggestive, although not pathognomonic of silicosis**.** Progressive massive fibrosis is characterized by mass lesions typically over the lateral interfaces which are parallel to the lateral chest wall (Gera et al., 2014).

In this case, the patient is a lifelong non-smoker presenting with persistent cough associated with progressive worsening dyspnoea and wheezing. Occupational hazards shall ring a bell in this case. The occupational history of exposure to silica dust, progressive nature of breathlessness and the classical radiological findings are the main clues for the diagnosis supported by pulmonary function testing with an obstructive pattern. Her clinical condition fits into accelerated silicosis complicated with progressive massive fibrosis. Although the current lung condition is stable, there is a high chance of further deterioration in terms of symptoms, radiological findings and pulmonary function testing. The mode of silica dust exposure, in this case, was mainly inhalation. Goodman et al. (1992) mentioned that there is no definitive treatment for silicosis while Sharma et al. (1991) stated that only symptomatic treatment in which bronchodilators and corticosteroids may be useful. National Safety Council advocated water spray and dry air filtering to control dust as preventive measures (National Safety Council, 2015).

Silicosis may also be caused by silicone injection as discussed in a case report from Texas which reported a transgender female suffered from interstitial lung disease secondary to silicosis 2 years after underwent a silicone breast implant, together with silicone injections unto thigh and gluteal (Mattox et al., 2018). Otherwise, most of the silicosis is caused by inhalation of silica dust for a long period as reported in other case reports.

CONCLUSIONS

Silicosis is an occupational disease that may present even after the cessation of silica exposure. As there is no cure, prevention is undoubtedly important. The best way of prevention is to identify high-risk workplaces and take necessary precautions as advised by the National Institute of Occupational

Safety and Health (NIOSH). Workers who are exposed to a high level of silica dust should be using standard protective respirators and monitored by occupational physicians with chest radiography regularly. If any early signs of silicosis are detected, the worker should be stopped from further exposure to prevent further complications**.** Exposure to high concentrations of dust is a significant risk factor for the development of progressive massive fibrosis as in this case.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written consent was obtained from the patient to publish the case. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

Near-miss Injury of Multiple Carpometacarpal Joint Dislocations: A Report of Two Cases

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ABSTRACT

Multiple carpometacarpal joint (CMCJ) dislocations are rare and are easily missed. The anatomical configuration renders stability to the joints. As a result, a high-velocity impact is required to dislocate the joint. We present two cases of multiple carpometacarpal joint dislocations with different mechanisms of injury and their subsequent management at our centre. In case 1, a 29-year-old gentleman presented with acute dislocations of the CMCJs involving the right middle, ring, and little fingers. An open reduction and fixation with Kirschner wires were done to stabilize the dislocated CMCJs and he subsequently recovered. In case 2, a 25-year-old gentleman had the CMCJ dislocations detected late due to other more profound injuries. Partial arthrodesis was performed to address the instability of the CMCJs of the right index, middle and ring fingers. He subsequently recovered and returned to work 6-months postoperatively. The diagnosis of carpometacarpal joint dislocation can be easily missed especially when there is a concurrent distracting injury. It is crucial to maintain a high index of suspicion as early diagnosis and prompt treatment is paramount to yield a better outcome.

INTRODUCTION

Dislocations of multiple carpometacarpal (CMC) joints are uncommon (Bao et al., 2018). They account for less than one per cent of all hand traumas (Beekhuizen et al., 2018). The CMC joints are strengthened by multiple ligaments especially the dorsal and volar ligaments in addition to the anatomical saddle joint configuration, hence explaining

the low incidence of the injury (Buren et al., 2016). Injury, when happens, usually affects the CMC joints of the ring and little fingers due to the looser ligamentous arrangement and more mobility as a result of the saddle joint configuration (Metikala et al., 2020). Anatomically, the pisiform bone and the hook of the hamate act as a volar buttress at the ulnar region, resulting in a higher incidence of dorsal CMC joint dislocations (Pundkare et al.,2015). Dorsal dislocations form 85% of all CMC joint dislocations with the 5th CMC joint being the most commonly dislocated one (Cobb et al., 2018; Nanno et al., 2007). Dislocations of the CMC joints can be classified based on the Pundkare Classification (Table 1) (Pundkare et al., 2018).

Table 1 Pundkare Classification of dislocations of the CMC joints (Pundkare et al.,2018)

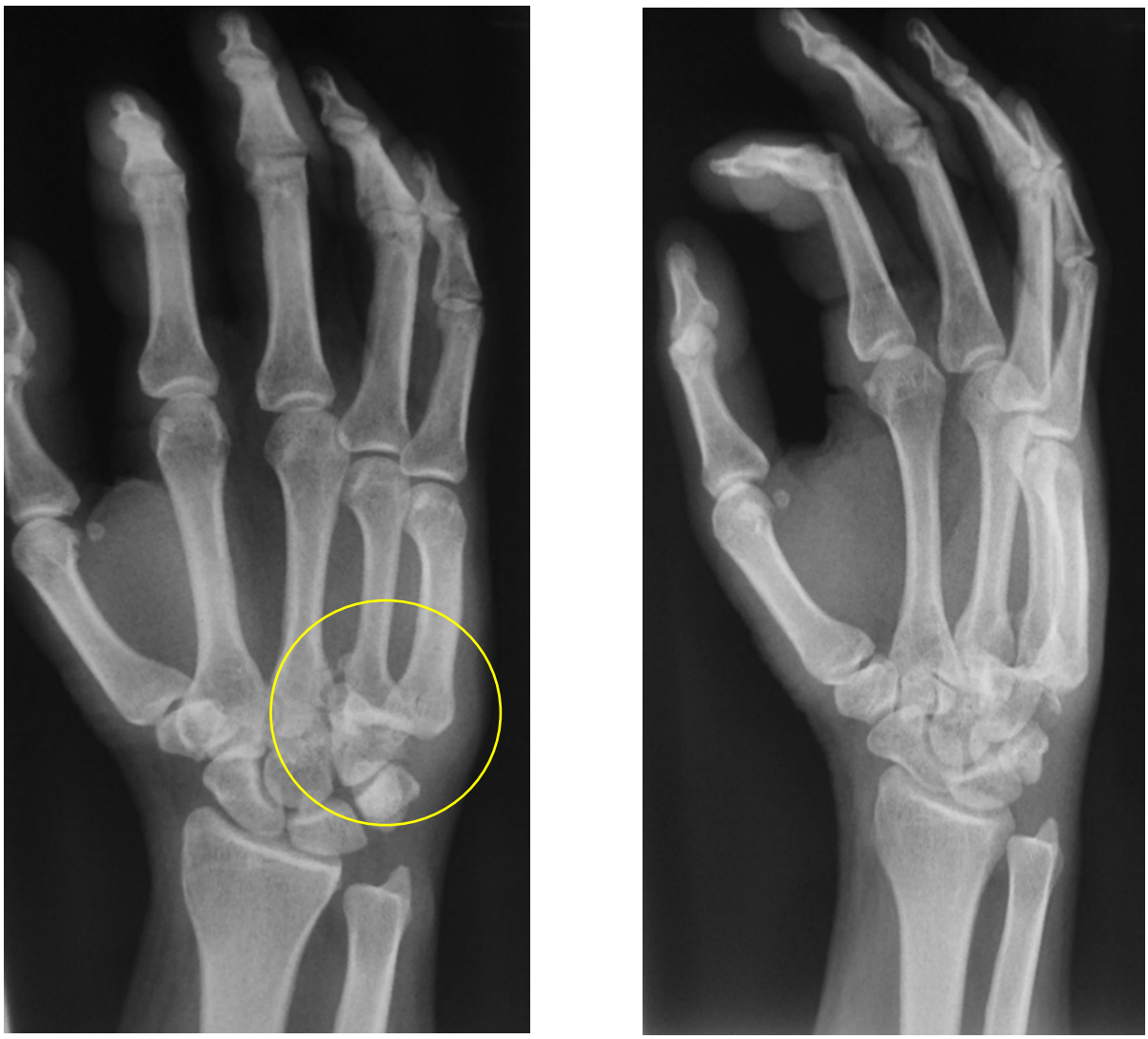
Type	Direction of dislocation	Involved metacarpals	Peculiarity
A	Dorsal	1 or more	All in the same direction
B	Volar	1 or more	All in the same direction
C	Divergent: Dorsal and Volar	2 or more	At least two in the opposite direction
To add 1	Any of the above plus concomitant carpal or metacarpal fracture	Metacarpal dislocation with associated fractures	Displaced fracture

CMC joint dislocations are often missed because of subtle radiographic changes and treating clinicians focusing on other more severe concomitant injuries. Henderson et al. (1987) reported that more than 70% of the CMC joint dislocations were missed at the accident and emergency department. In this case report, there are two cases of carpometacarpal joint dislocations with different mechanisms of injury and their subsequent management.

CASE PRESENTATION

Case One

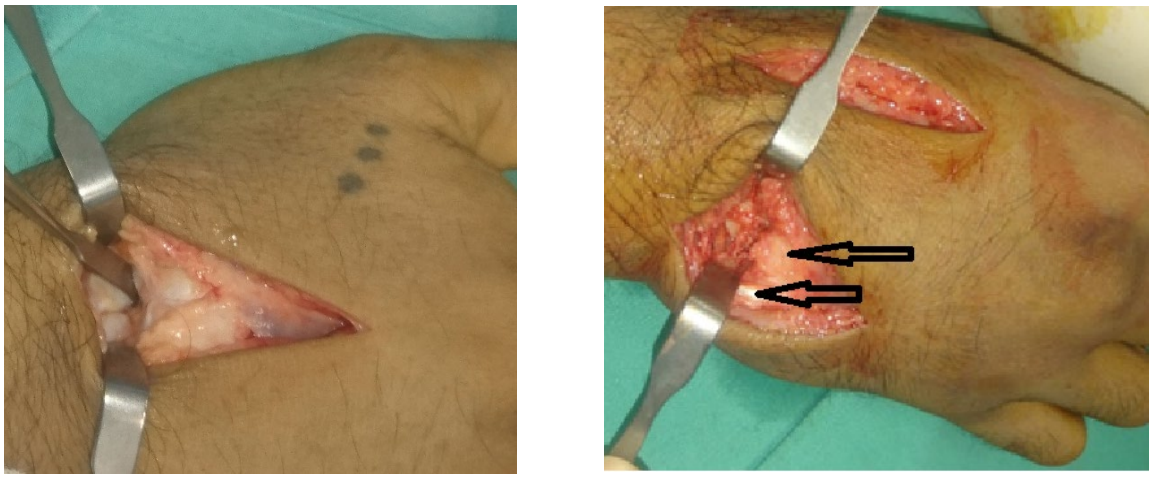
Mr R, a 29-year-old male, presented with pain and swelling at his dominant right hand one week after punching another person in the face with his right closed fist in a fight at the prison. On examination, the swelling was localized at his right wrist with a limited range of movement of the wrist due to pain. Plain radiographs of his right wrist revealed dislocations of the CMC joints involving the right middle, ring, and little fingers (Figure 1).



A B

Figure 1 Antero-posterior (AP) (A) and oblique (B) plain radiographs of the right hand show the carpometacarpal (CMC) joint dislocations. Note that there is a disruption of the parallel 'M lines' on the AP plain radiograph (yellow circle), hence raising the suspicion of CMC joint dislocations.

The initial trial of closed manipulative reduction was futile and an open reduction and fixation with Kirschner wires were then done to stabilize the dislocated CMC joints of the right middle, ring and little fingers (Figure 2 and Figure 3). Two longitudinal skin incisions were made, one overlying the second CMC joint and the other one overlying the fourth CMC joint to visualize and examine the stability of all four ulnar CMC joints (Figure 2). Post-operatively, the injured hand was protected with a volar slab for three weeks and then started on handgrip exercises. He subsequently recovered well without any complication. A handgrip test with a dynamometer showed that the right-hand grip strength was 75% compared to the contralateral normal left hand at six months post-operation. An attempt to reassess his handgrip strength was unsuccessful as he had defaulted the clinic follow-up after he was released from prison.



A B

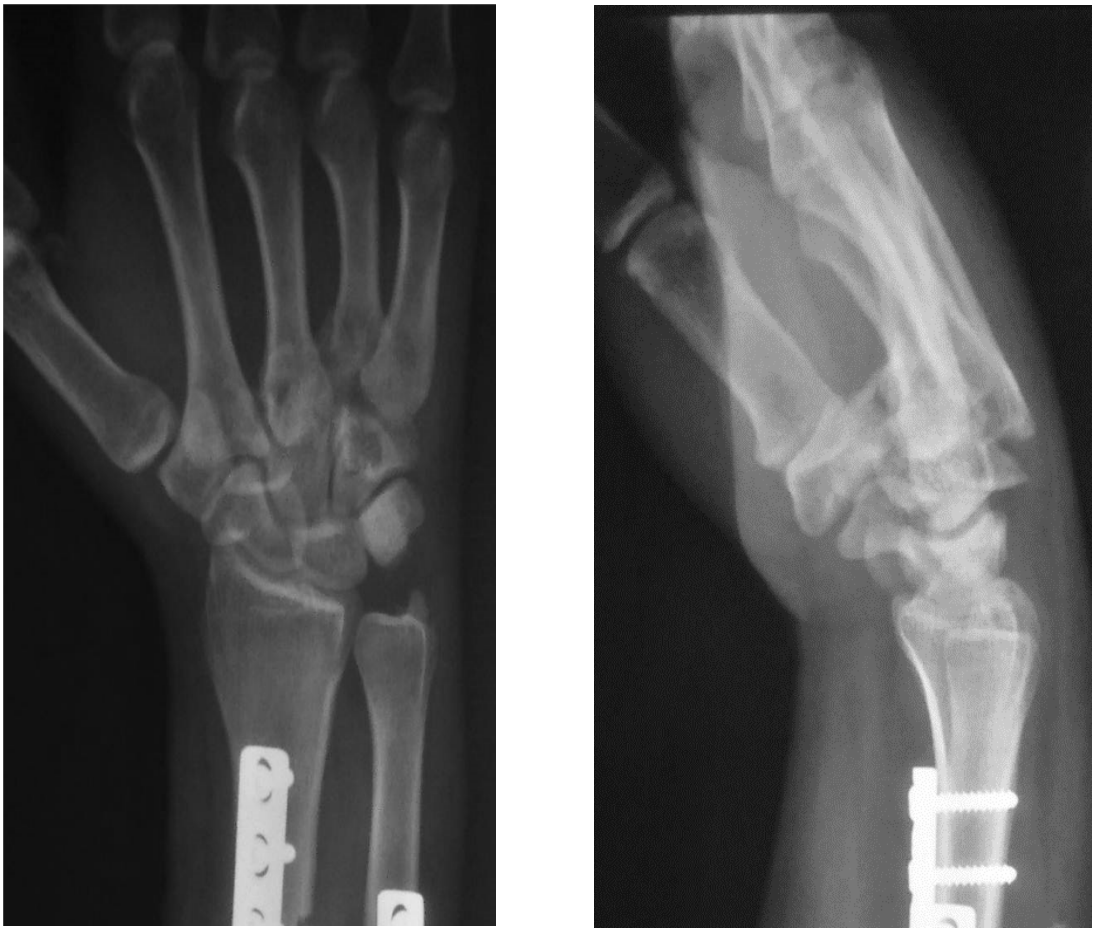
Figure 2 The CMC joint of the index finger is examined with a McDonald elevator and appears to be stable (A). There is a gross displacement of the CMC joints of the ring and little fingers (B - black arrows), with the metacarpal bone partially obscured by the extensor digitorum tendon. The CMC joint of the middle finger is unstable when stress is applied.

A B

Figure 3 Plain radiographs of the right wrist (A – anteroposterior view; B – lateral view) post-open reduction and Kirschner wiring show that the CMC joints of the right middle, ring and little fingers are well-reduced.

Case Two

Mr MH, a 25-year-old, right-hand dominant gentleman with no known medical illness, was involved in a motor vehicle accident and he sustained a cerebral concussion, an open comminuted fracture of the distal left radius Gustillo-Anderson grade 3A and a closed mid-shaft fracture of his right radius and ulna. The diagnosis of CMC joint dislocations of the right index, middle and ring fingers had been missed during the initial clinical assessment. Wound debridement, cross-wrist external fixation for the distal left radius open fracture and an open reduction with small dynamic compression plating of the right radius and ulnar closed fractures were done. The CMC joint dislocations of the right hand were then revealed through plain radiographs of the right wrist on a post-operative day one, especially on the lateral view (Figure 4), which was not obvious on the initial anteroposterior and oblique view.



A B

Figure 4 Plain radiographs of the right wrist (A – anteroposterior view; B – lateral view) show CMC joint dislocations of the index, middle and ring fingers

The patient opted and insisted for fixation of the right CMC joint dislocations during the surgery planned for the fixation of his left upper limb due to previous unpleasant general anaesthesia experience despite adequate counselling and explanation on associated risks were given. He underwent removal of the external fixator and variable-angle distal radius locking compression plating for his left distal end radius fracture 3 weeks after the first surgery due to an unfavourable soft tissue condition at his left forearm. Intra-operatively, the CMC joints of the right index, middle and ring fingers are grossly displaced with extensive fibrosis surrounding the joints, making the reduction difficult and challenging (Figure 5).

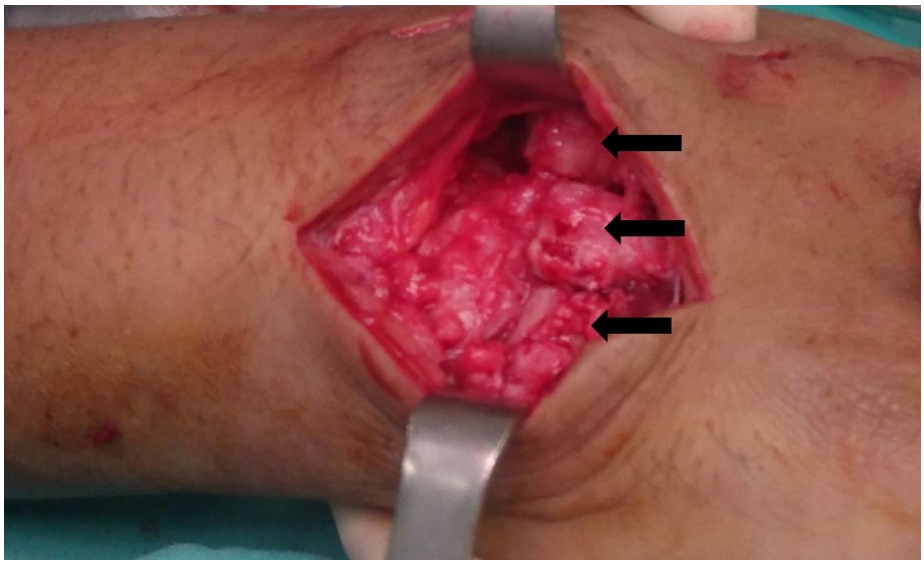


Figure 5 Intra-operatively, the CMC joints of the index, middle and ring fingers (arrows) are grossly displaced with extensive fibrosis surrounding the joint, making the reduction difficult.

The CMC joints were reduced, and they were fixed with two Kirschner wires. Partial arthrodesis was done by using a 4.0 mm screw and an iliac bone graft was used due to grossly unstable CMC joints (Figure 6). A volar slab was used for 3 weeks after the surgery for protection.

A B

Figure 6 Plain radiographs (A – anteroposterior view; B – lateral view) of the right wrist show that the dislocations are reduced, and partial arthrodesis is done with a 4.0 mm screw due to severely unstable CMC joints.

The Kirschner wires are removed in the clinic setting at 3 weeks post-reduction (Figure 7). However, he refused the removal of the cancellous screw and he denied having symptoms of implant prominence.

He was able to return to work 6 months after the surgery. At 18 months after the surgery, his grip strength based on the handgrip dynamometer on the right hand was 40 kg with comparable grip strength on the left hand. He was able to flex his right wrist up to 45 degrees, extend up to 30 degrees with 10 degrees ulnar deviation and zero-degree radial deviation.

A B

Figure 7 Plain radiographs of the right wrist (A – anteroposterior view; B – lateral view) show well-reduced CMC joints after the removal of Kirschner wires

DISCUSSION

Carpometacarpal joint dislocations are reported in the literature as isolated case reports or case series due to their rare incidence (Deshpande et al., 2017; Gil et al., 2017). The treatment varies based on the patient's presentation. It is generally agreed that early diagnosis and subsequent management, either conservative or surgical intervention, yield a better functional outcome (Tay et al., 2019; Zhang et al., 2015). In the acute setting (up to 2 weeks post-injury), closed manipulative reduction and splint immobilization of the CMC joints can be attempted. These patients should be monitored closely as there is a risk of secondary dislocation after the initial closed reduction and splinting. The risk of displacement is higher if the second and third CMC joints are involved, as a result of the dorsal pull of the extensor carpi radialis longus (ECRL) and extensor carpi radialis brevis (ECRB) tendons (Gil et al., 2017). Other methods such as closed reduction and percutaneous fixation

with Kirschner wires as well as open reduction and fixation with Kirschner wires or plates have been reported to be successful (Tay et al., 2019; Telich-Tarriba et al., 2020).

In both of the patients, there is multiple CMC joints involvement, hence an open reduction is imperative to obtain a good reduction of the CMC joints. In the first patient, fixation of the 3 ulnar CMC joints is made with Kirschner wires after an open reduction. The surgery for the second patient is complicated with extensive fibrosis surrounding the dislocated right second, third and fourth CMC joints, which is expected after a delay of 3 weeks. It is also unusual to have an intact fifth CMC joint when the other CMC joints are dislocated. After the reduction, fixation with Kirschner wires alone is unstable, hence a partial arthrodesis with a 4.0 mm screw and autologous iliac bone grafting is done. Based on previous case series, most of the CMC joint dislocations can be treated with K-wiring after reduction, either with closed or open reduction method and they generally produce a good long-term functional outcome. Arthrodesis of the CMC joint should be reserved for those patients with more severe injury or as a treatment for secondary osteoarthritis. Functional outcomes of patients who undergone arthrodesis after a CMC joint dislocation is not available in the literature as it is rarely done (Tay et al., 2019; Telich-Tarriba et al., 2020).

After an anatomic restoration of the CMC joints, good outcomes can be expected. The range of movement of the CMC joints will be compensated by other joints. The main goal of treatment is to obtain a pain-free wrist and to regain grip strength which can be achieved by undergoing extensive rehabilitation and physiotherapy post-operatively. We advocate for our patients to start handgrip exercises by using plasticine at 3 weeks post-reduction. Active range of movement exercises was started at 6 weeks post-reduction and subsequently passive range of movement exercises at 2 months post-surgery. Despite the delayed treatment, both of our patients have regained good functional handgrip strength by following this rehabilitation protocol. Generally, patients are advised for gradual mobilization of the fingers and CMC joints after four to six weeks of immobilization, followed by removal of the implants and more intense physiotherapy at eight to ten weeks post-operatively (Tay et al., 2019; Telich-Tarriba et al., 2020).

CONCLUSION

Carpometacarpal joint dislocation is an uncommon injury of the hand that is easily missed. Early diagnosis is the key to achieve a good functional outcome. Understanding the mechanism of injury with a high index of suspicion is the sine qua non in making an early diagnosis of carpometacarpal joint dislocation.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written consent was obtained from the patients to publish the case. A copy of the written consent is available for review by the Chief Editor.

ACKNOWLEDGEMENTS

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SHORT COMMUNICATION

Comprehensive Safety Guidelines for Doctors and Healthcare Workers during COVID-19

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ABSTRACT

When the coronavirus pandemic broke out, doctors approached it like another flu but ended up dying in significant numbers across the globe, resulting in the medical community getting shaken and suffering burnout and other mental issues. It is time to introspect as to how to give a healthy environment to doctors and other healthcare workers to work smoothly so that they can take care of the COVID-19 patients in a better way. A guideline is required for the safety of doctors and healthcare workers fighting the battle with COVID-19.

INTRODUCTION

The world is ill-prepared to respond to a severe influenza pandemic or any similarly global, sustained and threatening public-health emergency (Dumiak M, 2012).

When Dr Liang Wudong, Director of the Department of Otorhinolaryngology of Hubei Province, China became the first doctor to die from the COVID-19 infection on 25 January 2020, the medical community got the alarm but never realized the gravity of the situation due to this pandemic and the death and doom this virus will cause one day to the healthcare providers who are taking care of the infected patients in the hospital.

The National Health Commission of the People's Republic of China reported in February 2020 that out of the total number of COVID-19

patients, 4.4% were healthcare workers or others who worked in medical facilities. The median age of healthcare workers (HCW) at death was 55 years and the median period from hospital admission till death was 19 days (Zhan et al., 2020). In another study from Italy, reported on 17 April 2020, the latest estimate of medical doctor deaths reached 119, which is 57.8% of total HCW deaths; followed by nurses 16.5%, nurse aides 8.3% and dentists 5.8%; 2 nurses committed suicide due to unsustainable work pressure due to COVID-19 (Lapolla P et al., 2020). In India, the first case of COVID-19 was detected on 30 January 2020 and by May 2020, it had affected around 548 doctors, nurses and paramedics across the country, according to data maintained by the Government of India (Medical Dialogues Bureau, 2020). This figure excluded field workers, ward boys, sanitation workers, security guards, lab attendants, peons, laundry and kitchen staff. While the Indian Medical Association data till 29 April 2020 showed that 927 doctors were infected with COVID-19, of whom 57 died. This data does not include small private hospitals and nursing homes, general physicians, and those in the periphery of cities. By the end of May 2020, the Indian Council of Medical Research (ICMR) data portal contained the results and contact details of 23,898 symptomatic HCWs who were tested for SARS-CoV-2 infection. After excluding non-Indian nationals and missing or wrong contact details from this database, 21,402 records were obtained, with 1,073 (5%) confirmed SARS-CoV-2-infected HCWs (Chatterjee et al., 2020). A total of 515 doctors and 90 nurses and healthcare workers had succumbed to this disease according to the report released by the Indian Medical Association in October 2020 (The Wire Staff, 2020, 2 October). More than half of those who died were less than 60 years while 30% were less than 50 years and 21% below 40 years. The risk applies not only to nurses and doctors but also to pharmacists, technicians, physiotherapists, receptionists, paramedics, attenders, ambulance drivers and other staff. According to the World Health Organisation (WHO), the COVID-19 pandemic had hit over 22,000 healthcare workers across 52 countries and regions as early as April 2020 (IANS, 2020, 12 April). As so far there is no systematic reporting of infections among healthcare workers to the WHO, this number is probably grossly under-represented. It has been observed globally that the average age of the physicians at death due to the coronavirus was 63.7 years and 90% were males. The countries reporting the maximum deaths of doctors were Italy (44%), Iran (15%), Philippines (8%), Indonesia (6%), China (6%), Spain (4%), USA (4%) and UK (4%) (Ing et al., 2020). The most worrying statistics of all was that the healthcare workers have a serious perception of not getting enough support from medical administrators and public health authorities while they are dealing with this pandemic and it is very important to bring out protocols and change in the system to protect the healthcare professionals (Lai et al., 2020).

So, what can be done to save the doctors and the healthcare workers from falling prey to the novel coronavirus infection?

1. Avoid stupidity – All healthcare workers need to wear Personal Protective Equipment (PPE) with perfect knowledge of donning and doffing technique, along with an N95 mask and face shield without any compromise. Any slip shot or lacunae will make the entire hospital staff vulnerable to getting exposed to the virus. The reason for the high mortality of HCWs in Italy was not only due to the sheer prevalence of the COVID-19 outbreak, but the employment of senior retired doctors to treat ill patients and finally the shortage of PPE. If there is scarcity or non-availability of PPE, those HCW should not be put on duty in the designated COVID-19 ward (Ing E.B. et al., 2020)

2. With the COVID-19 test not available freely in many parts of the world

and the cumbersome procedure in practice in India to satisfy all the ICMR guidelines to qualify for the test, it is recommended to consider all patients to be potentially COVID-19 positive in this ongoing pandemic until and unless proven otherwise. All precautions should be in place while dealing with all the inpatients till the curve flattens (Bhattacharya & Bhattacharya, 2020).

3. All outpatient consultations should be either through video conferencing or teleconsultation wherever possible.

4. All planned elective surgery should be avoided till the graph flattens. Only life-threatening emergency surgeries should be entertained by the hospital. Even then, a screening HR CT of the chest and/ or an RT-PCR for COVID should be obtained prior to surgery to forewarn and protect the surgeon, all OT staff and the hospital workers handling the patient.

5. Depression, anxiety, insomnia, and distress are the most common mental health issues the physicians and nurses were facing in the fever clinics in China. It is of paramount importance for the authorities to protect the mental health of the HCWs fighting the COVID-19 pandemic by setting up therapy sessions, leave off duty to recuperate, and creating a positive environment where the HCW is assured of being taken care of should he fall ill. It is especially important to promote mental well-being in healthcare workers exposed to COVID-19 daily especially with women, nurses, and frontline workers (Ministry of Health and Family Welfare, Government of India, 2020). COVID-19 Traumatic stress disorder is the new terminology for the Surgeons performing surgery on the COVID-19 patients in the operation theatre (Majeed et al., 2020).

6. Good infection control measures with proper sterilization can reduce the risk of transmission of infections in healthcare settings. The hospital clinic and the floor should be cleaned with sodium hypochlorite. The recommendation of 0.1% (1,000 ppm) in the context of COVID-19 is a conservative concentration that will inactivate most other pathogens that may be present in the healthcare setting. However, for blood and body fluids large spills (i.e. more than about 10 mL) a concentration of 0.5% (5,000 ppm) is recommended.

7. The operation theatre should have a negative pressure airflow environment to prevent the risk of viral spread when managing a patient infected with COVID-19. High-risk aerosol-generating procedures, such as intubation, extubation or endoscopy should not be performed in a positive pressure environment (Bhattacharya, 2020)

8. As compared to the general population, doctors and healthcare workers are exposed to a high viral load due to long hours of continuous work in the hospital environment making the COVID-19 infection more serious and lethal. The system in the hospital should be such that high viral load can be minimized. WHO has called for respecting the rights to decent working conditions of HCWs to prevent them from suffering from burnout during this ongoing pandemic (Bhattacharya, 2020).

9. Aged and old physicians should avoid being frontline workers with COVID-19 patients (Gupta et al., 2020).

10. Even though scientific medical journals are considered as the best evidence to update knowledge on COVID-19, it was seen that 59.7% of Jordanian doctors believe that officials are a trustful source,

which reflects an adequate mutual trust between hospital administrators and the doctors serving in the frontline. Therefore, it is the duty of administrators to guide all staff especially the housekeeping, ward helpers and trainees so that infection among them be minimised. A total of 40% of medical information shared on social media were fake, and so all information has to be adequately whetted before being accepted (Suleiman et al., 2020).

As the ongoing world war against coronavirus, it is especially important to maintain a fit and robust army of medical health professionals to overcome the enemy from all sides. A team of motivated and dedicated healthcare workers are of paramount importance to fight the pandemic. It is very important to frame a proper guideline for all medical professionals to decrease the incidence of healthcare workers contracting COVID-19 during work. In a COVID-19 HCW surveillance programme at University Malaya Medical Centre (UMMC) Kuala Lumpur, it was concluded that risk-based assessment, symptom surveillance and its subsequent management are the most important components in a COVID-19 surveillance programme to safeguard the health of the HCW (Wan et al., 2020).

CONCLUSION

As most COVID-19 infections were transmitted by patients in a hospital environment, innumerable medical workers who encountered the infected personnel had to be quarantined and many hospitals had to be fully or partially closed down. Death of healthcare workers is a matter of serious concern which must be addressed by the regulatory authorities and proper guideline must come out for the safety of the healthcare workers who are facing the brunt of the attack during the battle with a virus which neither has any effective medical treatment nor any vaccine for protection till today.

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SHORT COMMUNICATION

Taiwan's Response to COVID-19: A Success Story

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ABSTRACT

Since the COVID-19 pandemic, Taiwan reported a total of 776 cases of COVID-19 (Dong et al., 2020) in comparison with its neighbouring countries, Japan and the Philippines which reported 210,769 and 465,724 cases of COVID-19 respectively, until 24 December 2020. Looking at the curve of the COVID-19 pandemic among various countries, Taiwan had indeed distinguished herself and stood out considering her well-contained COVID-19 infection despite it being a widespread infection in other countries.

INTRODUCTION

The positive outcome of the Taiwan government and citizens' responses showed that the containment of an easily transmissible respiratory infection is possible despite its proximity to China, where the outbreak is first recognized in Wuhan. Some factors enable Taiwan to be able to control the transmission of the COVID-19 effectively (Ministry of Health and Welfare, 2020).

The establishment of a centralized system is one of the factors of Taiwan being a pioneer in combating COVID-19 (Ministry of Health and Welfare, 2020). Taiwan had accumulated beneficial and real experience in working against easily spread respiratory infections after the severe acute respiratory syndrome (SARS) outbreak in 2013. After the pandemic, the Taiwan government amended the Communicable Disease Control Act

which specifies the necessity to coordinate all resources and manpower as a whole, leading to the establishment of the Central Epidemic Command Center (CECC) in 2015. The National Health Command Center (NHCC) is a unified central command system that includes the Central Epidemic Command Center (CECC), the Biological Pathogen Disaster Command Center (BPDCC), the Counter-Bioterrorism Command Center and the Central Medical Emergency Operations Center. NHCC addresses public health emergency and serves as a centralized and comprehensive platform for preventing major epidemics (Taiwan Centers for Disease Control, 2018).

In addition, Taiwan's timely border control helped in containing the spread of COVID-19. Starting from 31 December 2019, Taiwan began to conduct on-board health checks of passengers on direct flights from Wuhan. The entry of Chinese nationals from the outbreak regions in China was banned starting in January 2020 and entry of all Chinese nationals from China, Hong Kong, and Macao was all banned in February 2020 (Ministry of Health and Welfare, 2020). Other than China, Taiwan monitored the international COVID-19 situation and adjusted the travel notice for each country accordingly. To effectively track the high-risk groups of people, the National Health Insurance Administration (NHIA) integrated patients' past 14-day travel history from National Immigration Agency (Wang et al., 2020). Other than allowing identification of possible infection in an individual, it prompts the healthcare personnel to act quickly in detecting the suspected cases of COVID-10 infection.

On top of that, another marked feature of the Taiwan response was appropriate and timely resource allocation. The CECC sustained mass masking in Taiwan under a name-based mask distribution system to ensure every citizen has a fair and adequate supply of face masks (Lin et al., 2020). The widespread use of face masks prevents respiratory-droplet transmission of COVID-19 from one to another. Other than increasing the production of face masks using military personnel, the CECC also capped the price of masks to prevent the possible spiking in price due to the inevitable high demands at the time of pandemic (Wang et al., 2020).

The success story of Taiwan in mitigating COVID-19 infection cannot be completed without citizens who cooperate and comply with the government policy. Retaining the experience from SARS 2013, both the government and the citizens are aware of the consequences of the possible turmoil with the pandemic. Most of the citizens understand the importance of wearing face masks, washing their hands and acting accordingly with their role in preventing themselves from being a breach in infection control. The high awareness and respected etiquette of the Taiwan citizens in facing the COVID-19 pandemic can be evident when the citizens themselves started 'I'm okay, you go first' activity, showing courtesy when buying face masks when they leave the face masks for susceptible people such as elderly and people with co-morbid conditions (Ministry of Health and Welfare, 2020, 5 June). Other than the cooperation from the citizens, the Taiwan government also mandated the citizens to wear masks in public areas in which maintaining social distances are relatively less plausible such as public transportation, healthcare centres, education centres, recreational areas and so on. Otherwise, those who are not complying with the laws would be fined under the law enforcement from 3,000 New Taiwan Dollars (NT$) to 15,000 NT$ (equivalent to RM433 and RM2,164) (Taiwan Centers for Disease Control, 2020, 11 December).

CONCLUSION

The success of Taiwan effective infection control of COVID-19 can be attributed to the Taiwan government's vigilance and promptness in action and the citizens' virtue.

From the announcement of the COVID-19 pandemic in December 2020, Taiwan had not announced movement control and yet the infection is well-controlled in Taiwan. Other than increasing the healthcare burden not only in term of physical health and also mental health, the COVID-19 pandemic had also tremendously affected the economy worldwide. The prompt and effective regulations and actions by the Taiwan government in combating COVID-19 can be the concrete and constructive guidance for other countries in mitigating the infection, and control and contain the spreading of upcoming communicable disease in the future.

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