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- How should front-line general practitioners use personal protective equipment (PPE)?
- Barriers to implementing a national health screening program for men in Malaysia: An online survey of healthcare providers
- Lifestyle factors associated with cardiovascular risk among healthcare workers from the tertiary hospitals in Sarawak



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We have to write and share valid and reliable information on COVID-19

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The world has been grappling with the outbreak of COVID-19 for the past few months. The coronavirus, which was first reported in Wuhan, China has now spread to 82 countries and infected more than 95000 individuals.¹ As of March 5, 2020, there have been 55 confirmed cases of COVID-19 in Malaysia.¹

This epidemic has required a strong collaborative response from those working in primary care, emergency services, infectious disease, public health, internal medicine and pediatrics. Guidelines issued by the Ministry of Health were constantly updated with new case definitions changing by the day with reports of outbreaks in different countries.¹ There was a need for rapid sharing of information throughout the health care system that was unprecedented. An official website to disseminate guidelines was set up quickly by the Ministry of Health.¹ Yet, despite all these efforts, viral sharing of misinformation occurred even more rapidly through social media and group text messaging.² An infected patient that was admitted in a private hospital also highlighted existing gaps in private-public dissemination that was subsequently addressed.³

In the wake of this pandemic, the health care practitioners and authorities have come to realize the need for valid and reliable information. We are not known to be a nation of readers. The practice of evidence based medicine is still limited.⁴ Yet, we are all now avidly reading the latest papers regarding the outbreak. Such reports and studies are shared widely on group text messages and read even by the public.

We, the COVID 19 Malaysian writing group, believe that all the cases and responses to the infection in Malaysia should be reported, studied and published in order to improve our knowledge and response to such infections. It is only by transparent sharing and dissemination, that proper strategies can be developed and tested, and policy installed. Reporting would also improve public awareness and dispel myths. Let us continue to work together to overcome this pandemic.

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How should front-line general practitioners use personal protective equipment (PPE)?

Ambigapathy S, Rajahram GS, Shamsudin UK, Khoo EM, Cheah WK, Peariasamy KM, Goh PP, Khor SK

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Abstract

The COVID-19 outbreak continues to evolve with the number of cases increasing in Malaysia, placing a significant burden on general practitioners (GPs) to assess and manage suspected cases. GPs must be well equipped with knowledge to set up their clinics, use Personal Protective Equipment (PPE) appropriately, adopt standard protocols on triaging and referrals, as well as educate patients about PPE. The correct use of PPE will help GPs balance between personal safety and appropriate levels of public concern.

Introduction

The COVID-19 outbreak continues to evolve, and there is a possibility that larger-scale community outbreaks could occur across Malaysia, placing a significant burden on general practitioners (GPs) to assess suspected cases. However, as the risk associated with COVID-19 infection continues to evolve, GPs must act consistently with updated guidance on the appropriate use of personal protective equipment (PPE) such as masks, gloves, gowns and eye protectors.

This commentary focuses on the appropriate use of PPE for front line GPs to complement official guidance on its use.

PPE is only one part of risk mitigation for GPs

In GP clinics, a hierarchy of control measures should be used to mitigate risk of infectious diseases.¹ PPE is an important part of a basket of solutions and should be considered as supplementing but not substituting other measures such as administrative, environmental and engineering controls. Administrative controls include ensuring appropriate infrastructure, clear infection prevention and control policies, facilitated access to laboratory testing, appropriate triage and placement of patients, and adequate staff-to-patient ratios.²

In parallel, environmental and engineering controls reduce contamination of surfaces and inanimate objects, and hence the spread of pathogens. Where possible, clinics must

provide adequate space of at least 1 meter to be maintained between all persons, and ensure that well-ventilated isolation rooms are available for patients with suspected or confirmed disease.¹

The use of PPE may be seen as cumbersome, nonetheless, GPs must choose the right type of PPE, and be knowledgeable in wearing, removing and disposing used PPE. However, in an outbreak, PPE alone is not a magic solution, and other measures including good hand hygiene and social distancing should be prioritised.

How should GPs receive information about PPE

GPs must perform risk assessments to determine the most suitable combination of PPEs for their individual clinics. As the situation evolves, GPs need to be aware of and adhere to the latest updated guidelines on the use of PPE from the COVID-19 Management Guideline by Ministry of Health Malaysia (currently Version 4.0).³

There are several types of PPEs manufactured with different standards and methods for donning, removing and disposal of the PPE. It is advisable for GPs to follow the manufacturers' recommendations and complement it with the recommendations from the MOH.

Other sources of information for PPE and PPE quality assurance standards come from the Standards & Industrial Research Institute of Malaysia (SIRIM) and the Department of Occupational Safety and Health (DOSH) under the Ministry of Human Resources.⁴

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Malaysia**How should GPs set-up their clinics and use PPE**

At the entrance of the clinic, clear signage such as posters and visual alerts in local languages should be placed to inform patients who fall under the category of patients under investigation (PUI) and ensure that they notify the health personnel at triage counters or receptions.

PUI are defined as patients who have fever or acute respiratory infection (sudden onset with at least one of the following: shortness of breath, cough or sore throat) and have travelled to or reside in affected countries in the 14 days prior to illness, or have close contact with a confirmed case of COVID-19 in the 14 days before onset of illness.³

In addition, healthcare personnel at triage counters or receptions need to undertake risk assessment of all patients and visitors to identify possible PUI. This risk assessment is based on the MOH guidelines. Healthcare personnel should wear a face mask and regularly use an antiseptic hand rub or alcohol-based hand sanitizer at the counter.

Once a PUI is identified, they must be placed in a special isolation room (where available) or designated waiting area. This area should be well ventilated allowing staff and other patients to be placed 1 meter apart, free of clutter and with minimal fixtures. It should be equipped with a no-touch bin to discard used tissue and hand sanitizer dispensers.

In most instances, a physical examination is not required prior to referral to a designated hospital. However, if a physical examination for a PUI is warranted, healthcare personnel must wear N95 masks (fit checked) or surgical masks with face shield or goggle, standard isolation gown (fluid repellent long-sleeved gown) and gloves. There should be strict adherence to frequent and strict hand hygiene when examining patients in the isolation room.

All healthcare personnel must be skilled in the process of donning and doffing PPE.⁵ A video link to these procedures can be found on the official social media page of the Director-General of Health of Malaysia.⁶

After examining patients, cleaning and disinfection according to standard procedures must be followed. Waste management, packing

and transporting patient-care equipment, linen and laundry must be performed according to standard infection control procedures as described by the Department of Environment, Malaysia.⁷

Moreover, to avoid physical interaction with suspected COVID-19 cases, clinics can consider rescheduling routine appointments or ensure appropriate measures are taken to isolate high-risk patients.

Triaging and Referrals

All PUI should be offered hand sanitizer and surgical masks, provided the patient is not tachypnoeic or hypoxic. If the patient is unable to tolerate these, the patient is advised to cover their nose and mouth during coughing and sneezing with tissue. Patients, especially foreigners, must be asked for their Health Alert Cards, which are given at the point of entry into Malaysia if they have travelled from affected countries.

All PUIs should be referred to the nearest MOH hospitals accepting patients. This list is regularly updated on the MOH website and the COVID-19 Management Guidelines. Each PUI must be discussed with the Infectious Disease (ID) Physician/Physician at the designated hospital before transfer.

PUI must never be allowed go to MOH designated hospitals on any form of public transport or private hire vehicles. GPs can liaise with the local District Health Office or designated hospital emergency department to arrange transport for these patients. They must wear a face mask during the journey. The ID Physician or Physician will be able to guide the attending GPs further.

Educating Patients about PPE: How and What?

Currently, there is no evidence that those without respiratory symptoms should wear face masks. If a patient has cough, they are advised to practise good cough etiquette, which includes covering the nose and mouth with tissue whenever coughing or sneezing, to throw the tissue into proper trash bins immediately after use and to wash their hands with soap and water or use hand sanitizer frequently. If a tissue is not available, they are advised to use the fold of their elbow. These patients are also advised to wear a face mask.

PUIs who do not fulfil criteria for admission to hospital will be placed under home surveillance and be monitored daily by the district health office for 14 days. During this time they are strictly prohibited from leaving their home. Other measures prescribed are available in the home surveillance assessment tool.³

GPs should also provide patient and family with ongoing support, education and monitoring. This can be done by using Health Alert Cards with information useful for patient and family and counselling on any concerns they may have. This Health Alert Card can be easily obtained from the COVID-19 Management Guidelines 2020 of Ministry of Health Malaysia.³ GPs can make photocopies of these cards to be given to patients who come to their clinics.

Public Health and Public Policy Implications of PPE

GPs need to train and retrain all staff on the safe use of PPEs. Where possible, GPs must ensure that there is an adequate supply of PPE for their clinics, without tipping over into hoarding or inappropriate stockpiling. GPs must consider the psychological well-being and fatigue of their clinic staff.

The long-term use of PPE can lead to complacency and carelessness, or a false sense of security about other important measures of infection control, or prolonged stress or pressure from fear or other negative emotions from either the outbreak itself or from PPE use.

District Health Offices are important resources for information, PPE supply and a Psychological First Aid (PFA) unit. The PFA unit includes a Family Medicine Specialist together with Medical Doctors who are also trained to provide counselling for those who need support with mental and emotional wellbeing.

Malaysia's national preparedness, manufacturing capacity and stockpiling of PPE requires a relook after this outbreak is over. The health system must address questions on the equitable distribution of limited resources, such as whether the first face-masks go to front line professionals or the sickest patients.

Another public policy question is to determine the rights and duties of front line professionals during outbreaks where little is known about the disease. PPEs are a form of risk mitigation, but governments and the health system equally must provide adequate information, supplies and risk communications for PPE. This unwritten social contract between professionals and the government must be strengthened after this outbreak.

GPs have a role in helping to reassure appropriate levels of public concern and vigilance, and PPEs are very visual reminders of the severity of the threat. Therefore, GPs must continuously update themselves with the right information to deliver the right level of concern to the public, especially during outbreaks whose peak, duration and severity are unpredictable and unknown.

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Barriers to implementing a national health screening program for men in Malaysia: An online survey of healthcare providers

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Abstract

Introduction: This study aimed to determine the views and practices of healthcare providers and barriers they encountered when implementing the national health screening program for men in a public primary care setting in Malaysia.

Methods: An online survey was conducted among healthcare providers across public health clinics in Malaysia. All family medicine specialists, medical officers, nurses and assistant medical officers involved in the screening program for adult men were invited to answer a 51-item questionnaire via email or WhatsApp. The questionnaire comprised five sections: participants' socio-demographic information, current screening practices, barriers and facilitators to using the screening tool, and views on the content and format of the screening tool.

Results: A total of 231 healthcare providers from 129 health clinics participated in this survey. Among them, 37.44% perceived the implementation of the screening program as a "top-down decision." Although 37.44% found the screening tool for adult men "useful," some felt that it was "time consuming" to fill out (38.2%) and "lengthy" (28.3%). In addition, 'adult men refuse to answer' (24.1%) was cited as the most common patient-related barrier.

Conclusions: This study provided useful insights into the challenges encountered by the public healthcare providers when implementing a national screening program for men. The screening tool for adult men should be revised to make it more user-friendly. Further studies should explore the reasons why men were reluctant to participate in health screenings, thus enhancing the implementation of screening programs in primary care.

Introduction

Men's health is an important but neglected issue. Regional and national men's health reports have consistently reported that the average life expectancy for men is shorter than that for women and that they suffer higher mortality and morbidity across various diseases. More men in the productive age group (15–45 years) die compared to women in the same age group. Similarly, in Malaysia, a multi-ethnic developing country where men live 5 years less than women,¹ men have poorer health² and a higher mortality rate compared to women.³ Cardiovascular disease (CVD) is the most common male-predominant cause of death⁴ and can be prevented with early interventions. Health screenings are one of the effective strategies for identifying those individuals in need of intervention. For example, a health screening program for CVD has been found to be useful in detecting CVD-related health

conditions and can effectively reduce the CVD mortality rate.⁵ Similarly, colorectal cancer screening, done through a fecal occult blood test, sigmoidoscopy and colonoscopy, has been shown to decrease mortality due to colorectal cancer.⁶

However, unlike the case for women and children, there are only limited healthcare services that cater specifically to the health needs of men.⁷ Men are managed under general health services, where healthcare providers tend to prioritize disease-based management over gender-related health issues. In addition, health services are generally less male-friendly, and healthcare providers have less exposure to specific training for men's health compared to women and children's health.^{4,8} Furthermore, studies have shown that men are less likely to undergo health screening than women^{9,10} due to poor health-seeking behavior, lack of health knowledge and masculine attitudes.¹¹ Globally, there is

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a lack of men's health policies. To date, only Ireland¹², Australia¹³ and Brazil¹⁴ have established men's health policies. In Malaysia, despite the increasing awareness of the importance of men's health, there is inadequate attention given to policy development for providing holistic, culturally appropriate and gender-sensitive care for men.⁴ Without a health policy for men, the implementation of men's health services and programs will be fragmented and suboptimal. The current system, healthcare providers and male-related barriers create significant challenges for improving men's health in Malaysia.

In 2008, the Ministry of Health introduced the Integrated Health Service to provide comprehensive health services coverage to the public in order to improve the health of population and reduce the burden of disease in Malaysia.³ The Health Status Screening Form (Borang Saringan Status Kesihatan, BSSK) was one of the screening tools implemented across all public health clinics to improve the health of different target groups based on their age and gender, including youths, adult women, adult men and the elderly. It is filled out annually or based on individual risk profiles. The screening target is set at 5% of the total population covered by each health clinic. Screening for adult men using the BSSK for adult men is one of the strategies being used to improve men's health in Malaysia. However, there have been significant changes in the recommended screening for men since the BSSK for adult men was developed. For example, the latest edition of the BSSK for adult men (2014) includes screening for symptoms of prostate and testicular cancers, while the Malaysian Consensus Guide to Adult Health Screening for General Population Attending Primary Care Clinics, published in 2015, recommends against prostate cancer screening and does not recommend testicular examinations for testicular cancer screening. Currently, the BSSK for adult men includes 10 sections: biodata, medical/surgical history, current signs and symptoms, dietary habits, physical activity, drug and substance use, abuse (physical, emotional and sexual), mental health, a biometric assessment and a physical examination. The form is 8 pages long. It is debatable whether some assessments, such as conducting a complete physical examination, should be performed. Apart from these issues, the lack of continuity of care and lack of time in the health clinics make the implementation of screening for men even more challenging.¹⁵ Such shortcomings may affect the uptake of the BSSK for an adult men's

health screening program on the part of both healthcare providers and men.

Therefore, this study aims to determine the views of, and current practices in, screening for men, specifically the use of the BSSK for adult men among healthcare providers in public health clinics, with the intention of improving screening for men in the primary care setting in Malaysia.

Methods

This cross-sectional study used the online survey method to determine the views of, and practices in, implementing the BSSK for adult men's health screening among healthcare providers in public health clinics across Malaysia. This study used the mixed-method design, in which a five-level Likert scale and free text response were employed. The inclusion criteria for the study participants were healthcare providers working in a Ministry of Health (MOH) public health clinics that have implemented a screening program using the BSSK for adult men. These included family medicine specialists (FMSs), medical officers, nurses and assistant medical officers who had experience using the BSSK for adult men. The list of FMSs and their contact details were obtained from the Family Health Development Division, Ministry of Health. The universal sampling method was used, i.e., all FMSs were invited to participate in the study. The link to the online survey (Google Form) was sent to the FMSs, who then circulated the link via emails and WhatsApp to the other healthcare providers working in the health clinics under their supervision. There was no sampling frame for the other healthcare providers (medical officers, nurses and assistant medical officers) who were invited to participate by the FMSs. The survey was conducted from June to July 2017. Two reminders were sent to all participants, spaced two weeks apart.

This study was approved by the Medical Research & Ethics Committee, Ministry of Health Malaysia (NMRR-17-711-35265). No personal, identifiable information was collected through the survey. Prior to answering the questionnaire, the participants were instructed to read the information sheet and provide informed consent by ticking the checkbox provided for this purpose. All answers to the questionnaires were anonymized to protect the confidentiality of the participants. The data were stored and analyzed in a designated password-protected

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laptop which could only be accessed by the principal investigator and the research assistant. The questionnaire was developed by the research team based on group discussions and a literature review. It contained five sections: participant's sociodemographic information, current screening practices, barriers and facilitators to using the BSSK for adult men, views on its content and format as well as recommendations to improve its use in health clinics. A five-level Likert scale ('totally agree,' 'agree,' 'neither agree nor disagree,' 'disagree' and 'totally disagree') was used to assess the views on the content and format of the BSSK for adult men; these options were later re-categorized into "agree" and "disagree" (Table 5). Two open-ended questions were also asked in the barrier and facilitator section to explore the respondents' barriers and facilitators to using the BSSK in their health clinics. The questionnaire underwent content and face validation with 12 respondents, i.e., FMSs (n=5), medical officers (n=2), nurses (n=3) and assistant medical officers (n=2). The validation phase resulted in the inclusion of additional items, which were the names and types of the health clinics where the respondents worked.

Descriptive analyses were performed for all study variables. Categorical data were described with proportions, and normally distributed continuous data were described with their means (and standard deviations). The screening practice was treated as the dependent variable, while the health clinic and participant information served as the independent variables. Free-text responses

to the questions "What is your reason for using the BSSK to screen adult men?" and "What is your reason for not using the BSSK to screen adult men?" were analyzed by four researchers independently using a thematic approach then categorized via content analysis (Table 4). For variables with incomplete responses, the number of responses available for the analyses are reported in the parentheses.

Results:*Response rates*

A total of 231 healthcare providers participated in this study, of whom 83 were FMSs and 148 were other healthcare providers (medical officers, nurses, assistant medical officers) (Table 1). The response rate of the FMSs was 39.9% (83/208). A total of 129 health clinics were represented in this survey (Table 2).

Participant and health clinic profiles

The majority of the respondents were male (58.4%). The respondents had a mean age of 37.9 (+8.79) years, 35.9% of them were FMSs and had spent a mean of 7.55 (+6.59) years working in a health clinic. Most of the health clinics were located in the states of Selangor (16.3%), Sarawak (14.0%) and Pahang (12.4%), while 64.3% of the clinics were urban and 27.1% were type 3 health clinics with 301 to 500 patient attendances per day.

Table 1: Sociodemographic profile of the respondents

Variable	Frequency (%) (n=231)	Mean (SD) (min-max)
<i>Gender</i>		
Male	135 (58.4)	-
Female	96 (41.6)	-
<i>Position</i>		
Family medicine specialist	83 (35.9)	-
Medical officer	56 (24.2)	-
Assistant medical officer	59 (25.5)	-
Nurse	27 (11.7)	-
Community nurse	6 (2.6)	-
Age (years) (n=198)	-	37 (8.79) (23-59)
Years working in a health clinic (n=229)	-	5 (6.59) (0-37)

Table 2: Profile of health clinics

Variable	Frequency (%) (n=129)
<i>Health clinic location by state</i>	
Selangor	21 (16.3)
Sarawak	18 (14.0)
Pahang	16 (12.4)
Sabah	12 (9.3)
Perak	11 (8.5)
Penang	8 (6.2)
Negeri Sembilan	8 (6.2)
Kuala Lumpur	8 (6.2)
Johor	8 (6.2)
Terengganu	5 (3.9)
Kelantan	4 (3.1)
Perlis	3 (2.3)
Kedah	3 (2.3)
Malacca	3 (2.3)
Putrajaya	1 (0.8)
Labuan	0 (0.0)
<i>Setting of health clinic</i>	
Urban	83 (64.3)
Rural	46 (35.7)
<i>Type of health clinic</i>	
Type 1: More than 800 patient attendances per day	10 (7.8)
Type 2: 501-800 patient attendances per day	23 (17.8)
Type 3: 301 - 500 patient attendances per day	35 (27.1)
Type 4: 151- 300 patient attendances per day	31 (24.0)
Type 5: 51- 150 patient attendances per day	26 (20.2)
Type 6: 50 or less patient attendances per day	4 (3.1)

Practices in health screening for men

Table 3 shows the health screening practices for men in the public health clinics. On average, 32 adult men were screened with the BSSK for adult men per month. The most common selection criteria for screening men using the BSSK for adult men were: adult men coming in for screening (77.6%), followed by adult men seeing a doctor for an acute illness (60.1%) and adult male government workers 40 years old and above coming in for routine health screening (58.8%).

Table 3: Health screening practices used for men in health clinics

Variable	Frequency (%) (n=231)	Mean (SD)
<i>Estimated average number of people screened using BSSK per month by population category:</i>		
Adult men (n=225)	-	32 (45.76)
Adult woman (n=223)	-	32 (48.02)
Elderly (n=224)	-	19 (36.51)
Youth (n=223)	-	23 (35.77)
<i>Selection of participants for BSSK screening (can choose multiple answers): (n=228)</i>		
Adult men coming in for screening	177 (77.6)	-
Adult men seeing a doctor for an acute illness	137 (60.1)	-
Adult men (government servant 40 years old and above) coming in for routine screening	134 (58.8)	-
Adult men who accompany their family/friends to see a doctor	127 (55.7)	-
Adult men seeing a doctor for chronic disease follow- up	107 (46.9)	-
Time taken to complete BSSK for adult men per person (minutes): (n=228)	-	15.7 (9.02)

Table 3: Health screening practices used for men in health clinics

Variable	Frequency (%) (n=231)	Mean (SD)
Experience in using the BSSK (years): (n=219)	-	3.8 (2.59)
<i>Have you undergone formal training for BSSK (adult men): (n=231)</i>		
Yes	53 (22.9)	-
<i>Do you perform screening for adult men without using BSSK: (n=231)</i>		
Yes	121 (52.4)	-
<i>How many person(s) is/are in charge of implementing BSSK in your health clinic: (n=120)</i>		
1	10 (8.3)	-
2	29 (24.2)	-
3	16 (13.3)	-
4	14 (11.7)	-
5	4 (3.3)	-
More than 5	47 (39.2)	-

Barriers and facilitators to using BSSK for adult men

There were 219 respondents who provided comments about the reasons that they perform the BSSK for adult men in the free-text section. The most common reasons were: 'BSSK is a top- down decision' (37.44%), 'BSSK helps to facilitate screening in adult men' (37.44%) and 'BSSK is useful for improving the health status of adult men' (25.11%)(Table 4). When considering the reasons for not using the BSSK for adult men, the barriers were divided into three domains (tool, manpower and patient factors) and the most common barriers listed by the 191 respondents were: 'it is time consuming' (38.2%), 'it is too lengthy' (28.3%) and 'adult men refuse to answer' (24.1%).

Table 4: Barriers and facilitators to using BSSK for adult men in health clinics

Variable	Frequency (%)
<i>Reason for using the BSSK (n=219)</i>	
BSSK is a top-down decision	82 (37.44)
BSSK helps to facilitate screening	82 (37.44)
BSSK is useful for improving the health status of men	55 (25.11)
<i>Reasons for NOT using the BSSK (n=191)</i>	
Time consuming (Tool)	73 (38.2)
Too lengthy (Tool)	54 (28.3)
Men refuse to answer (Patient)	46 (24.1)
Time constraints (Manpower)	17 (8.9)
Lack of manpower (Manpower)	15 (7.9)
Tedious for healthcare providers (Tool)	13 (6.8)
The BSSK form is complicated (Tool)	13 (6.8)
Heavy workload (Manpower)	10 (5.2)
Patient has low education (Patient)	5 (2.6)
Answers provided by men are not truthful (Patient)	5 (2.6)
Questions are not relevant (Tool)	4 (2.1)
Insufficient BSSK forms available at time of screening (Tool)	4 (2.1)

Views on BSSK with regards to men's health screening

The majority of the healthcare providers felt that 'it takes too long' for them to complete the BSSK for adult men (87.4%) and that 'men often do not want to be screened' (81.8%). In addition, three-quarters of the participants suggested translating the BSSK for adult men into more languages, such as English and Tamil (74.5%). Although the majority considered the BSSK for adult men to be useful (65.8%), they felt that it covered too many topics (59.7%). When comparing doctors and non-doctors, there were differences in their views, including on the statements: "Men often do not want to be screened" (77.0% vs 89.1%, $p=0.019$), "The BSSK should be translated into more languages" (73.5% vs 28.6%, $p=0.012$), "There are inadequate efforts to promote health screening programs for men at my health clinic" (64.5% vs 44.6%, $p=0.003$), "BSSK for adult men is based on scientific evidence" (35.3% vs 54.3%, $p=0.004$) and "BSSK for adult men is easy to use" (37.4% vs 51.1%, $p=0.040$).

Table 5: Views on using the BSSK to screen adult men (agree and totally agree)

Variables	Frequency (%)			P values
	Total (n=231)	Doctors (n=139)	Non-doctors (n=92)	
It takes too long for me to complete the BSSK for adult men	202 (87.4)	123 (88.5)	79 (85.9)	0.556
Men often do not want to be screened	189 (81.8)	107 (77.0)	82 (89.1)	0.019
The BSSK should be translated into more languages	172 (74.5)	105 (75.5)	67 (72.8)	0.643
There is insufficient space in my health clinic to perform health screening for adult men	133 (57.6)	78 (56.1)	55 (59.8)	0.581
There are inadequate efforts to promote health screening programs for men at my health clinic	130 (56.3)	89 (64.5)	41 (44.6)	0.003
I am too busy to perform health screening for adult men	96 (41.6)	59 (42.4)	37 (40.2)	0.737
There are insufficient BSSK forms for adult men at my health clinic	65 (28.1)	40 (28.8)	25 (27.2)	0.791
I am not confident in using the BSSK to perform health screening	60 (26.0)	34 (24.5)	26 (28.3)	0.519
<i>What do you think about the topics covered in the BSSK for men?</i>				
The number of topics covered in the BSSK for men is				
Too great	138 (59.7)	84 (60.4)	54 (58.7)	0.645
Adequate	88 (38.1)	53 (38.1)	35 (38.0)	
Too small	5 (2.2)	2 (1.4)	3 (3.3)	
The BSSK for adult men is based on scientific evidence	99 (42.9)	49 (35.3)	50 (54.3)	0.004
The BSSK for adult men is easy to use	99 (42.9)	52 (37.4)	47 (51.1)	0.040
The BSSK for adult men is useful	152 (65.8)	86 (61.9)	66 (71.7)	0.122

Discussion

This study is the first to review the national screening program for men in Malaysia since it was implemented in the public health clinics in 2008. Despite recognizing the importance of screening in men, the healthcare providers in the health clinics faced challenges in implementing the screening program. This study found that the length and complexity of the screening instrument were the major barriers to conducting

health screening for men in the health clinics. The BSSK for adult men form is an 8-page booklet with 13 sections, including sections on a self-administered symptom list for the men as well as healthcare provider-administered history taking, physical examinations and investigations, making the tool lengthy and complicated to use. One way of making the screening tool more user-friendly is to use a simplified screening form or information and communication technology such as mobile apps or the web. A study by Teo

et al.¹⁶ found that men wanted a mobile app that contain personalized and credible information to guide them in making decision about health screening due to the convenience and privacy of such an app. In the context of the busy public primary care setting, utilizing a screening tool via a mobile app before seeing the healthcare provider is a feasible and possibly cost-effective option.

Another common barrier shown in this study is men's refusal to use the screening tool. While refusals could be due to the tedious process of using a long questionnaire such as the BSSK for adult men, men have been found to be reluctant to engage in preventive health.⁸ A systematic review by Teo et al.⁹ identified 'masculinity' as one of the important factors which impedes screening in men, i.e., they are more likely to take risks and perceive of themselves as invincible, especially when they are young. In addition, while men tend to be fearful of getting a disease and suffering from its consequences, they also have a lower risk perception compared to women they and often refuse screening because they do not experience symptoms and hence consider themselves to be healthy.¹⁷ This barrier could be overcome by increasing the knowledge and awareness of men.¹⁸

Like most interventions, the BSSK for adult men faces system barriers such as time constraints, lack of manpower, and heavy clinical workloads.¹⁹ In Malaysia, an audit was conducted in a primary healthcare clinic in Gombak District, Selangor. The result showed that the average primary care consultation time in a health centre is 18.21 minutes and 41.8% of patients saw the doctor for 10–20 minutes.²⁰ It would be challenging for the Malaysian primary care workers to stretch consultations by 15 minutes to administer a screening questionnaire. The same result was found for the UK National Health Service (NHS) Health Checks program, i.e., time constraints and workload were cited as the main barriers in implementation, despite it being much shorter (focuses on cardiovascular disease risks and events only) than the BSSK.^{21,22} One way of 'expediting' the delivery of a screening tool is to provide adequate support in terms of training and resources.¹⁹ Only one-quarter of our study respondents had undergone formal training for BSSK administration. The healthcare providers need to be trained how to use the tool with their patients effectively and efficiently. Another way to improve the delivery of health screening is to incorporate technology into the process. For instance, men can use a

risk assessment tool to identify their health risks before seeing the healthcare provider, who will then suggest the list of screening tests to be done based on this latest evidence. Such a process could be enhanced further by incorporating an algorithm into a screening platform to generate a summary of the risks and screening tests needed based on the risk assessment. For example, the NHS has developed the Heart Age Test and encourages the public to use it before seeing their doctor.²³ Such tests may save time and reduce variations in the screening process, thus enhancing the shared decision-making process.

One of the strengths of this study is that it obtained responses from the whole of Malaysia, with fair representation from different geographical regions. In addition, it identified process and structural barriers to men's health screening in public primary care settings. Furthermore, all healthcare providers involved in implementing this screening program, including doctors, assistant medical officers and nurses, were included in this study. The challenges identified in this study will help policy makers to revise and improve the screening program and its implementation.

There are several limitations to this study due to the difficulty in obtaining an accurate sampling frame for this study. We realized that there was no comprehensive way to recruit participants because there was no complete database of the staff working in the health clinics across the country. The most reliable database was the FMS email list which we obtained from the Ministry of Health. Even within this list, a number of email addresses had not been updated. In addition, some FMSs might consider this survey irrelevant to them, as the screening is usually done by nurses and assistant medical officers. This issue may have resulted in a low response rate from the FMSs and other healthcare providers (despite two reminders via email). Furthermore, one FMS could be in charge of more than one health clinic, resulting in difficulty in calculating the number of the health clinics that participated in this study. The nature of an online survey does not allow for in-depth exploration of the barriers and facilitators; a qualitative study has been planned in the next phase of this study to seek explanation of the findings from this survey. Another limitation was that this study only targeted screening for adult men. However, the national screening program also includes children, women and the elderly, and these specific programs will be assessed in the next phase of the study.

This study identified screening tools, patients and system factors as the major barriers for the implementation of the national health screening program for adult men in Malaysia. It highlighted the importance of having a simpler, user-friendly and evidence-based screening tool with a structured and efficient delivery pathway when implementing a screening program for men in the primary care setting. The findings from this study provide evidence for revising and improving the existing screening programs in order to ensure their successful implementation.

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Competing interests

None declared.

Ethical approval

This study was approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia (NMRR-17-711-35265).

How does this paper make a difference to general practice?

- Determines the barriers faced by general practitioners as they utilize a national health screening program.
- Provides evidence for policy makers to revise and improve screening programs in Malaysia.
- Serves as a platform for a phase two qualitative study to explore the barriers and proposed solutions in depth.
- Identifies opportunities to explore possible solutions and overcome the barriers for any national screening program in Malaysia.

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Lifestyle factors associated with cardiovascular risk among healthcare workers from the tertiary hospitals in Sarawak

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Abstract

Introduction: A cross-sectional study is used to evaluate the lifestyle factors associated with cardiovascular disease (CVD) risk among healthcare workers in tertiary hospitals in Sarawak, Malaysia.

Methods: A questionnaire-based survey using the Simple Lifestyle Indicator Questionnaire (SLIQ) was administered to, and anthropometric measurements were collected from, 494 healthcare workers.

Results: The mean age of the subjects was 32.4 ± 8.4 , with a range of 19 to 59 years. The subjects were from the allied health (45.5%), management and professional (25.1%) and executive (29.4%) fields. Overall, 47.4% of the subjects were of normal weight, 30.2% were overweight, 17.2% were obese and 5.2% were underweight. The mean number of working hours per week for the subjects was 47.6 ± 14.0 with the highest working hours found among the management and professional group, followed by the executive and allied health groups. Overall, 39.7% of the healthcare workers worked office hours, 36.6% worked within the shift system, 20.9% worked office hours and were on-call and the remaining 2.8% worked a mixture of office hours and shifts. Based on the SLIQ score, 58.1% were classified as at intermediate risk for CVD, 38.5% were in the healthy category and 3.4% were in the unhealthy category. Factors associated with a healthier lifestyle were being female (Odds Ratio [OR]= 12.1; CI= 3.2- 46.4), professional (mean score= 6.70), in the allied health group (mean score=7.33) and in the normal BMI group (OR= 9.3, CI= 1.8- 47.0).

Conclusion: In our study, healthcare workers had an intermediate risk of developing CVD in the future. Thus, there is a need to intervene in the lifestyle factors contributing to CVD.

Introduction

Cardiovascular disease (CVD) occurs when coronary arteries are clogged by plaque or atheroma in a process known as atherosclerosis.¹ CVD affects millions of lives across the world and is one of the leading causes of morbidity and mortality.¹ It was responsible for almost 30.0% of all reported mortality in the United Kingdom (UK) in 2011.¹ A significant reduction (40.0%) in mortality rates for individuals under 75 years old was reported in 2010 compared to 2001 due to the prevention and treatment of CVD over the past decade.¹ In Australia, CVD was the single leading cause of mortality and involved in more than 21,500 lives in the year 2011.² In Russia, a high prevalence of CVD risk factors were noted, especially among the working age population.³ The extremely high mortality rates from CVD were associated with psychosocial factors, alcohol abuse, smoking, dietary choices, hypertension, physical inactivity, obesity and hyperlipidaemia.³ The standard mortality rate from CVD in Russia was reported to be two to three times higher than those of other developed

countries.³ The increase in the adoption of the Western diet and sedentary lifestyles have caused the incidences of obesity to mushroom.³

In Taiwan, overweight and obese BMIs were independently associated with a higher prevalence of CVD risk factors.⁴ Non-medical workers had the highest prevalence of obesity (21.9%).⁴ Meanwhile, medical technicians were found to have the highest prevalence of all other risk factors for developing CVD.⁴ This study suggested that the association of BMI (overweight or obese) with CVD risk factors was dependent on two other factors (gender and age).⁴ Female healthcare workers who were overweight or obese had a higher prevalence of CVD risk factors compare to the same BMI groups of male healthcare workers.⁴ Overweight females in the younger age group were found to have significantly higher levels of CVD risk factors. In addition, for this group, age had less effect on the relationship between BMIs in the overweight or obese range and CVD risk factors.⁴

It has been reported that shift workers have

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less healthy lifestyles than non-shift workers.⁵ The factors involved include poor dietary intake, being more prone to smoke and being predisposed to an unhealthy BMI, i.e., being overweight.⁵ The majority of healthcare workers who were working in the shift system in Australia were nurses.⁵ Long working hours were found to increase the risk of developing acute myocardial infarction (AMI) in a case control-study of workplaces in Japan.⁶ Several studies since 1958 have suggested that the longer the duration of working hours, the higher the risk of CVD. Overtime work may be related to an increased risk of developing AMI. A twofold increase in risk was reported for working more than 60 hours per week as compared to 40 hours and below.⁷

There are multiple risk factors that contribute to the development of CVD.⁸ Modifiable risk factors include smoking; hyperlipidemia; hypertension; diabetes mellitus; being physically inactive, overweight or obese; depression and social isolation.⁸ As for the non-modifiable risk factors, generally, males have a higher propensity as compared to females in middle age, but post-menopausal hormonal changes predispose females to higher risks subsequently.⁸ Five cardiovascular risk factors involving lifestyle issues had been identified, namely, physical activity, diet, smoking, alcohol consumption and stress.⁸ Physical activity and diet modification play an important role in reducing CVD by improving long-term health, weight management, lowering high blood pressure and reducing blood glucose and cholesterol levels.⁸ It is recommended that moderate-intensity physical activity, which is defined as brisk walking, be performed for at least 30 minutes for three times a week.⁸ The Simple Lifestyle Indicator Questionnaire (SLIQ) was chosen for this study to determine the associations of modifiable cardiovascular disease risk factors with CVD based on relevant scores, as it is an easy tool to use.

A study in Malaysia by Hazmi et al. showed that 42% of 330 selected healthcare workers had at least one medical condition, such as dyslipidemia (30.8%), hypertension (14.3%) or diabetes mellitus (10.4%).⁹ Biochemical profiles were measured in this study, resulting in a mean fasting blood glucose of 5.8mmol/L $\pm$ 2.4 and elevated fasting total cholesterol of 5.5mmol/L $\pm$ 1.0.9 The mean systolic and diastolic blood pressures were 121.5 $\pm$ 14.0 mmHg and 76.5 $\pm$ 9.7 mmHg, respectively.⁹ In another study by Mohd Ghazali et al., the majority (68.4%) of healthcare workers had at least three CVD risk factors,

with hypercholesterolemia and obesity being the most common.¹⁰ The most common lifestyle risk factors were dietary intake (72.8%) and physical inactivity (41.3%).¹⁰

A study among 108 subjects consisting of physicians, nurses and medical school faculty members showed a mean body mass index (BMI) of 24.67 (standard deviation, SD=3.77).¹¹ More than a quarter (39.8%) were overweight or obese.¹¹ Only 19.4% out of 108 subjects reported exercising more than twice a week. More than half of the respondents (55.0%) did not consume vegetables, and 11.0% only occasionally consumed fruits.¹¹ More than half of them had severe or moderate life-related and work-related stress levels, which were reported by 61.1% and 63.9% of the respondents, respectively.¹¹ Only 1.8% were smokers, and underlying risk factors for CVD based on medical conditions were also reported (2.8% with a history of hypertension, 1.9% with a history of diabetes mellitus and 7.4% with hyperlipidemia).¹¹ It was also discovered that the emphasis on the control of CVD risk factors was lower among the physicians compared to the nurses and faculty members.¹¹

Our study was conducted among healthcare workers from the two tertiary hospitals in Sarawak in order to identify the lifestyle factors associated with the risk of CVD in this group. They are the front-liners in providing healthcare services; thus, identifying the risk factors for CVD among them is very crucial.

Methods**Study Setting**

The government medical healthcare services in Sarawak, Malaysia are provided through 23 hospitals. Most of them are located in the district. Out of the 23 hospitals, there are only two tertiary hospitals, which are Sarawak General Hospital (SGH) and Sarawak Heart Centre (SHC). There are three district hospitals with specialist services (i.e., Sibu, Miri and Bintulu Hospitals), sixteen district hospitals without specialist services (mainly in rural areas) and two special institutions (i.e., Sentosa and Rajah Charles Brooke Memorial Hospitals) in Sarawak.

Study Design

This was a cross-sectional study involving healthcare workers in tertiary hospitals in Sarawak, Malaysia. As of March 2016,

there were 4504 healthcare workers at SGH and 676 at SHC.

Ethical Approval

Permission to conduct the study was obtained from both hospital directors. Ethical clearance was obtained as well from MREC of Ministry of Health, Malaysia (Ref: (05) KKM/NIHSEC/P16-1293)).

Sample Size Calculation

The sample size was calculated by using the sample size calculator for a prevalence study¹² with a 95% confidence level and an expected prevalence of CVD in the population of 30.0%. From this calculation, the minimum number of respondents was 434 healthcare workers (anticipating about 30% with redundant or missing data).

Data Collection

The participant information sheet was explained, and written consent was obtained from each subject. The SLIQ was used as the assessment tool. Each subject was required to complete a set of self-administered questionnaires which took about ten to fifteen minutes to complete. All subjects were prohibited from engaging in any form of discussion or conversation during the session in order to maintain an unbiased environment. Anthropometric measurements were collected by using a standardized digital weighing scale. Our study used a non-probability sampling method to obtain the subjects.

Basic Demographic Data

Details such as age, gender, marital status, underlying chronic medical conditions (e.g., diabetes mellitus, hypertension and dyslipidemia), education level, occupation, work patterns and working hours were obtained from the subjects.

Anthropometric Measurements

All of our subjects were measured for their height (in meters) and weight (in kilograms) while bare-foot and in light clothing via a standardized Secca Digital Medical Scale. BMI was calculated based on the formula of weight in kilograms divided by the square of the height in meters (kg/m²). The readings were then classified into the categories shown in **Table 1** below.¹³

Table 1: The International Classification of adults as underweight, overweight or obese according to the Body Mass Index (BMI)

Classification	BMI (kg/m ²)
Underweight	<18.50
Normal range	18.50-24.99
Overweight	≥25.00
Obese	≥30.00

Simple Lifestyle Indicator Questionnaire (SLIQ)

The SLIQ was adapted and modified from Godwin M et al.⁸ The SLIQ is comprised of five different lifestyle components, i.e., diet, physical activity, alcohol, smoking and stress. The diet and physical activity components have three questions each. Alcohol, smoking and life stress components have one question each. Every component is assigned a category score of 0, 1 or 2. Questions on diet are scored from 0 to 5, then classified into a Diet Category Score (0= score 0 to 5, 1= score 6 to 10 and 2= score 11 to 15). Questions on exercise are scored from 0 to 12, summed up to obtain the Activity Raw Score and then classified into an Activity Category Score (a score of 0 for light exercise only, a score of 1 for any moderate activity and a score of 2 for any vigorous activity). Questions on alcohol intake are categorized into three groups based on the units of alcohol intake (score 0= alcohol score 14 and above, score 1= alcohol score 8 to 13 and score 2= alcohol score 0 to 7). The question on smoking habits is classified into three category scores (score 0 for current smoker, score 1 for ex-smoker and score 2 for non-smoker). Finally, the question on life stress uses a rating from level 1 (not at all stressful) to 6 (very stressful) then is categorized into category scores 0 (life stress 1 or 2), 1 (life stress 3 or 4) and 2 (life stress 5 or 6). All of the five component scores are then summed up to provide a final SLIQ score, ranging from 0 to 10 (0 = very unhealthy, 10= very healthy). The scores are then categorized into three groups as follows (**Table 2**):

Table 2: Categories of SLIQ Scores

SLIQ Score	Category
0 to 4	Unhealthy
5 to 7	Intermediate
8 to 10	Healthy

Validation of Instruments

Content validity for the questionnaire in its English version was assessed by content experts that consisted of medical officers and a medical specialist specialists. After evaluation, all items were considered valid and no amendments regarding the items were made. Next, face validity was checked using five healthcare workers. Face validity is used to make sure that respondents understand every item. Doubts or difficulties when answering the items were noted.

The questionnaire was then modified to fit the local setting. The questionnaire only require minimal amendments after face validity, such as removing “curling” from the list of physical activities, as this activity is not available in our local setting. The minimal amendments were transmitted to the original author. There was no change to the cut-off point in the scoring, as only minimal modifications were made.

A pilot study consisting of 30 respondents was then carried out. Items on diet and physical activity were amenable to assessment for internal consistency via Cronbach's alpha (α). Cronbach's alpha was 0.653 for diet and 0.611 for physical activity. No translation of the questionnaire into the Malay language was made since all the respondents were professional staff working in hospital and corresponded in English in the workplace.

Data Analysis

All of the data were analyzed by using the Statistical Package for Social Sciences (SPSS) Version 16.0. ANOVA was used for the comparison of SLIQ scores in the three staff categories.

Multivariate logistic regression using the enter method (without stepwise analysis) was used to study the relationship between SLIQ score (dependent variable) and BMI (independent variable). Statistical significance was set at $p\text{-value} < 0.05$.

Results

A total of 499 healthcare workers were eligible for this study. However, only 494

participated; hence, the response rate was 99.0%. **Table 3** shows the sociodemographic characteristics of the study population. This study showed that 71.3% of the respondents were females. More than half were married (57.7%), and the majority of the respondents had a tertiary education (80.0%). About half were allied health workers (45.5%), and the remaining were almost equally from the management and professional groups. The majority of healthcare workers worked office hours ($n=196$) and in shifts ($n=181$).

The mean number of working hours was 47.6 ± 14.0 a week, with highest working hours attributed to the management and professional group, followed by the executive and allied health groups. The data (not shown in table) for working hours for doctors ranged from 40 to 160 hours per week. The mean scores for SLIQ for the allied health and professional groups were 7.33 and 6.70, respectively.

Our study showed that almost half of the healthcare workers were overweight to obese (47.4%). Further data showed that 5.3% of these workers identified as having underlying hypertension, dyslipidemia and/or diabetes mellitus.

In **Table 4**, a comparison of the SLIQ category scores is seen, with more than half (58.1%) of the healthcare workers classified as having an intermediate risk for CVD. The unhealthy category covered 3.4% of the workers.

Our study discovered that the factors associated with a healthier lifestyle were being female (Odds Ratio [OR]= 12.1; CI= 3.2-46.4), professional (mean score= 6.70), in the allied health group (mean score= 7.33) and associated with the normal BMI group (OR= 9.3, CI= 1.8- 47.0). Marital status may have an association with a healthier lifestyle since married subjects reported a higher odds ratio in comparison with the other category (i.e., divorced). However, although the odds ratio was considered high (Odds Ratio [OR]= 11.3; CI= 0.9 - 147.4), the $p\text{-value}$ was not significant ($p=0.064$) (seen in **Table 5**).

Table 3: Study Population Demographics

Variable	Category	Mean (SD)	n (%)
Age		32.4 (8.4)	
Gender	Male		142 (28.7)
	Female		352 (71.3)
Marital Status	Single		202 (40.9)
	Married		285 (57.7)
	Other		7 (1.4)
Education Level	Primary and Secondary		99 (20.0)
	Tertiary		395 (80.0)
Occupation Type	Management and Professional		124 (25.1)
	Executive		145 (29.4)
	Allied Health		225 (45.5)
Working Hours		47.6(14.0)	
Working Pattern	Office Hours		196 (39.7)
	Shift System		181 (36.6)
	Office Hours and On-Call		103 (20.9)
	Other		14 (2.8)
BMI	Underweight		26 (5.2)
	Normal		234 (47.4)
	Overweight		149 (30.2)
	Obese		85 (17.2)
Medical Illness	Cardiac Risk (e.g., diabetes mellitus, hypertension and/or dyslipidemia)		26 (5.3)
	Non-Cardiac Risk		36 (7.3)
	None		432 (87.4)

Table 4: SLIQ Category Scores

SLIQ Score	Category
0 to 4	Unhealthy
5 to 7	Intermediate
8 to 10	Healthy

Table 5: Associations with a Healthier Lifestyle: A Multivariate Analysis Using Logistic Regression

Factor		OR	95% CI	p-value
Constant Demographic				0.108
age		1.0	1.0, 1.1	0.297
gender	male	Reference group		
	female	12.1	3.2, 46.4	<0.001
marital status	single	6.9	0.5, 101.6	0.165
	married	11.3	0.9, 147.4	0.064
	others	Reference group		
education level	primary & secondary	1.1	0.2, 5.1	0.886
	tertiary	Reference group		
occupation type	professional	6.3	1.2, 32.6	0.029
	allied health	12	1.9, 76.5	0.009
	executive	Reference group		

Table 5: Associations with a Healthier Lifestyle: A Multivariate Analysis Using Logistic Regression

Factor		OR	95% CI	p-value
Clinical				
BMI	underweight	1.3	0.1, 17.0	0.845
	normal	9.3	1.8, 47.0	0.007
	overweight	2.3	0.6, 8.7	0.210
	obese	Reference group		
Factor Clinical				
Medical illness	cardiac risk	0.7	0.0, 11.6	0.823
	non-cardiac risk	2.4	0.2, 24.1	0.457
	none	Reference group		

Discussion

In our study, we found that more than a quarter (47.4%) of the healthcare workers were either overweight or obese. These findings are similar to those in a study by Monir et al.¹¹ High BMI is an independent contributor to the risk of developing CVD.⁴ We then further explored the other modifiable risk factors for CVD based on the SLIQ scores. More than half (58.1%) of the workers were classified as being at intermediate risk for CVD, and 3.4% were classified as unhealthy. As for a comparison of BMI groups, the normal BMI group had healthier lifestyles with a high OR and significant p-value. Based on this finding, it is important to promote healthy lifestyles among the unhealthy BMI groups.¹¹

As for the non-modifiable risk factors, female healthcare workers were found to have a lower risk of developing CVD, as shown by a high OR and significant p-value.⁸ This finding was different from that of the Taiwanese study.⁴ The possible reason is the difference in the marital status of our female healthcare workers, as the majority of them were married. Marital status may have an association with a healthier lifestyle when positive communications among the married couples and family members play an important role in promoting healthy lifestyle behaviours.¹⁴ Looking into the underlying cardiac risk factors, only 5.3% of the healthcare workers had underlying diabetes, hypertension and/or dyslipidemia, which is similar to the rate found in the study of physicians, nurses and faculty members.¹¹ However, the result seen in our study is lower than that in the study by Hazmi et al., in which almost half of the participants had at least one medical condition.⁹ Genetic factors may play an important role in determining the inheritance of these diseases in our study population, and this aspect needs to

be explored further. These underlying medical conditions were the modifiable risk factors for developing CVD and thus need to be controlled well in order to reduce the risk of developing cardiac complications.⁸

Our healthcare workers worked more than 50 hours per week, on average. Long working hours reduce resting periods and increase stress to the heart, predisposing these workers to an increased risk of developing AMI, as shown in the previous study.^{6,7} Among the different professions, our fellow doctors' working hours ranged from 40 to 160 hours per week. Doctors who worked more than 60 hours a week had twofold increased risk for developing AMI.⁷ Longer working hours among this professional group was due the on-call system that was practiced by certain hospital departments.

When comparing job scope, generally, both the professional and allied health groups were healthier compared to the executive group (as shown by significant p-values). Our study found that the medical technicians and nurses had the highest chances of developing CVD. This result is similar to that of the Taiwanese study⁴ as well as results reported by Zhao and Turner.⁵ The nurses in our tertiary hospitals were mainly working in shifts. Some of the nurses tended to practice unhealthy lifestyles by, for example, consuming fast food and indulging in excessive caffeine intake when doing overnight shifts. These practices will lead to the nurses becoming overweight and obese, which then predisposes them to developing CVD.

Overall, our study showed that the healthcare workers in tertiary centers had both modifiable and non-modifiable risks for developing CVD. We evaluated their risks based on a simple screening tool, i.e., the SLIQ, and

measurements of their BMIs. Further research needs to be conducted to the biochemical measurements and genetic components further to better determine the cardiovascular risk factors.

Conclusion

Our findings showed that being male, having a high BMI, having an unhealthy lifestyle (based on the SLIQ), working long hours and working pattern contribute to the intermediate risks for developing CVD. The SLIQ is an easy screening tool for the detection of modifiable CVD risk factors. There is a need to intervene by promoting and improving current national health education programs in order to lessen the burden of CVD in our healthcare settings.

Limitations

This was a cross-sectional study, which limited our ability to monitor the possibility of progression in developing CVD in the future. Due to constraints in sample recruitment, non-probability sampling was applied. A large sample was collected to ensure that the sample was representative of the targeted population. Although the sample did not cover all healthcare workers in Malaysia, the study's results can be generalized to all healthcare workers in Malaysia due to the large sample size. A previous study found that when the sample size reaches at least 300, the statistics resulting from the sample are likely the same as the parameters in that particular population.¹⁵

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Ethical Approval

This research was approved by the Medical Research and Ethics Committee (MREC) of Ministry of Health, Malaysia via Ref: (05) KKM/NIHSEC/P16-1293).

Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

How does this paper make a difference to general practice?

- Creates an awareness of the prevalence of unhealthy body mass index (BMI) among healthcare workers.
- Enables the usage of the Simple Lifestyle Indicator Questionnaire (SLIQ) to determine the association of modifiable cardiovascular disease risk factors with cardiovascular lifestyle risk factors among healthcare workers.
- Validation of the use of the SLIQ in a local setting.

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The risk factors of lower limb cellulitis: A case-control study in a tertiary centre

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Abstract

Introduction: Lower limb cellulitis is a common superficial skin infection that leads to morbidity and mortality. Cellulitis risk factors have been well studied in many countries, but to date, not in Malaysia. Geographical and climate variables may affect risk factors. Early identification of the preventable risk factors is vital to prevent cellulitis and improve holistic patient care.

Objective: To determine the risk factors of lower limb cellulitis amongst hospitalized patients at a tertiary center.

Methods: A prospective case-control study of hospitalized patients with a clinical diagnosis of lower limb cellulitis was conducted at UKM Medical Centre, January–August 2015. Each patient was compared to two age and gender-matched control patients. All patients were interviewed and examined for risk factors of cellulitis.

Results: A total of 96 cellulitis patients and 192 controls participated in this study. The cellulitis patients included 61 males and 35 females with a mean age of 62.07 ± 15.43 years. The majority of patients were experiencing their first episode of cellulitis. Multivariate analysis showed a previous history of cellulitis (OR 25.53; 95% CI 4.73–137.79), sole anomalies (OR 16.32; 95% CI 6.65–40.06), ulceration (OR 14.86; 95% CI 1.00–219.39), venous insufficiency (OR 10.46; 95% CI 1.98–55.22), interdigital intertrigo (OR 8.86; 95% CI 3.33–23.56), eczema (OR 5.74; 95% CI 0.96–34.21), and limb edema (OR 3.95; 95% CI 1.82–8.59) were the significant risk factors for lower limb cellulitis.

Conclusion: Previous cellulitis and factors causing skin barrier disruption such as sole anomalies, ulceration, venous insufficiency, eczema, intertrigo, and limb edema were the risk factors for lower limb cellulitis. Physician awareness, early detection, and treatment of these factors at the primary care level may prevent hospital admission and morbidity associated with cellulitis.

Introduction

Cellulitis is a common bacterial skin infection presented as a painful, ill-defined erythematous patch. According to data published in the United Kingdom, in 2009, there were 82,113 hospital cellulitis admissions in England and Wales¹, and it was estimated that £133 million was spent on hospital stays alone.² Cellulitis accounted for 1.6% of emergency hospital admissions in the United Kingdom in 2008–2009.³ In Singapore, cellulitis was ranked as one of the top ten causes of hospital admissions in 2012, contributing 2% of total admissions.⁴ In Malaysia, the epidemiological data for cellulitis is scarce; however, unpublished data from 2016 in our tertiary center indicated approximately 1% of total hospital admissions in both medical and surgical wards was due to cellulitis (UKM Medical Centre unpublished patient census, 2016).

Cellulitis can be debilitating, potentially life-

threatening, and cause a considerable economic burden to healthcare. Risk factors of cellulitis in lower limbs are treatable and could prevent recurrent infection. These risk factors are generally divided into two major categories. The first category is local risk factors that cause disruption in the skin and compromise its barrier function. These factors include local wounds, ulcers, dermatitis, tinea infection, and maceration of interdigital spaces, all of which provide a portal for skin bacteria to enter the tissue. The second category is systemic factors that are thought to weaken the host immune defense either systemically or locally, e.g., uncontrolled diabetes mellitus (DM).⁵ Despite vast treatment options, the complications of cellulitis are still considerably high and have been documented as high as 31% in hospitalized patients.⁶

Previous studies have shown that risk factors for cellulitis are interdigital intertrigo, lymphedema, leg edema, leg eczema,

and sole abnormalities (e.g., tinea pedis, onychomycosis, and dermatitis).^{10,11,16,18} To date, there has been no prospective study on the risk factors of lower limb cellulitis in Malaysia. It is vital to identify these risk factors in our local population and to ascertain whether they are considerably different from those studied around the globe. We hypothesized that tropical climate and genetic diversity may influence some of the risk factors involved. Although this study is more focused on the risk factors of lower limb cellulitis which is more severe and requires hospitalization, we believe that the same risk factors are applicable for milder cases. The result of this study will provide more meaningful information in identifying and treating these risk factors, which ultimately contribute to cellulitis prevention.

Considering the large number of patients treated by primary care physicians for various conditions, most of these risk factors would have been detected in a primary care setting. Also, the non-severe cellulitis cases would most likely be seen at the onset in a general practitioners' office. Therefore, it is necessary to create awareness amongst primary care physicians regarding the importance of these risks in the development of cellulitis. An increase in physician awareness will lead to early identification and treatment to prevent cellulitis, particularly in patients with multiple risk factors. Early detection and treatment at the primary care setting will prevent admission to tertiary care facilities and may help reduce healthcare costs, morbidity, and mortality associated with cellulitis.

Materials and methods

This was a prospective, case-control study carried out January–August 2015 at the UKM Medical Centre (UKMMC) including all patients 12 yo and above admitted to all wards with a clinical diagnosis of lower limb cellulitis. Sample size calculation is shown in appendix 1. Patients were identified from hospital admission records readily available in the medical and surgical wards. Patients with cellulitis associated with surgical wounds, surgical instrumentation, abscesses, and necrotizing fasciitis were excluded. Each study case was age and sex-matched to control

patients which were admitted to any medical and surgical wards at UKMMC within 48 hours of the case patients due to diagnoses other than cellulitis. The patients were not racially matched as previous studies have shown that race is not a contributing factor to cellulitis risk. A ratio of 1 case to 2 controls was applied in this study to increase the accuracy and to minimize confounders to the identified risk factors.

All case and control patients were interviewed and underwent a thorough clinical examination within 48 hours of admission. The face-to-face interview and clinical examination were carried out by the same dermatology-trained medical officer and it included skin examinations of the upper and lower limbs, looking for any evidence of erosion, intertrigo, eczema, or psoriasis and any nail changes which may indicate onychomycosis. Interdigital intertrigo includes maceration and fissuring of the interdigital spaces. Sole anomaly in this study was defined as scaling, callus, erosion, wound, or erythema at the dorsum of the foot. Lower limb peripheral pulses were also determined. Immunocompromised individuals were defined as those on systemic corticosteroids, chemotherapy, immunosuppressive medication, and diagnosed with AIDS. This study was approved by the Research Ethics Committee from UKM Medical Centre (Approval No: FF-2014-356). Demographic data collected were expressed as mean $\pm$ standard deviation (SD), number and percentage in parenthesis where appropriate. The categorical variables in the case and the control groups were compared using the chi-square test. The risk factors with $p < 0.05$ on univariate analysis were included in further multivariate analysis. Multivariate analysis with multiple logistic regression was performed on the identified risk factors. A value of $p < 0.05$ was considered statistically significant.

Results

A total of 96 case patients were recruited in this study. Most patients were admitted with their first episode of cellulitis (76.1%), 15.6% were experiencing their second episode, 5.2% their third and 3.1% their fourth. The majority had cellulitis on one leg (77.1%) and the remaining were bilateral. The demographic data of both case and control patients are summarized in **Table 1**.

Table 1: Demographic Characteristics of Case and Control Patients

	Case (N=96) (Mean $\pm$ SD)/N (%)	Control (N=192) (Mean $\pm$ SD)/N (%)
Age (years)	62.07 $\pm$ 15.43	61.90 $\pm$ 15.36
Gender		
Female	35 (36.5)	70 (36.5)
Male	61 (63.5)	122 (63.5)
Ethnicity		
Malay	52 (54.2)	87 (45.3)
Chinese	30 (31.3)	86 (44.8)
Indian	14 (14.5)	17 (8.9)
Others	0 (0)	2 (1.0)

Table 2 summarizes all the systemic risk factors identified in the case patients compared to control. From the univariate analysis, only diabetes and previous cellulitis were found to be significant. Intravenous drug users and the immunocompromised were excluded from OR analysis due to small numbers. As for the local risk factors, interdigital intertrigo, leg edema, venous insufficiency, ulceration, peripheral vascular disease and sole anomalies were found to be significant in the univariate analysis (**Table 3**).

Table 2: Univariate Analysis for Systemic Risk Factors of Lower Limb Cellulitis

	Cellulitis		p-value*
	Control (N=192)	Case (N=96)	
Systemic risk factors			
Diabetes	84 43.6%	57 59.4%	<0.05
Overweight 25<BMI(kg/m2)<30	11 5.7%	7 7.2%	
Obesity BMI(kg/m2)>30	27 14.1%	20 20.8	
Alcoholic	3 1.6%	2 2.1%	0.75
IV drug use	0 0.0%	2 2.1%	
Cirrhosis	2 1.0%	5 5.2%	0.19
Heart failure	23 12.0%	12 12.5%	0.80
Immunocompromised ^a	1 0.52%	3 3.1%	
Smoking	48 25.0%	24 25.0%	0.92
Previous cellulitis	2	18	<0.05

^a Immunocompromised defined as patients on systemic corticosteroid, chemotherapy, immunosuppressive medication, and AIDS.

* Chi-Square Test

Table 3: Univariate Analysis for Local Risk factors of Lower Limb Cellulitis

	Control (N=192)	Case (N=96)	p-value*
Local risk factors			
Eczema/ psoriasis	4 1.9%	4 6.8%	0.16
Dry skin	18 8.8%	13 13.5%	0.41
Blisters	0 0.0%	2 2.1%	
DVT	0 0.0%	4 4.2%	
Interdigital intertrigo ^c	12 6.3%	35 36.5%	<0.05
Edema	45 23.4%	59 61.5%	<0.05
Venous insufficiency	4 2.1%	11 11.5%	<0.05
Ulceration	1 0.5%	8 8.3%	<0.05
PVD	1 0.5%	8 8.3%	<0.05
Sole anomalies ^d	9 4.7%	46 47.9%	<0.05

* chi-square test

^c Interdigital intertrigo includes maceration and fissuring of the interdigital spaces

^d Sole anomalies defined as scaling, callus, erosion, wound, or erythema at the dorsum of foot

Table 4: Multivariate Analysis with Binary Logistic Regression for Significant Risk Factors of Lower Limb Cellulitis

Risk factors	OR	95%CI	p-value
Previous cellulitis	25.53	4.73–137.79	<0.05
Sole anomalies	16.32	6.65–40.06	<0.05
Ulceration	14.86	1.00–219.39	<0.05
Venous insufficiency	10.46	1.98–55.22	<0.05
Interdigital intertrigo	8.86	3.33–23.56	<0.05
Eczema	5.74	0.96–34.21	<0.05
Edema	3.95	1.82–8.59	<0.05
Diabetes mellitus	0.81	0.36–1.82	0.61

NA: not applicable; IV: intravenous; DVT: deep vein thrombosis; PVD: peripheral vascular disease; OR: odds ratio; CI: confidence interval

Multivariate analysis identified seven risk factors that had strong association with cellulitis. Of the potential systemic factors, only previous history of cellulitis (OR 25.53, 95% CI 4.73–137.79) was significant. For local risk factors, sole anomalies including scaling, callus, erosion, wound, and erythema at the dorsum of foot (OR 16.32, 95% CI 6.65–40.06), ulceration (OR 14.86, 95% CI, 1.00–219.39), venous insufficiency (OR

10.46, 95% CI 1.98–55.22), interdigital intertrigo (OR 8.86, 95% CI 3.33–23.56), eczema (OR 5.74, 95% CI 0.96–34.21), and limb edema (OR 3.95, 95% CI 1.82–8.59) were significant.

Discussion

Most previous studies exploring risk factors of cellulitis were retrospective in nature, which

relies on medical record documentation. This may result in recall bias or underestimation due to a lack of documentation. Hence, we conducted a prospective case-control study to provide more accurate, real-time data regarding the risk factors for cellulitis. The results of this study supported previous studies from other parts of the world. Our results demonstrated that tropical climate and genetic diversity in Malaysia did not influence the risk factors. All the significant risk factors for cellulitis in our study and previous studies such as sole anomalies, interdigital intertrigo, ulceration, eczema, venous insufficiency, limb edema, and previous history of cellulitis are commonly found in the lower limbs, explaining why it is the most common site for the condition.

In this study, previous cellulitis and sole anomalies had the two highest odds ratios (OR) for local risk factors, similar to that of a previous study.⁹ This is expected as a majority of the time, patients with a previous episode of cellulitis also had at least one of the other risk factors.

Venous insufficiency, dermatitis, and ulceration were also found to be significant and these findings concur with results from many other studies.^{7,8,9,10} Sole anomalies, dermatitis and ulceration contribute to cellulitis as they provide a direct portal for the invasion of pathogens through the skin.¹¹

Among the risk factors studied, interdigital intertrigo is most consistently associated with cellulitis, either singly or combined. This is not surprising because in intertrigo, there is the presence of scaling, maceration, and fissures which all create direct portals of entry for bacterial invasion. Results from Iceland⁹ and England¹⁰ reported OR values of 0.32 and 5.35, respectively, slightly lower than our result. The wide variation in OR may be influenced by climate and location. The higher temperature and level of humidity in Malaysia may be contributing factors for the development of interdigital intertrigo.

Our study and many other studies have also shown that limb edema plays a role in cellulitis. Damage to the venous system and lymphatic vessels which cause limb edema hinders clearance of bacteria which leads to the propagation of infection.^{12,13} These conditions also have been shown to predispose patients to Streptococci infection by providing optimal conditions for bacterial infection.¹⁴

Chronic venous insufficiency, which may also lead to limb edema, is postulated to lead to the development of venous microangiopathy, which subsequently causes growth factor trapping and white blood cell decline, which impairs healing process.¹⁵ It is essential to highlight that cellulitis itself will lead to limb edema which will predispose the individual to another episode of cellulitis.

It is interesting to note that being neither overweight nor obese were significant risk factors in this study, in agreement with previous studies.^{8,10} We hypothesize that it is not the excess weight but rather the complications related to venous stasis, stasis eczema, and leg edema that were the main cellulitis risk factors. Both leg dermatitis and edema were shown to be significant risk factors in this study. However, other studies have concluded that obesity was linked to cellulitis.^{7,16} It has been suggested that obesity causes impairment in cutaneous vascular supply predisposing those individuals to cutaneous infection.¹⁷ The WHO classification for overweight and obese categories was used instead of Malaysian classification to facilitate comparison to other studies by using the same classification.

Diabetes mellitus, which is almost synonymous with skin and soft tissue infection such as necrotizing fasciitis, was found to be significant in univariate analysis but not in the multivariate analysis. This is because poor diabetes control and not diabetes itself is a risk factor for cellulitis. There is evidence that poor glycemic control poses a risk to skin infection such as cellulitis⁵, and higher *Staphylococcus aureus* colonization has been found in patients with poor DM control.¹⁹ Our results are the opposite of that found in a few other studies.^{7,8,9,18} It may be that our DM patients had better glycemic control compared to those in other studies but we are unable to conclude this as we did not assess the DM control in our patients, such as via HBA1c measurements.

Conclusions regarding cellulitis risk factors may be limited in this study as there were no confirmatory investigations such as ankle-brachial pressure index (ABPI) measurements or ultrasound doppler studies done for patients with a diagnosis of peripheral vascular disease. The cellulitis diagnosis was based on previous investigation or via clinical examination. This might lead to an under or overestimation of the condition.

The findings of this study highlight the importance of local risk factors, as opposed to systemic risk factors, to lower limb cellulitis. Therefore, our findings emphasized the importance of aggressive treatment of these conditions to prevent the occurrence of cellulitis. Patients with sole anomalies and leg eczema need to be treated with appropriate topical treatment. Interdigital intertrigo needs more comprehensive care combined with systemic or topical antibiotics and antifungals. Leg edema and lymphoedema, which seem harmless before the onset of cellulitis, will need to be investigated and treated with diuretics and compression therapy.^{20,21} These measures were mentioned in previous studies and may seem imperative however, no study has evaluated their effectiveness in preventing cellulitis and its recurrence. Many cellulitis prevention studies focused more on the use of antibiotic prophylaxis in preventing cellulitis.²²

The results of this study can be translated into clinical practice in a primary care setting by early screening of these factors in patients at risk of cellulitis, e.g. those with chronic leg edema and uncontrolled DM. In first episode or recurrent cellulitis patients, using a pre-printed clerking proforma which includes these important risk factors may facilitate physician awareness, better identification, and treatment.

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Conflict of Interest

All authors declared there were no conflict of interest in this study.

Appendix

Appendix 1

Sample Size Determination

Based on the formula

$$P_{\text{case}} = \frac{OR \times P_{\text{control}}}{P_{\text{control}}(OR-1) + 1}$$

$$P_{\text{case}} = \frac{2.6 \times 0.1}{0.1(2.6-1)+1}$$

$$P_{\text{case}} = 0.224$$

$$\begin{aligned} P_{\text{average}} &= \frac{P_{\text{case}} + P_{\text{control}}}{2} \\ &= \frac{0.224 + 0.1}{2} \\ &= 0.162 \end{aligned}$$

$$N = \frac{(R+1) \times (P_{\text{average}})(1-P_{\text{average}})(Z_{\beta} + Z_{\alpha/2})^2}{2(P_{\text{case}} - P_{\text{control}})}$$

$$N = \frac{(2+1) \times (0.162)(1-0.162)(0.84+1.96)^2}{2(0.224-0.1)^2}$$

$$N = 103$$

P_{case} = Prevalence of the case

P_{control} = Prevalence of the control, based on previous study, it is 10%

P_{average} = Average of Prevalence of the case and Prevalence of the control

OR = Odd ratio of the control, based on previous study is 2.6

N = Number of cases needed for the study

R = Ratio of the control to the case

Z_{β} = For 80% power, $Z_{\beta} = 0.84$

$Z_{\alpha/2}$ = For 0.05 significance, $Z_{\alpha/2} = 1.96$

A total of 103 case patients and 206 of control patients are needed. (Ratio is 1 case : 2 control)

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Prevalence and risk factors associated with falls among community-dwelling and institutionalized older adults in Indonesia

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Abstract

Objective: To assess the prevalence and social and health correlates of falls and fall risk in a sample of community-dwelling and institutionalized older Indonesians.

Methods: This cross-sectional study was conducted July–August 2018 in three regions in Indonesia. Adults aged 60 years and above (n=427) were recruited via random sampling from community clinics and public and private elderly homes. They responded to interview-administered questions and provided measurements on sociodemographics and various health variables, including falls and fall risk. Fall risk was assessed with the STEADI (Stopping Elderly Accidents, Deaths, & Injuries) screen. Multivariable logistic regression was conducted to estimate associations with fall and fall risk.

Results: In the year immediately preceding the study, 29.0% of participants had suffered a fall. Approximately one-third of women (31.1%) and one-fifth of men (20.4%) reported a fall in the past year, and 25.4% of community dwellers and 32.7% of institutionalized older adults had fallen. The overall proportion of fall risk was 45.4%, 49.0% among women, 38.0% among men, 50.5% in the institutionalized setting, and 40.4% in the community setting. In adjusted logistic regression analysis, older age (OR: 1.89, CI: 1.06, 3.37), private elderly home setting (OR: 2.04, CI: 1.10, 3.78), and being female (OR: 0.49, CI: 0.30, 0.82) were associated with falls in the preceding 12 months. Older age (80–102 years) (OR: 2.55, CI: 1.46, 4.46), private elderly home residence (OR: 2.24, CI: 1.19, 4.21), lack of education (OR: 0.51, CI: 0.28, 0.93), memory problems (OR: 1.81, CI: 1.09, 2.99), and arthritis (OR: 2.97, CI: 1.26, 7.00) were associated with fall risk by the STEADI screen. In stratified analysis by setting, being female (OR: 0.49, CI: 0.25, 0.95) and living in urban areas (OR: 1.97, CI: 1.03, 3.76) were associated with falls in the institutionalized setting, and having near vision problems (OR: 2.32, CI: 1.09, 4.93) was associated with falls in the community setting. Older age (OR: 2.87, CI: 1.36, 6.07) was associated with fall risk in the institutionalized setting, and rural residence (OR: 0.37, CI: 0.15, 0.93) and having a joint disorder or arthritis (OR: 4.82, CI: 1.28, 16.61) were associated with fall risk in the community setting.

Conclusion: A high proportion of older adults in community and institutional care in Indonesia have fallen or were at risk of falling in the preceding 12 months. Health variables for fall and fall risk were identified for the population overall and for specific populations in the home care and community setting that could help in designing fall-prevention strategies.

Introduction

Injurious falls in older adults have been identified as a significant public health problem.^{1,2} In community-based studies among older adults (60 years and older), the past-year fall prevalence was 17.2% in Singapore,³ 4.1% in Malaysia,⁴ and 31% in rural India.⁵ In the past two years in Indonesia, the prevalence of falls among community-dwelling older adults (50 years and older) was 12.8%.⁶ In a population of institutionalized older adults (60 years and older) in Malaysia in the past 12 months, 32.8% and 13.3% of study

participants were, respectively, at high or moderate risk for falling.⁷ Homebound or semi-homebound older adults in South Korea were found to be 50% more likely to experience a fall than non-homebound individuals.⁸ In Indonesia, there is a lack of information on fall and fall risk in institutional care and on fall risk in community dwellers.

Effective fall prevention programs need to include a fall and a fall risk assessment to target interventions.⁹ Risk factors for falling in older adults include sociodemographic and health condition variables. Sociodemographic

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risk factors include older age,^{3,10-12} female sex,^{3,13,14} lower socioeconomic status,¹⁴ rural residence,¹³ living alone,¹⁵ and residence in an institutional care setting.⁸ Health condition risk factors for falls among older adults may include specific chronic conditions such as stroke,^{16,17} diabetes,¹⁶ arthritis,^{8,17} and poor cognitive functioning.^{6,13,17} Other health risk factors include visual difficulties,^{16,17} hearing problems,^{18,19} urinary incontinence,^{6,16,17} and depression.^{6-8,13}

To successfully include fall-prevention health care programming,^{13,20} the government of Indonesia requires epidemiological data on fall and fall risk. To address this gap, this study aims to assess the prevalence and social and health correlates of falls and fall risk in a sample of community-dwelling and institutionalized older Indonesians.

Methods***Sample population and procedure***

A cross-sectional study was conducted July–August 2018 in three provinces on the island of Java: DKI Jakarta, West Java (Bandung), and Yogyakarta. From the total number of public elderly homes in Jakarta (n=4), Bandung (n=4), and Yogyakarta (n=2), three public elderly homes were randomly selected, two in Jakarta and one in Yogyakarta. From the total number of private elderly homes in Jakarta (n=19), Bandung (n=5), and Yogyakarta (n=2), four private elderly homes were randomly selected, one in Jakarta and three in Bandung. From the total number of primary health care centers in Jakarta (n=341), Bandung (n=74), and Yogyakarta (n=121), seven primary health care centers were randomly selected, three in Jakarta, three in Bandung and one in Yogyakarta.

The inclusion criteria were 60 years of age and older, able to communicate, and agreement to complete the assessment. Total care elderly who were bed-ridden were excluded from the study as they could not perform independent care. Moreover, this consideration is subjected to the homogeneity of the risk of falls among study participants. Identification of potential participants was based on a list provided by the elderly home officer and in the community by a social worker active in the Elderly Integrated Development Post, a position developed by the primary health center in the community. The respondents who met the inclusion criteria were chosen randomly for study inclusion.

The sample size calculation for regression analysis was based on Van Voorhis and Morgan:²¹ the overall model is $50+8k$, in which k is the number of independent variables, and an analysis for individual variables model is $104+k$. In this study, as there are six independent variables, the overall model sample size is $50+8 \times 6 = 98$, and overall is $104+6 = 110$. Thus, the minimum sample size for this study is 110 per model. In this study, we have four models: community, health care organization, past year fall occurrence, and fall risk STEADI models. Thus, the minimum sample size is $98 \times 4 = 392$.

The questionnaire, initially in English, was translated by two independent bilingual translators into Bahasa, and another bilingual translator, who did not know the original questionnaire, back-translated the reconciliated target language version. Before study participation, written informed consent was obtained from all participants. The study was approved by the Ethical Committee of the Faculty of Public Health, Universitas Indonesia, Indonesia, approval number 125/UN2.F10/PPM.00.02/2018.

Measures***Outcome variables***

Fall was assessed with the questions, “Have you fallen in the past year?”²²

Fall risk was assessed with the 12-item STEADI (Stopping Elderly Accidents, Deaths, & Injuries) screen.²² A summary score of four or greater was indicative of fall risk.²² Cronbach alpha for the STEADI in this sample was 0.79.

Exposure variables

Socio-demographic factor questions included age, sex, education, residential status, living status, region, and care setting.

Depression was assessed with the 15-item Geriatric Depression Scale (GDS) (Short Form), with scores of 6 or more indicative of depression.^{23,24} Cronbach's alpha for the GDS in this sample was 0.91.

Visual impairment was assessed by first asking the study participants whether they have “a problem with their vision,” and if so, a visual acuity test was performed, and “visual impairment was defined as presenting or best-corrected visual acuity less than 20/40 (better eye).”²⁵

Other chronic conditions were assessed based on the list of chronic diseases from the Comprehensive Geriatric Assessment tools (CGA).²⁶ The list consisted of hypertension, heart disease, lung disease, stroke, TIA, diabetes mellitus, Parkinson's disease, osteoporosis, cancer, leukemia, hepatitis, HIV, herpes, chronic ulcer disease, and others. Hypertension was assessed by blood pressure measurement. Other chronic conditions were identified by asking the elderly or family and caregiver for triangulation.

Data analysis

Descriptive statistics were calculated to describe the sample and occurrence of fall and fall risk. Logistic regression (forced entry) was used to estimate the association with past 12-month fall and fall risk, separately, for the whole sample and also stratified by the study setting (institutionalized and community). Variables significant in bivariate analyses were subsequently included in a multivariable logistic regression model with fall and fall risk. Independent variables included sociodemographic and health variables. Potential multicollinearity between variables was assessed with variance inflation factors, none of which exceeded a critical value. $P < 0.05$ was considered significant. All analyses were done with STATA software version 13.0 (Stata Corporation, College Station, TX, USA).

Results

Sample characteristics and bivariate analysis with falls and fall risk

The total sample included 427 persons 60 years and older (median age 71 years, IQR=14.0, age range 60-102 years) in three regions (133 in Jakarta, 146 in Yogyakarta, 148 in Bandung); the response rate was 85.4%. The proportion of women was 67.9%, 49.9% were community dwellers, 29.0% in public residential care, and 21.1% in private elderly homes. Almost one-third of the participants (30.7%) had no formal education, and 56.2% resided in rural

areas. Regarding health variables, 18.5% scored positive for depression, 22.7% had impaired near vision, 24.1% had a memory problem, 11.7% arthritis, 13.3% a urinary problem, and 14.3% a cardiovascular disorder.

The proportion of participants who had suffered a fall in the past year was 29.0%. Almost one-third of women (31.1%) and one-fifth of men (20.4%) reported a fall in the past year, as well as 25.4% of community dwellers and 32.7% of institutionalized older adults. The fall risk, measured with the STEADI screen, was 45.4% overall, 49.0% among women, and 38.0% among men. The prevalence of falling in the past 12 months was 32.7% in the institutionalized setting, and 25.4% in the community and the fall risk was 50.5% in the institutionalized setting and 40.4% in the community setting (see Table 1).

Associations with past year fall and fall risk

In adjusted logistic regression analysis, older age, private institutional care setting, and being female were associated with falling in the previous 12 months. Older age (80-102 years), private elderly home setting, having no education, memory problems, and arthritis were associated with fall risk on the STEADI screen (see Table 2).

Associations with past year fall stratified by setting

In adjusted logistic regression analysis, being female and having an urban residence was associated with falling in the past 12 months in the institutionalized setting, and having near vision problems was associated with falling in the community setting (see Table 3).

Associations with fall risk stratified by setting

In adjusted logistic regression analysis, older age was associated with fall risk in the institutionalized setting, and rural residence and having a joint disorder or arthritis were associated with fall risk in the community setting (see Table 4).

Table 1: Sample characteristics and bivariate analysis between socio demographic factors, health conditions and past year fall and fall risk

	Sample	Total sample		Home care sample		Community sample	
Variable		Past year fall	Fall risk (STEADI)	Past year fall	Fall risk (STEADI)	Past year fall	Fall risk (STEADI)
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Sociodemographics							
All	427	124 (29.0)	194 (45.4)	70 (32.7)	108 (50.5)	54 (25.4)	86 (40.4)
Age (in years)							
60-69	185 (43.3)	39 (21.1)	63 (34.1)	18 (28.1)	25 (39.1)	21 (17.4)	38 (31.4)
70-79	137 (32.1)	43 (31.4)	63 (46.0)	26 (32.5)	36 (45.0)	17 (29.8)	27 (47.4)
80-102	105 (24.6)	42 (40.0)**	68 (64.8)***	26 (37.1)	47 (67.1)**	16 (45.7)**	21 (60.0)**
Care setting							
Elderly home (public)	124 (29.0)	30 (24.2)	51 (41.1)	---	---	---	---
Elderly home (private)	90 (21.1)	40 (44.4)	57 (63.3)				
Community	213 (49.9)	54 (25.4)***	86 (40.4)***				
Sex							
Female	290 (67.9)	96 (33.1)	142 (49.0)	54 (37.2)	80 (55.2)	42 (29.0)	62 (42.8)
Male	137 (32.1)	28 (20.4)**	52 (38.0)*	16 (23.2)*	28 (40.6)**	12 (17.6)	24 (35.3)
Region/city							
Jakarta	133 (31.1)	29 (21.8)	47 (35.3)	23 (29.1)	14 (25.9)	6 (11.1)	33 (41.8)
Yogyakarta	146 (34.2)	35 (24.0)	53 (36.3)	12 (17.4)	26 (33.8)	23 (29.0)	27 (39.1)
Bandung	148 (34.7)	60 (40.5)***	94 (63.5)***	35 (53.0)**	46 (56.4)***	25 (30.5)*	48 (72.7)***
Education							
None	130 (30.7)	47 (36.2)	71 (54.6)	21 (33.3)	38 (60.3)	26 (38.8)	33 (49.3)
Less than middle school	174 (41.0)	47 (27.0)	74 (42.5)	23 (33.3)	32 (46.4)	24 (22.9)	42 (40.3)
Middle school or more	120 (28.3)	30 (25.0)	47 (39.2)*	26 (32.1)	37 (45.7)	4 (10.3)**	10 (25.6)
Residential status							
Rural	240 (56.2)	66 (27.5)	109 (45.4)	18 (22.8)	34 (43.0)	48 (29.8)	75 (46.6)
Urban	187 (43.8)	58 (31.0)	85 (45.5)	52 (38.5)*	74 (54.8)	6 (11.5)**	11 (21.2)***
Living status							
Lives with relatives	---	---	---	---	---	39 (22.7)	66 (37.5)
Lives alone						15 (40.5)*	20 (54.1)
Health conditions							
Depression	79 (18.5)	31 (39.2)*	---	15 (34.1)	---	16 (45.7)**	---
Vision problem (near)	97 (22.7)	39 (40.2)**	55 (56.7)*	17 (36.2)	26 (55.3)	22 (44.0)***	29 (58.8)**
Vision problem (far)	24 (5.6)	11 (45.8)	13 (54.2)	6 (42.9)	7 (50.0)	6 (50.0)	6 (60.0)
Osteoporosis	42 (9.8)	15 (35.7)	27 (64.3)**	8 (42.1)	14 (73.7)*	7 (30.4)	13 (56.5)
Memory problem	103 (24.1)	38 (36.9)*	60 (58.3)**	22 (40.0)	35 (63.6)*	16 (33.3)	25 (52.1)
Joint disorder/arthritis	50 (11.7)	22 (44.0)*	36 (72.0)***	11 (42.3)	18 (69.2)*	11 (45.8)*	18 (75.0)***
Urinary problem	57 (13.3)	24 (42.1)*	33 (57.9)*	13 (52.0)*	14 (56.0)	11 (34.4)	19 (59.4)*
Defecation problem	43 (10.1)	17 (39.5)	28 (65.1)**	8 (40.0)	14 (70.0)	9 (31.9)	14 (60.9)*
Diabetes	46 (10.8)	14 (30.4)	26 (56.5)	10 (31.3)	18 (56.3)	4 (28.6)	8 (57.1)
Parkinson's disease	21 (4.9)	5 (23.8)	12 (57.1)	2 (15.4)	8 (61.5)	3 (37.5)	4 (50.8)
Cardiovascular disease (Stroke, heart disease, light stroke)	61 (14.3)	31 (39.2)	30 (49.2)	12 (32.4)	20 (54.1)	6 (25.0)	10 (41.7)

***P<0.001, **P<0.01. *P<0.05

Table 2: Associations with past year fall and fall risk (using logistic regression)

Variable	Past year fall		Fall risk (STEADI)	
	COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)
Sociodemographics				
Age (in years)				
60-69	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
70-79	1.71 (1.03, 2.84)	1.53 (0.89, 2.23)	1.65 (1.05, 2.59)	1.40 (0.85, 2.30)
80-102	2.50 (1.47, 4.23)	1.89 (1.06, 3.37)	3.56 (2.15, 5.88)	2.55 (1.46, 4.46)
Care setting				
Elderly home (public)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Elderly home (private)	2.51 (1.40, 4.50)	2.04 (1.10, 3.78)	2.47 (1.42, 4.32)	2.24 (1.19, 4.21)
Community	1.05 (0.64, 1.78)	1.10 (0.64, 1.90)	0.97 (0.62, 1.52)	1.01 (0.61, 1.67)
Sex				
Female	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Male	0.52 (0.32, 0.84)	0.49 (0.30, 0.82)	0.64 (0.42, 0.97)	0.65 (0.40, 1.04)
Education				
None	1 (Reference)	--	1 (Reference)	1 (Reference)
Less than middle school	0.68 (0.42, 1.10)		0.51 (0.39, 0.96)	0.76 (0.46, 1.26)
Middle school or more	0.61 (0.35, 1.05)		0.53 (0.32, 0.87)	0.51 (0.28, 0.93)
Residential status				
Rural	1 (Reference)	---	1 (Reference)	---
Urban	1.19 (0.78, 1.80)		1.00 (0.68, 1.47)	
Health conditions				
Depression	1.76 (1.06, 2.94)	1.30 (0.74, 2.28)	Not included	---
Vision problem (near)	1.94 (1.22, 3.12)	1.58 (0.93, 2.66)	1.80 (1.14, 2.84)	1.24 (0.74, 2.09)
Vision problem (far)	2.17 (0.95, 4.99)	---	1.45 (0.63, 3.31)	---
Osteoporosis	1.40 (0.72, 2.75)	---	2.35 (1.21, 4.56)	1.71 (0.80, 3.63)
Memory problem	1.61 (1.01, 2.59)	1.43 (0.85, 2.39)	1.98 (1.28, 3.10)	1.81 (1.09, 2.99)
Joint disorder/arthritis	2.12 (1.16, 3.87)	1.52 (0.73, 3.16)	3.56 (1.86, 6.83)	2.97 (1.26, 7.00)
Urinary problem	1.96 (1.11, 3.49)	1.52 (0.75, 3.04)	1.79 (1.02, 3.14)	0.98 (0.48, 2.01)
Defecation problem	1.69 (0.88, 3.25)	---	2.45 (1.26, 4.74)	1.50 (0.65, 3.44)
Diabetes	1.08 (0.55, 2.10)	---	1.65 (0.89, 3.06)	---
Parkinson's disease	0.75 (0.27, 2.10)	---	1.64 (0.68, 3.98)	---
Cardiovascular disease (Stroke, heart disease, light stroke)	1.03 (0.57, 1.86)	---	1.19 (0.69, 2.05)	---

COR= Crude Odds Ratio; AOR= Adjusted Odds Ratio; CI=Confidence Interval; Bold=significant

Table 3: Associations with past year fall stratified by setting (using logistic regression)

Variable	Fall in home care setting		Fall in community setting	
	COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)
Sociodemographics				
Age (in years)				
60-69	1 (Reference)	--	1 (Reference)	1 (Reference)
70-79	1.23 (0.60, 2.52)		2.02 (0.97, 4.23)	1.51 (0.68, 3.87)
80-102	1.51 (0.73, 3.13)		4.01 (1.78, 9.06)	2.02 (0.80, 5.12)
Sex				
Female	1 (Reference)	1 (Reference)	1 (Reference)	--
Male	0.51 (0.27, 0.98)	0.49 (0.25, 0.95)	0.59 (0.26, 1.08)	
Education				
None	1 (Reference)	--	1 (Reference)	1 (Reference)
Less than middle school	1.02 (0.50, 2.11)		0.49 (0.25, 0.96)	0.71 (0.34, 1.48)
Middle school or more	0.97 (0.48, 1.95)		0.19 (0.06, 0.59)	0.37 (0.10, 1.46)
Residential status				
Rural	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Urban	2.12 (1.13, 3.40)	1.97 (1.03, 3.76)	0.31 (0.12, 0.77)	0.37 (0.10, 1.46)
Living status				
Lives with relatives	--		1 (Reference)	1 (Reference)
Lives alone			2.40 (1.14, 5.05)	1.85 (0.77, 4.43)
Health conditions				
Depression	1.07 (0.53, 2.16)	---	3.10 (1.46, 6.60)	2.01 (0.86, 4.67)
Vision problem (near)	1.22 (0.62, 2.40)	---	3.22 (1.63, 6.34)	2.32 (1.09, 4.93)
Vision problem (far)	1.59 (0.53, 4.79)	---	3.14 (0.87, 11.31)	---
Osteoporosis	1.56 (0.60, 4.07)	---	1.33 (0.52, 3.43)	---
Memory problem	1.54 (0.84, 2.92)	---	1.67 (0.83, 3.37)	---
Joint disorder/arthritis	1.60 (0.69, 3.70)	---	2.87 (1.20, 6.87)	2.02 (0.73, 5.63)
Urinary problem	2.51 (1.08, 5.83)	2.31 (0.97, 5.52)	1.68 (0.75, 3.76)	---
Defecation problem	1.42 (0.55, 3.65)	---	2.07 (0.84, 5.10)	---
Diabetes	0.92 (0.41, 2.08)	---	1.19 (0.36, 3.97)	---
Parkinson's disease	0.36 (0.08, 1.65)	---	1.81 (0.42, 7.85)	---
Cardiovascular disease (Stroke, heart disease, light stroke)	0.99 (0.46, 2.10)	---	0.98 (0.37, 2.61)	---

COR= Crude Odds Ratio; AOR= Adjusted Odds Ratio; CI=Confidence Interval; Bold=significant

Table 4: Associations with fall risk stratified by setting (using logistic regression)

Variable	Fall risk in home care setting		Fall risk in community setting	
	COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)
Sociodemographics				
Age (in years)				
60-69	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
70-79	1.28 (0.65, 2.49)	1.26 (0.62, 2.56)	1.28 (0.65, 2.49)	1.64 (0.84, 3.26)
80-102	3.19 (1.57, 6.47)	2.87 (1.36, 6.07)	3.19 (1.57, 6.46)	2.29 (0.98, 5.36)
Sex				
Female	1 (Reference)	1 (Reference)	1 (Reference)	---
Male	0.56 (0.31, 0.99)	0.60 (0.32, 1.12)	0.73 (0.40, 1.33)	
Education				
None	1 (Reference)	---	1 (Reference)	1 (Reference)
Less than middle school	0.55 (0.28, 1.11)		0.69 (0.37, 1.27)	0.86 (0.44, 1.68)
Middle school or more	0.54 (0.28, 1.05)		0.36 (0.15, 0.84)	0.67 (0.22, 2.00)
Residential status				
Rural	1 (Reference)	---	1 (Reference)	1 (Reference)
Urban	1.61 (0.92, 2.81)		0.31 (0.15, 0.64)	0.37 (0.15, 0.93)
Living status				
Lives with relatives	---	---	1 (Reference)	---
Lives alone			1.96 (0.96, 4.01)	
Health conditions				
Vision problem (near)	1.28 (0.67, 2.46)	---	2.57 (1.34, 4.91)	1.75 (0.86, 3.60)
Vision problem (far)	0.98 (0.33, 2.90)	---	2.31 (0.63, 8.43)	---
Osteoporosis	3.01 (1.04, 8.68)	2.34 (0.77, 7.14)	2.08 (0.87, 5.00)	---
Memory problem	2.06 (1.10, 3.88)	1.91 (0.98, 3.72)	1.85 (0.97, 3.55)	---
Joint disorder/arthritis	2.45 (1.02, 5.91)	2.44 (0.95, 6.18)	5.34 (2.02, 14.09)	4.82 (1.28, 16.61)
Urinary problem	1.29 (0.56, 2.98)	---	2.49 (1.16, 5.36)	0.89 (0.32, 2.28)
Defecation problem	2.48 (0.92, 6.73)	---	2.55 (1.05, 6.19)	1.56 (0.49, 4.93)
Diabetes	1.31 (0.62, 2.80)	---	2.07 (0.69, 6.19)	---
Parkinson's disease	1.62 (0.51, 5.11)	---	1.50 (0.37, 6.17)	---
Cardiovascular disease (Stroke, heart disease, light stroke)	1.19 (0.59, 2.42)	---	1.06 (0.45, 2.52)	---

COR= Crude Odds Ratio; AOR= Adjusted Odds Ratio; CI=Confidence Interval; Bold=significant

Discussion

The study aimed to investigate the prevalence and social and health correlates of falls and fall risk in a sample of community-dwelling and institutionalized older Indonesians. A high proportion of participants had suffered a fall in the past 12 months (29.0% overall, 32.7% in-home care, and 25.4% in the community) and 45.4% overall (50.5% in-home care and 40.4% in the community) were at risk for a fall. The finding of 32.6% fall prevalence in the home care setting was similar to a study among institutionalized elders in Malaysia

(32.8%).⁷ The fall risk prevalence in the home care setting was 50.5%, which is much higher than in the study among institutionalized elders in Malaysia (13.3%).⁷ Some of these differences may be related to the different fall risk screens used: the Malaysia study used the 4-item Fall Risk Assessment Tool (FRAT),⁷ while this study used the 12-item STEADI.²² The past 12-month fall prevalence in the community setting (25.4%) was higher than in older adults in previous community surveys in Indonesia (50 years and older, past 2 years, 12.8%),⁶ Singapore (60 years and older, past 12 months, 17.2%),³ Thailand (60 years and older, past 6 months, 18.7%),²⁷ Malaysia (60 years and older, past 12

months, 4.1%),⁴ but was lower than in Italy (65 years and older, past 12 months, 28.6%)¹⁶ and in rural India (60 years and older, past 12 months, 31%).⁵ Possible reasons for some of the differences in the fall prevalence could be different methodologies used and different age groups.⁷ We found a higher fall prevalence in home care (32.7%) than in the community setting (25.4%). Higher fall prevalence in institutionalized care than in the community setting was also found among older adults in Korea⁸ and Malaysia.^{4,7}

Consistent with previous studies,^{3,10-12} we found an association between older age and fall and fall risk. In addition, in agreement with previous studies,^{3,13,17} this study found that women were more likely than men to suffer a fall in the past 12 months. This gender disparity may be due to different levels of physical activity, muscle strength, bone density, and fatal fall rates between the genders.²⁸ Some studies found an association between residing in rural areas and falling,¹³ this study found an association between urban residence and falling and rural residence and fall risk. Lower socioeconomic status was previously found to be associated with falls,¹⁷ while this study did not find an association between educational level and fall occurrence but we did find an association between no education and fall risk. It is possible that women with a lower educational status reside primarily in certain environments which put them at greater fall risk.²⁹

Urinary incontinence is a known risk factor for falls,^{6,14,15,19} but we did not find an association between urinary problems and falling. Visual difficulties^{16,17,30} are an established risk factor for falls and were also found in this study in the community setting. Poor cognitive functioning has been identified as a risk factor for falls,^{13,17} while in this study, memory problems were associated with fall risk. Depression may be common among older people and there is evidence it is associated with increased fall risk,^{13,19} but this study did not find such an

association. Some studies reported an association between arthritis and falling,^{8,17} while this study found such an association with fall risk in the community. Suggested reasons for this include “impaired muscle strength, postural instability, fatigue, joint pain, and reduced functioning.”³¹

Limitations of the study

This study had several limitations. The self-reported assessment of the study measures may have its limitations. Recall bias of fall occurrence and survivor bias may limit the robustness of the findings. Furthermore, this study was based on cross-sectional data, and we can therefore not ascribe causality to any of the associated factors in the study. Circumstances of falls and consequences in terms of the type of injury were not assessed and should be evaluated in future studies. Moreover, certain variables, such as the number and type of medications taken, could also be another important risk factor and should be included in future studies.

Conclusions

A high proportion of older adults in the community and institutional care in Indonesia experienced a fall in the past 12 months or are at risk for a fall. Several sociodemographic (older age, female sex, private institutional care, no education, and urban residence for fall and rural residence for fall risk) and health (impaired vision, memory problem, and arthritis) factors for fall and fall risk were identified. This data could assist the home care and community setting caretakers in designing fall-prevention strategies.

Conflict of Interest: The authors declare no conflict of interest.

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How does this paper make a difference to general practice?

- The proportion of those suffering a fall was very common in the sample of community-dwelling (29.0%) and institutionalized (32.7%) elderly in Indonesia.
- Health care workers in primary care and institutionalized elderly care should enquire about fall risk factors identified in this study (older age, female sex, private institutional care, no education, impaired vision, memory problem, and arthritis).
- The STEADI screen may be used for assessing fall risk in Indonesia.

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Management of Atopic Eczema in primary care

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Abstract

Introduction: Atopic eczema (AE) is a common inflammatory skin dermatosis that is increasing in prevalence. However, it can present in various clinical presentations, which leads to challenges in the diagnosis and treatment of the condition, especially in a primary care setting. The Clinical Practice Guidelines on the Management of Atopic Eczema was developed by a multidisciplinary development group and approved by the Ministry of Health Malaysia in 2018. It covers the aspects of diagnosis, severity assessment, treatment, and referral.

Introduction

Atopic eczema (AE) or atopic dermatitis is a complex, chronic, and recurrent inflammatory itchy skin disorder. In the majority of cases, it starts to develop in early childhood and may persist into adulthood. The prevalence is as high as 20% in some countries. In Malaysia, the prevalence has increased from 9.5% in 1995 to 12.6% in 2003. AE has various clinical manifestations in different age groups. This makes the diagnosis a challenge, leading to misdiagnosis and mistreatment. Therefore, it is paramount to have evidence-based clinical practice guidelines (CPG) for effective and safe management.

Clinical Presentation

AE has both acute and chronic clinical presentations. Acute eczema is characterized by papulovesicular eruption with erythema, weeping, edema, and excoriation, whereas chronic eczema is characterized by lichenification and dry skin (xerosis).

Diagnosis

AE is diagnosed clinically and not by any specific laboratory investigation. The following criteria is used for the diagnosis of AE.

The U.K. Working Party's Diagnostic Criteria for Atopic Dermatitis:

Patient must have an itchy skin condition (or parental report of scratching or rubbing in a child) plus 3 or more of the following:

- history of involvement of the skin creases such as folds of elbows, behind the knees, fronts of ankles, or around the neck (including cheeks in children under 10)
- a personal history of asthma or hay fever (or history of atopic disease in a first-degree relative in children under 4)
- a history of generally dry skin in the last year
- visible flexural eczema (or eczema involving the cheeks/forehead and outer limbs in children under 4)
- onset under the age of 2 (not used if child is under 4)

Severity Assessment

Assessment of disease severity and quality of life should be used in the management of atopic eczema. The preferred tools are the following:

- Investigator's Global Assessment (IGA)
- Dermatology Life Quality Index/Children's Dermatology Life Quality Index (DLQI/CDLQI)

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Investigator's Global Assessment (IGA)

Score	Description
0 = Clear	No inflammatory signs of AD
1 = Almost clear	Just-perceptible erythema and just-perceptible papulation/infiltration
2 = Mild disease	Mild erythema and mild papulation/infiltration
3 = Moderate disease	Moderate erythema and moderate papulation/infiltration
4 = Severe disease	Severe erythema and severe papulation/infiltration
5 = Very severe disease	Severe erythema and severe papulation/infiltration with oozing/crusting

Aggravating/Triggering Factors

Various factors may worsen AE, which include the following:

- aeroallergen (e.g., house dust mites, animal's dander)
- physical irritants (e.g., nylon, wool, detergents, sweat)
- environmental factors (e.g., extreme temperature)
- microbial colonization/infection (e.g., *Staphylococcus aureus*)
- patient factors (e.g., pregnancy, stress)
- food

The influence of food allergy on the clinical course of AE remains unclear. Food may worsen AE in children less than two years old, especially milk, eggs, and peanuts. In the prevention of AE, hydrolyzed formulas should not be offered to infants in preference to breast milk.

Topical Therapy

Topical therapy is the mainstay of treatment in AE. This includes emollients, topical anti-inflammatory agents, and topical antiseptic/antimicrobial agents.

Emollient/moisturizer

Emollient therapy is the mainstay of management in AE in all age groups of patients and in all stages of the disease, from mild to severe. It improves the epidermal barrier function and dryness, leading to a reduction in pruritus. Its application decreases the usage of topical corticosteroids.

Emollients are available in different formulations (ointments, creams, lotions, gels, and aerosol sprays). Ointments (e.g., petrolatum) are

greasy in nature, whereas creams and lotions contain water and are more user-friendly and acceptable cosmetically. Creams (e.g., aqueous cream and urea cream), lotions, and gels contain preservatives to protect against microbial growth in the presence of water. There is no reliable evidence to show that one emollient is more effective than another. Generally, emollients are safe to be used in AE.

In infants with first-degree relatives with atopy, daily use of an emollient significantly reduces the risk of developing AE.

Topical corticosteroids

Topical corticosteroids (TCS) are the first-line anti-inflammatory agents for AE in both children and adults. They should be used to treat flares in AE. The choice of TCS depends on the following factors:

- age of the patient
- site of skin lesions
- chronicity of skin lesions
- severity of skin inflammation

The use of TCS should be monitored every 3–6 months to determine response and potential side effects.

TCS are categorised into four classes according to their potencies:

- Class I (very potent; clobetasol propionate 0.05% cream/ointment)
- Class II (potent; betamethasone valerate 0.1% cream/ointment, mometasone furoate 0.1% cream/ointment, fluticasone propionate 0.05% cream)
- Class III (moderate; clobetasone butyrate 0.05% cream/ointment)
- Class IV (mild; hydrocortisone acetate 1% cream/ointment)

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Practical guides for TCS application are the following:

- TCS should be used concomitantly with emollients.
- Fingertip unit can be used as a guide to the amount of TCS required for affected sites.
- Choice of vehicle of TCS depends on the affected sites (i.e., gel for scalp; cream for face, genital and flexural areas; ointment for palm and sole).
- Choice of potency of TCS depends on the clinical severity of eczema (i.e., potent to very potent TCS ointment for thick lesions and mild to moderate TCS cream for thin lesions).
- After resolution of eczema flares, discontinuation of TCS application should be done gradually to avoid rebound (i.e., twice a day followed by once a day, then 1–3 times a week before complete discontinuation).
- After resolution of eczema flares, proactive therapy (mild TCS application intermittently once or twice a week) can be used to maintain remission.

Topical calcineurin inhibitors

Topical calcineurin inhibitors (TCIs), e.g., tacrolimus and pimecrolimus, are non-steroidal immune-modulating agents and may be considered for treatment of flares in AE. They are licensed for the treatment of children older than two years of age.

Systemic Therapy

Systemic therapy includes adjunctive treatment (e.g., antihistamines and systemic antibiotics) and specific treatment of AE (e.g., immunomodulating agent and biologics). Specific systemic treatments should be used only in severe cases of AE in patients where other management options have failed or are not appropriate and where AE has a significant impact on quality of life.

Antihistamines

Itch is a common symptom in AE, and sedating antihistamines may be considered as a short-term measure at bedtime in AE patients with sleep disturbance.

The medication should not be used as a monotherapy or as a substitute topical therapy in AE.

Immunomodulating agents

Corticosteroids, cyclosporin A, methotrexate, azathioprine, mycophenolate mofetil, intravenous immunoglobulin, and interferon gamma are some of the immunomodulating agents used in AE. These agents are used in moderate to severe AE which are uncontrolled after optimization of topical treatment and/or phototherapy. They are also considered in chronic AE where quality of life is substantially impacted. A referral to a dermatologist should be considered when patients require immunomodulating agents.

Antimicrobials

Routine use of topical and systemic antimicrobials among patients with non-infected AE is not recommended. They may be considered when there is clinical evidence of infection.

Antiseptics at appropriate dilutions, e.g., potassium permanganate, triclosan, or chlorhexidine, may be used as an adjunct therapy to decrease bacterial load in patients who have recurrent infected AE.

In a local setting, short-term antiseptic agents may be used for weepy lesions in AE:

- diluted potassium permanganate solution as bath/soak over the limbs and trunk
- normal saline dab/wash over the face

Long-term continuous use of antiseptics should be avoided.

Educational Interventions

Educational and psychological interventions are used as an adjunct to conventional therapy in the management of AE. Patient education plays an important role in the self-management of AE. The use of a written eczema action plan (WEAP) may enhance patients' understanding and empower patients/caregivers to better manage their condition, thus reducing the frequency and severity of flares and the frequency of clinical encounters.

WRITTEN ECZEMA ACTION PLAN

NAME:	GREEN = GO : Use preventive measures YELLOW = CAUTION : Use lower strength medications RED = FLARE : Use higher strength medications and consult your doctor
GREEN 	ECZEMA UNDER CONTROL REGULAR DAILY SKIN CARE 1. Bathe twice a day with a gentle cleanser for less than 10 minutes. 2. Apply moisturizer to all body parts immediately after bathing. 3. Apply moisturizer to all body parts a minimum of thrice a day. 4. Bathe and moisturize your skin before bed. 5. Wear suitable clothes/pajamas (preferably cotton) to bed.
YELLOW 	ECZEMA WORSENING SKIN CARE DURING WORSENING 1. Continue regular skin care from GREEN phase. 2. Apply anti-inflammatory creams until eczema clears. 2a. Face: Apply hydrocortisone 1% twice a day for 5–7 days, then once a day for 5–7 days until eczema clears. 2b. Body: Apply betamethasone (1:4) twice a day for 5–7 days, then once a day for 5–7 days until eczema clears. 3. Take an antihistamine (anti-itch medication) as prescribed by doctor half an hour before bed. 4. If eczema gets better, revert back to GREEN phase. 5. If eczema is not responding within 3 days or eczema and itch worsens, move to RED phase.
RED 	FLARE SKIN CARE DURING FLARE 1. Continue regular skin care from GREEN phase. 2. Bathe daily with antiseptic wash for 5–7 days. 3. Apply anti-inflammatory creams until eczema clears. 3a. Face: Apply betamethasone (1:8) twice a day for 5–7 days, then once a day for 5–7 days until eczema clears. 3b. Body: Apply betamethasone (1:2) twice a day for 5–7 days, then once a day for 5–7 days till eczema clears. 4. Take an antihistamine (anti-itch medication) as prescribed by doctor half an hour before bed. 5. If eczema gets better, revert back to YELLOW phase, then subsequently to GREEN phase. 6. If eczema is not responding within 3 days or eczema and itch worsens, consult your doctor.

Referral

Referral to a dermatology service may be needed in the management of AE. The urgency of referral is dependent upon various factors. Referrals may be classified as either urgent or non-urgent.

1. Urgent referral (within 24 hours)

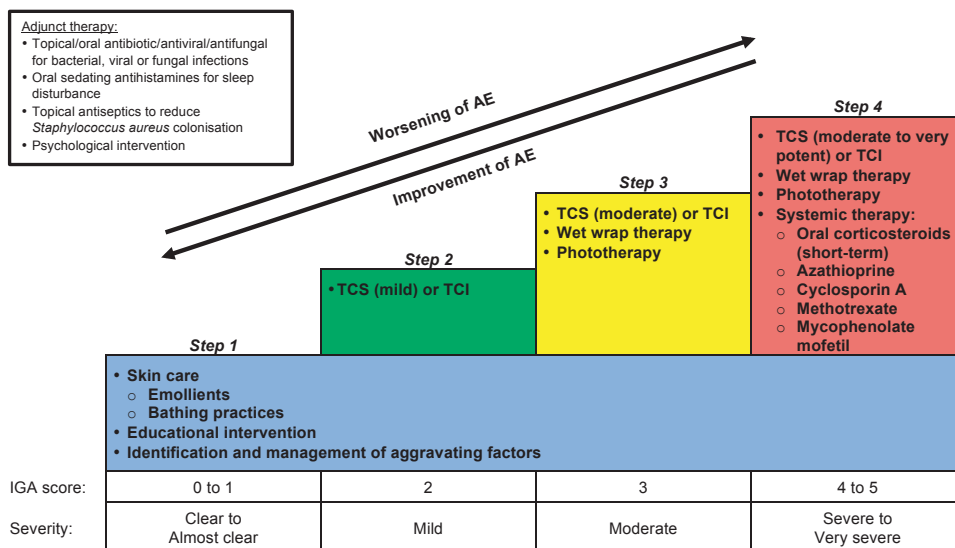
- AE with clinical suspicion of eczema herpeticum (eczema with widespread herpes simplex infection)
- AE with severe skin bacterial infection that requires intravenous antibiotics
- AE with acute erythroderma where the eczema is affecting more than 80% of the body surface area

2. Non-urgent referral

- Diagnostic uncertainty
- Severe or uncontrolled eczema:
 - requirement of potent and very potent TCS
 - frequent infections
 - poor sleep or excessive scratching
 - treatment failure with appropriate topical therapy regimen
- Parental concern
- Need for treatment demonstration/education
- Involvement of sites that are difficult to treat
- Psychological disturbance on the patient or family

A summary of the management of AE is illustrated in the following algorithm.

ALGORITHM: TREATMENT OF ATOPIC ECZEMA



IGA: Investigators' Global Assessment; TCS: topical corticosteroids; TCI: topical calcineurin inhibitors

Acknowledgement

Details of the evidence supporting the above statements can be found in Clinical Practice Guidelines on the Management of Atopic Eczema 2018, available on the following websites: <http://www.moh.gov.my> (Ministry of Health Malaysia) and <http://www.acadmed.org.my> (Academy of Medicine). Corresponding organization: CPG Secretariat, Health Technology Assessment Section, Medical Development Division, Ministry of Health Malaysia; contactable at htmalaysia@moh.gov.my.

Primary middle ear tuberculosis mimicking cholesteatoma

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Abstract

Tuberculous granuloma in the middle ear is an unusual entity. Herein, we report a case with short presentation of otitis media with mastoid abscess but with a CT scan showing widespread bone destruction. The cause was determined to be middle ear tuberculosis. Awareness of this entity is important, as it may cause a delay in referral to an otorhinolaryngology specialist and, subsequently, a delay in initiating treatment. Therefore, it should be considered in the differential diagnosis, especially when the usual treatment fails to produce the desired result.

Introduction

Otorrhea with mastoid abscess is commonly associated with pathology in the middle ear. The accompanying presentations may include hearing impairment, a recent history of ear infection, or the presence of granulation tissue from the middle ear that can be visible from the ear canal. The progression of the disease can lead to more devastating conditions, such as destruction of the middle ear conductive apparatus, facial paralysis, cochlear involvement with labyrinthitis, and intracranial dissemination of infection. However, failure of the standard treatment for acute otitis media should raise some suspicion of middle ear tuberculosis (TB) as a differential diagnosis. Tuberculosis is a puzzling infectious disease which may remain undiagnosed or cause confusion with other middle ear conditions like acute otitis media or even chronic otitis media with or without cholesteatoma. An atypical aggressive infection warrants further investigations for definitive diagnosis and treatment.

Case report

A 17-year-old man presented with a non-foul-smelling, yellowish discharge and post-auricular swelling of the right ear for two weeks. It was associated with otalgia, reduced hearing, and nocturnal fever. He had visited a private general practitioner and had completed one course of oral antibiotics prior to presentation at our clinic. However, his condition remained unresolved. There was no history of prolonged cough or loss of appetite or weight. He denied any history of night sweats or contact with a TB patient.

On examination, the vital signs were normal. There was a 7 x 4 cm fluctuant, soft, and tender swelling with no sinus or punctum pushing the right pinna antero-inferiorly. Otoscopic examination of the right ear showed posterior sagging of the canal with granulation tissue deep to it. The tympanic membrane was not visualized. The left ear examination was normal. A tuning fork test revealed negative Rinne on the right side while positive on the left. A Weber test was lateralized to the right, indicating right conductive hearing loss. The facial nerve was intact bilaterally and there were no signs of intracranial complications. There were no palpable lymph nodes.

A blood test showed high erythrocyte rate (80 mm/h). However, tuberculosis screening was unremarkable. He tested negative for hepatitis B and C as well as HIV. Chest x-ray was normal. Pure Tone Audiometry (PTA) showed severe to profound mixed hearing loss of the right ear with normal hearing on the left. Patient was started on intravenous ciprofloxacin and incision and drainage drained 8 ml of pus. Nevertheless, the culture came back as no growth.

The high-resolution CT scan (HRCT) revealed non-enhancing soft tissue density inside the external auditory canal, mesotympanum, and mastoid cavity on the right. There was erosion of the ossicles, the posterior, superior, and inferior walls of the auditory canal, and the mastoid bone (**Fig. 1a**). Otherwise, the cochlear and semicircular canals were intact. The proximal part of the tympanic segment and the anterior genu of the facial nerve were obliterated. There was a thinning of the bony area of the right tegmen tympani (**Fig. 1b**).

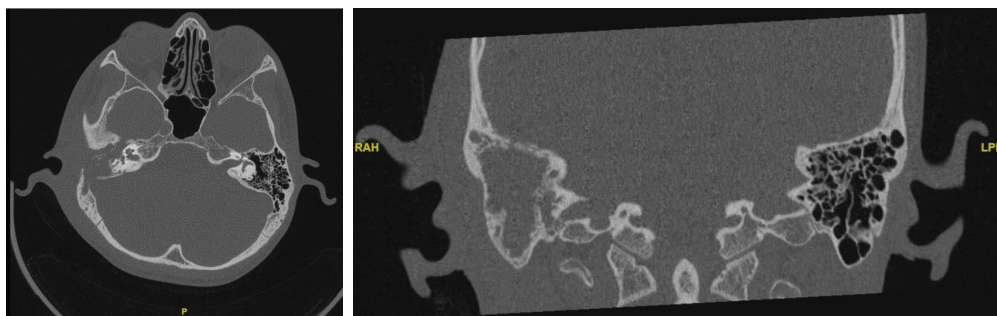


Fig. 1a (Left): Axial view of the HRCT of the temporal bone showing non-enhancing soft tissue density mass and bony erosions in the right temporal bone

Fig. 1b (Right): Coronal view of the HRCT of the temporal bone showing non-enhancing soft tissue density inside the mastoid cavity with erosion of the tegmen tympani

The left temporal bone structures were normal. The impressions from the radiological findings were in keeping with right cholesteatoma.

Right-modified radical mastoidectomy was carried out a week later as the patient did not respond well with the antibiotic. Intraoperatively, the right tegmen tympani and the right sigmoid sinus as well as the ossicles and the posterior wall of external auditory canal were noted to be eroded. Pus was sent for culture, sensitivity, and acid-fast bacilli (AFB) tests. The soft tissue from the mesotympanum was sent for histopathological examination (HPE).

The patient was discharged well on day two after the operation. Subsequently, the HPE was reported as tuberculous granuloma. However, the AFB test was negative. The patient was then treated as having extra-pulmonary TB with the regime of ethambutol, isoniazid, rifampicin, and pyrazinamide for nine months. The patient was seen well with no ear discharge during his follow-up at 8 months after completing the TB treatment.

Discussion

Otorrhea is a common presentation to the otorhinolaryngology clinic. Diagnosis of otorrhea with mastoid abscess is mostly limited to acute otitis media or chronic otitis media with or without cholesteatoma. The combination of microbiological, histopathological, and radiological findings guided by a thorough history and physical examination is important for achieving an accurate diagnosis.

Tuberculous otitis media is not a common

disease, especially in an immunocompetent person. It is even rarer to occur as a primary infection. The findings of soft tissue density in the middle ear with extensive bony erosion on HRCT of the temporal bone of our patient was suggestive of cholesteatoma, but the short history of ear symptoms causing complications is not its typical presentation. Similar aggressiveness of the disease has also been reported in a few case reports.^{1,2} Cavallin and Munoz suggested diagnosis of tuberculous otomastoiditis when there is CT evidence of widespread bone destruction without clinical signs of aggressive infection.¹

In our case, the AFB smear was negative for *Mycobacterium tuberculosis* (MTB). Garg et al. reported a very low sensitivity of MTB detected from pus AFB as compared to real-time polymerase chain reaction (RT-PCR).³ They have found that RT-PCR detected MTB in 28.6% of the cases with a negative AFB smear.

The diagnosis of tuberculosis in our case was made based on the histology report. In the same manner, Maniu et al. reported three cases of tympanomastoidectomy done under the suspicion of otitis media with cholesteatoma that were proven to be granulomatous lesions based on microscopic examination of the affected tissue.⁴ The common features in their report were the presence of severe granulation tissue filling the mastoid cavity and middle ear during surgery in the absence of cholesteatoma.

Primary tuberculosis of the middle ear is rarely encountered. In the literature, there are a few articles that report on this condition.^{5,6} The

condition should be suspected when the usual treatment fails to produce the desired result. Histopathological assessment is always a crucial step for an accurate diagnosis in addition to microbiological and radiological assessments.

Conclusion

Middle ear tuberculosis should be considered in a patient who presents with otorrhea accompanied by an atypical aggressive infection. Histopathological examination is critical in accurately diagnosing this condition.

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Severe Dengue with Hemophagocytosis Syndrome

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Abstract

Dengue is known to cause high morbidity and mortality worldwide. In recent years, there have been increasing cases of dengue fever associated with a rare complication: hemophagocytic syndrome (HPS), which is a dangerous disorder that carries high mortality. It is associated with infections, autoimmune disorders, and malignancies. Prolonged duration of fever and cytopenia together with multi-organ dysfunction out of proportion to the plasma leakage phase should alert clinicians to consider this condition. In this case study, we highlight a 45-year-old woman with underlying diabetes who was admitted due to dengue fever with warning signs. Her conditions deteriorated quickly: she had spontaneous bleeding, evidence of plasma leakage, severe hepatitis, and coagulopathy on the 11th day of illness. With the support of other blood results, such as raised serum ferritin and lactate dehydrogenase, she was diagnosed with severe dengue with hemophagocytosis syndrome. She responded well to intravenous dexamethasone and recovered on the 19th day of illness.

Introduction

Dengue has been recognized recently as one of the most significant public health threats, causing high morbidity and mortality worldwide. Although death due to dengue is 99% avoidable, every year around 20,000 deaths are estimated to occur in more than 100 countries.

One of the causes of severe dengue presentation is hemophagocytic syndrome. Hemophagocytic syndrome (HPS), or hemophagocytic lymphohistiocytosis (HLH), is a potentially fatal disorder caused by an abnormal immune response.¹ Reactive HPS is associated with infections, autoimmune disorders, and malignancies. The infectious agents that have been previously linked with HPS are the Epstein-Barr virus, influenza virus, mycobacteria, cytomegalovirus, and human immunodeficiency virus, to name a few. In recent years, there have been increasing cases of dengue fever associated with HPS reported in the literature. However, this condition is still considered rare and under-recognized. Prolonged duration of fever and cytopenia together with multi-organ dysfunction out of proportion to the plasma leakage phase should alert clinicians to consider this condition.

This case illustrates a severe case of dengue infection with multi-organ dysfunction associated with hemophagocytosis syndrome, which was managed successfully due to early recognition of this condition.

Case presentation

We report a case of a 45-year old woman with underlying hypertension and diabetes mellitus who presented on day 5 of illness to the health clinic with a high grade fever associated with chills, rigor, myalgia, arthralgia, and headache. NS1Ag taken was positive. On day 9 of illness, she was referred to the hospital for dengue fever with warning signs because she developed vomiting and loose stool. She denied any bleeding tendencies. On the day of admission, the patient's vital signs were stable with no evidence of organomegaly. The initial full blood count showed leucopenia ($1.29 \times 10^3/\mu\text{L}$) and thrombocytopenia ($74 \times 10^3/\mu\text{L}$). The hematocrit was slightly raised (41%), but the hemoglobin was normal (12 g/dL). The liver function tests showed slightly raised aspartate transaminase (AST; 276 mmol/L) and alanine transaminase (ALT; 35 mmol/L). The patient was initially admitted into the general ward and managed with fluid therapy.

On day 2 of admission, her condition deteriorated. She had spontaneous gum bleeding, persistent vomiting, and dizziness. Her blood pressure was 135/86 mmHg, heart rate 80 beats per minute, and temperature 37.5 °C. Her respiratory rate was 36 per minute with reduced air entry in the right lower zone. Chest x-ray showed bilateral pleural effusion, and arterial blood gases showed compensated metabolic acidosis. There were sudden increased in the liver

enzymes: AST (276→2154), alkaline phosphatase (ALP) (66→109), and ALT (35→205). The coagulation profile was also prolonged with INR of 1.3 and APTT of 75. She was treated as having severe dengue with hepatitis, plasma leakage, and coagulopathy, and thus transferred to the intensive care unit.

The patient was transfused with 4 units of platelets, 4 units of fresh frozen plasma, and 1 pint whole blood and was commenced on non-invasive ventilation. An IV N-acetylcysteine (NAC) regime was given for the severe hepatitis. The increased liver enzyme levels raised the possibility of hemophagocytosis syndrome, which was later confirmed with high serum ferritin (31013 g/dL) and lactate dehydrogenase (LDH; 3627 U/L). The patient was then started on IV dexamethasone. She continued to improve with this management and was discharged on day 19 of illness with slightly raised liver enzymes.

Outcome and follow-up

Repeat blood investigation one week after discharge showed normalized liver function.

Discussion

We describe an unusual, severe presentation of dengue infection associated with hemophagocytosis with multi-organ dysfunction. There have been other cases reported worldwide.^{2,3} To our knowledge, there has been one case series of eight dengue cases associated with hemophagocytosis syndrome reported in Malaysia by Tan et al (2012). Our case was similar to previous cases^{4,5} in that the patient presented with multi-organ dysfunction and highly elevated liver enzymes.

The time of presentation in this case was on the 10th day of illness, which is consistent with most HPS cases reported.⁶ There are underlying diseases or disorders that increase the risk of HPS. This patient has underlying diabetes mellitus. It has been reported that this is one of predisposing factors for HPS.⁷

The elevated transaminases that peak during the convalescent phase in dengue patients are postulated to be due to immune dysregulation. Hemophagocytic activity (HA), a form of immune dysregulation, plays a role in the pathogenesis of hepatic dysfunction. Direct hepatocyte damage by the

virus, immune factors, and apoptosis of cells due to oxidative stress have all been suggested as possible mechanisms for liver cell damage. The limitation in this case was that a bone marrow biopsy was not done in our patient to confirm the hemophagocytic activity because the patient refused. Bone marrow biopsies in other HPS cases showed normal maturity of all cell lineages and infiltration by activated macrophages filled with other blood cells (Stabile et al., 2006). Another feature that supported the diagnosis in this patient was elevated lactate dehydrogenase, which was observed in almost all cases with hemophagocytosis syndrome.⁶

Another hallmark feature of HPS is elevated ferritin level. There is an argument that the increase in ferritin level is a marker for an acute phase reactant.⁸ However, our patient's highest ferritin level was 49637 ug/L, noted on day 12 of illness. This was far above 500 µg/L, which is the level considered as criteria for HPS diagnosis.¹ This supported the diagnosis of HPS in this patient's case.

Specific treatment guidelines for dengue fever associated with HPS syndrome do not exist. The general rule of treatment for acquired HPS is to identify the cause and institute specific treatment for it, which may suffice to arrest the development of HPS. Since there is no specific treatment for dengue fever other than fluid therapy, the main aim of treatment in cases associated with HPS is to suppress the inflammatory response and control cell proliferation. For less severe cases, corticosteroids and/or intravenous immunoglobulins or cyclosporine A may be adequate, but for high-risk cases, etoposide therapy is recommended. However, the most important step is to start treatment early; a delayed initiation of treatment is the greatest barrier to a successful outcome. **Our patient was given IV dexamethasone at day 11 of illness, as soon as HPS was suspected by rapidly rising transaminitis, high ferritin, and the patient clinically deteriorating. Early initiation of at least dexamethasone treatment may halt the inflammation. She improved very well with the treatment. Pulse dosages of methylprednisolone or dexamethasone have been used to suppress the hyperinflammatory state.** Other case reports⁵ also showed improvement of conditions with the same treatment, except for one case in Tan et al. (2008),

where the patient died despite receiving methylprednisolone. This could be due to a more severe presentation of the illness where the steroid was not sufficient or a delay in the initiation of treatment.

The use of NAC in non-acetaminophen acute liver failure (ALF), however, is controversial. A randomized, double-blind, placebo-controlled study had shown that intravenous NAC improved transplant-free survival and was well tolerated in non-acetaminophen ALF when given at an early stage.⁹ None of the other

cases reported the use of NAC as part of the management of dengue infection associated with HPS.

Learning Points

Hemophagocytosis syndrome associated with dengue infection can result in severe multi-organ failure.

Early recognition of the condition with prompt treatment gives a good prognosis for the patient.

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Fetal Atrial Ectopic Rhythm Detected Using Handheld Doppler

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Abstract

Atrial ectopic rhythm is one of the most common fetal arrhythmias that can present during the prenatal period. Detection of fetal arrhythmia can be made by auscultating fetal heart rate and rhythm using a fetal handheld Doppler, and this can be done even in a resource-limited setting. The finding of an abnormal fetal heart rate and rhythm should prompt early referral to a pediatric cardiologist, as this may improve clinical outcomes. We present a case of atrial ectopic rhythm detected in utero using a handheld Doppler.

Introduction

Atrial ectopic rhythm is a fetal arrhythmia that can be detected in primary care. Fetal arrhythmia occurs in 1–3% of all pregnancies, and the most common arrhythmia is atrial ectopic rhythm, or premature atrial contractions (PAC).¹ Fetal atrial ectopic rhythm is a benign arrhythmia that can present transiently for a few hours or may persist throughout pregnancy and into the neonatal period.¹ It can be detected via the auscultation of fetal heart rate, and diagnosis is confirmed with M-mode and pulsed Doppler fetal echocardiography.¹ Although it is usually idiopathic, it can also be associated with congenital heart disease, fetal cardiomyopathy, fetal tumors, fetal atrial fibrillation, or fetal heart block.^{1,2} Depending on the degree of prematurity of an ectopic event, a PAC may be conducted to the ventricles or be blocked within the AV node and then manifest as an extra beat or missed beat on auscultation.³ Atrial ectopic rhythm has been reported to resolve spontaneously without any treatment, but, in rare cases, it can progress to life-threatening supraventricular tachycardia.

The handheld Doppler is a handheld ultrasound transducer used to detect the fetal heartbeat during prenatal care.⁴ It provides a steady-state number of beats per minute (bpm) as well as audible auscultation of the fetal heart. Auscultation of fetal heart rate (FHR) during prenatal checkups is routinely done using a handheld Doppler or Pinard fetal stethoscope, as these can increase the detection of FHR abnormalities. Any suspected fetal arrhythmia during auscultation should be referred promptly to a specialist for assessment.

Case Report

A 24-year-old, gravida 6 para 5 with underlying maternal obesity (Body Mass Index of 36 kg/m²) came for a routine prenatal checkup at 38 weeks of pregnancy at a primary health care clinic on 8th October 2018. The prenatal history was uneventful up to this presentation. Clinically, she was well with a blood pressure of 120/70 mmHg and a pulse rate of 72 bpm. Other systemic examination was unremarkable, and the uterus size corresponded to the gestational period. During abdominal and uterine examinations, an abnormal heart sound was detected by auscultation using a handheld Doppler (Audio File 1). Fetal heart rate was noted to be in the range of 110–200 bpm, with an average heart rate of 146 bpm. The rhythm was regularly irregular. The nurse had never heard such a peculiar fetal heart sound, which was described as “dududup... dududup...dududup”. The fetal heart rhythm persisted despite positioning the mother in left lateral position. Transabdominal ultrasound showed fetal parameters that corresponded to gestational age with a grossly normal heart structure. Otherwise, the mother did not have signs or symptoms of autoimmune diseases, hyperthyroidism, or infection.

The patient was then referred to a consultant obstetrician on the same day and was admitted to a tertiary hospital. In the ward, the cardiotocography (CTG) showed fetal arrhythmia with fetal heart rate ranging from 70 to 200 bpm. A decision for emergency lower segment cesarean section (LSCS) and bilateral tubal ligation was made due to persistent fetal arrhythmia and completed family. A baby boy weighing 3.42 kg was born with a good Apgar

score. On examination at birth, the baby was pink with no cyanosis, and the heart rate was 149 bpm. Systemic examination was normal and no signs of heart failure were observed.

However, at 10 minutes of life, the baby's oxygen saturation dropped to 72–78% under room air with presence of subcostal recession. A Neopuff® Infant T-piece Resuscitator was used for 15 minutes, and oxygen saturation rose to 92%. Subsequently, the baby was admitted to the Neonatal Intensive Care Unit (NICU) for observation and close monitoring. The baby's blood investigations were normal, as shown in Table 1 below.

Table 1: Blood investigation results

Blood Investigations	Result
Hemoglobin	17.7 g/dL
White blood count	14.67 u/L
Platelet	321 u/L
Calcium	2.55 mmol/L
Phosphate	1.91 mmol/L
Magnesium	0.8 mmol/L
Blood gas pH	7.29
Blood gas pO ₂	42.0 mmHg
Blood gas cHCO ₃	25.0 mmol/L
Base excess (BE)	-2.3 mmol

At 30 minutes of life, the baby's oxygen saturation had improved to 100% and oxygen supplementation was changed to nasal prong oxygen at 2 L/minute. There was no pre- and post-ductal oxygen saturation discrepancy. Continuous cardiac monitoring showed the baby's heart rate ranging from 120–130 bpm with intermittent bradycardia (heart rate 50–60 bpm) that resolved spontaneously. A 12-lead ECG showed sinus rhythm with ectopic beats (**Picture 1**). The baby's blood pressure was stable at 68/30 mmHg, and there were no signs of respiratory distress or apnea. Echocardiogram showed a structurally normal

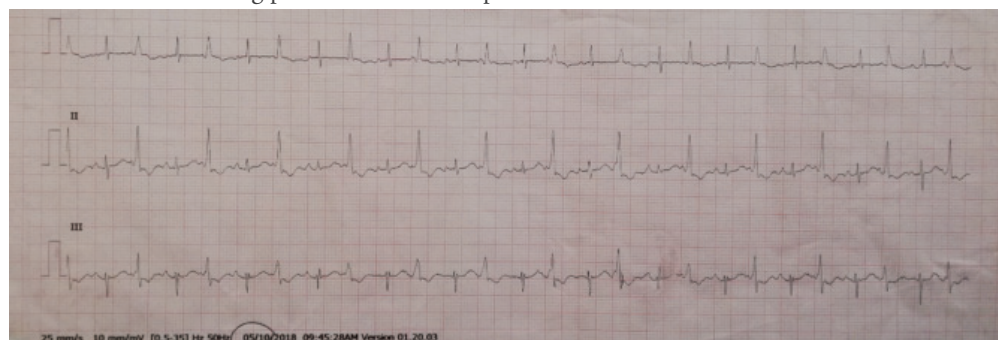
heart. The case was discussed with a pediatric cardiologist, and the diagnosis of atrial ectopic rhythm was made with a plan to observe for any persistent arrhythmia.

On the next day, the baby's oxygen supplementation was reduced to 1 L/minute, and he was subsequently weaned off at 28 hours of life. He was able to maintain oxygen saturation at 99–100% under room air. The respiratory deterioration was attributed to transient tachypnea of the newborn. As his condition stabilized, breastfeeding on demand was initiated. Heart rate was noted to be at 120–140 bpm with no more bradycardia or ectopic episodes. The baby was observed for 72 hours and discharged well at day 4 of life. He was seen at a pediatric clinic by a visiting pediatric cardiologist at the age of one month old, and a repeated ECG was noted to be normal. The child had no symptoms of heart failure, cyanosis, or rapid breathing. He breastfed well, and his weight had increased to 6 kg. The mother was screened for thyroid disease and autoimmune diseases, which all came back as normal.

Discussion

Fetal arrhythmia is a benign condition, and it has been reported to occur in 0.6–3% of all pregnancies.^{1,2} Fetal arrhythmias can be categorized into sustained bradycardia (heart rate <100 bpm), sustained tachycardia (heart rate >180 bpm), or a combination of irregular rhythm and abnormal heart rate.⁵ It has been reported that approximately 10% of all referrals for fetal rhythm abnormalities were clinically significant and could lead to mortality issues.⁶ Therefore, because there is a possibility of intervention being necessary, it requires an early recognition and diagnosis as well as access to expert services. An accurate early diagnosis is crucial for the selection of prenatal and postnatal treatment.

Picture 1: ECG showing premature atrial ectopic



Atrial ectopic rhythm, or premature atrial contraction, is due to an activity of the atrium that starts before the normal atrium beats, which resets the normal sinus beat.⁷ Depending on the degree of prematurity of the ectopic event, a PAC may be conducted to the ventricles or be blocked within the AV node, resulting in an extra beat or a missed beat on auscultation.³ This condition is usually well tolerated and resolves spontaneously without treatment.¹ Nevertheless, in rare cases, progression to supraventricular tachycardia (SVT) or fetal bradycardia, such as complete heart block, can occur.³ Perinatal factors that may predict conversion of PACs to SVT includes fetus with cardiomegaly, evidence of ventricular systolic dysfunction, AV valve regurgitation, hydrops, and lack of conversion to normal sinus rhythm during the prenatal period.^{6,8} It is not common to have fetal atrial ectopic rhythm with any signs or symptoms, but it can be suspected in fetuses with persistent FHRs below 110 bpm coupled with a family history of fetal or neonatal demise or sudden unexplained death in a young adult.² Auscultation of fetal heart rate once per week is recommended in fetal arrhythmia cases to exclude the development of major and life-threatening tachy- or bradyarrhythmia.¹ Mothers of fetuses with arrhythmia are usually asymptomatic, but the mother should be warned of the red flag symptoms of fetal tachycardia, which are an increase in abdominal and uterine girth secondary to polyhydramnios and a decrease in fetal movement.⁵

Fetal arrhythmias can be detected as early as 18 weeks using a handheld Doppler during routine fetal monitoring in prenatal clinics. During a prenatal care checkup, the nurse will screen the development of the fetus using a checklist. This checklist is printed in the standardized prenatal record book, and it includes clinical examinations for uterine size, fetal presentation, fetal heart rate, and presence of fetal movement. According to the standard operating procedure in the national perinatal guidelines, the nurses are expected to do fetal heart auscultation from 24 weeks of gestation using a Pinard stethoscope or from 14 weeks if using a handheld Doppler monitor for at least 30 seconds to determine the fetal heart rate, rhythm, and/or variability.⁹ This routine fetal examination is useful and should be done properly because it can screen for fetal abnormalities such as poor fetal growth, abnormal amniotic fluid level, and abnormal heart rate or rhythm.

Although there are new technologies, such as fetal ECG and magnetocardiography,¹⁰ a simple tool like the handheld Doppler allows for detection of fetal abnormalities. This is especially important in a limited-resource settings where early detection with a handheld Doppler can prompt the attending nurse to refer the patient to a doctor and, subsequently, to a tertiary center for early intervention. In this case, the attending nurse was able to detect the abnormal heart rhythm from auscultation during a routine prenatal checkup. This allowed for the patient's immediate admission to a tertiary center where there was a team of professional health care providers, including obstetric and pediatric specialists equipped for any possible outcomes during delivery.

Ultrasound is the primary modality for the diagnosis of fetal arrhythmias, and fetal echocardiography using M-mode or pulsed Doppler is the mainstay in the assessment of fetal heart rate.² This evaluation is done by a fetal cardiologist or perinatologist to rule out any associated cardiac lesion. Once confirmed to have fetal atrial ectopic rhythm, subsequent monitoring of fetal heart rate is recommended to be done weekly because of a small risk of sustained fetal tachycardia.⁷ Most atrial ectopic beats are benign, do not need any specific intervention, and are not indicated for LSCS.^{1,11} In fetuses with sustained fetal tachycardia, emergency delivery is indicated if they are term or near-term in gestation.¹² Analysis of the mode of delivery in 84 cases of fetal atrial ectopic rhythms showed that only 32% underwent cesarean section for a cardiac indication.¹³ The decision for an emergency cesarean section in this case was made based on the CTG finding of persistent fetal arrhythmia and the pregnancy being at term. Due to a lack of expertise to confirm the diagnosis of benign fetal atrial ectopic rhythm in utero, the decision for immediate delivery via LSCS was made to reduce morbidity and mortality risks to the baby. Postnatal outcomes for fetal atrial ectopic rhythm are favorable, as most of them will resolve as the child grows older.¹ Although the child in this case developed a few episodes of bradycardia in the first few hours of life, probably due to blockage of the premature beat at the AV node, it was not persistent, and the echocardiography findings also showed a structurally normal heart. The majority of patients usually present with postnatal arrhythmia within the first 48 hours of life. Therefore, patients should be monitored in the

hospital for rhythm disturbances within the first 48 hours and then discharged home if well with the instructions of monitoring the heart rate for the first one to two months of life.⁸

Conclusion

This case report on an atrial ectopic rhythm fetal arrhythmia underlines the importance of proper auscultation performed prenatally to identify potentially life-threatening conditions in the fetus. This procedure, which has an easy implementation and a low cost, enables an early diagnosis that is vital in preventing complications. The management of fetal arrhythmias requires a quality hospital environment, allowing the safe conduct of invasive fetal procedures and delivery. Equivalently, survival and quality of life for both mother and baby are protected by the presence of an appropriately specialized multidisciplinary team.

Recommendations

This case report highlights the importance of routine prenatal monitoring for detecting fetal abnormalities using a simple handheld Doppler. It is important that these routine care practices are not neglected in day-to-day practice. We also want to highlight the importance of not only listening to heart rate but also noting the fetal heart rhythm during prenatal screening.

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Vision loss in an immunocompetent child post varicella infection: A case report

Lee SC, Ng MCE, Tan CL, Ting SL

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Abstract

Chickenpox may lead to several neurological complications. Optic neuritis is one of the complications which has rarely been described, especially in immunocompetent individuals. We report a case of an 11-year-old immunocompetent girl who presented with sudden onset bilateral vision loss three weeks after varicella eruption. Ophthalmic examination revealed bilateral optic disc edema. Diagnosis of bilateral optic neuritis secondary to varicella was established based upon the preceding medical history, supported with clinical and radiological findings.

Introduction

Optic neuritis is a condition characterized by inflammation of the optic nerve, leading to acute visual loss. It commonly occurs bilaterally in the pediatric population and can be attributed to viral infection or demyelinating disease. Optic neuritis is a rare consequence of varicella infection.¹ This case report is to highlight that optic neuritis can occur as one of the complications after chickenpox infection in an immunocompetent child.

Case Report

An 11-year-old girl presented with sudden onset bilateral reduced vision associated with painful eye movements for a week with rapid progression. No prior treatment was

sought for her ocular symptoms. She had varicella eruption three weeks prior and was treated in a primary healthcare center without acyclovir. She was pre-morbidly healthy and had completed immunization up to her age. There was no redness, eye discharge, floaters, or flashes of lights. Otherwise, she gave no other significant ocular history or neurological symptoms.

Her bilateral visual acuity was counting finger. Relative afferent pupillary defect was positive on right eye. The optic nerve function tests revealed failed Ishihara color vision. Anterior segments were normal. Bilateral optic discs were diffusely swollen and hyperemic (**Figure 1A & 1B**). Systemic and neurological examination was normal.

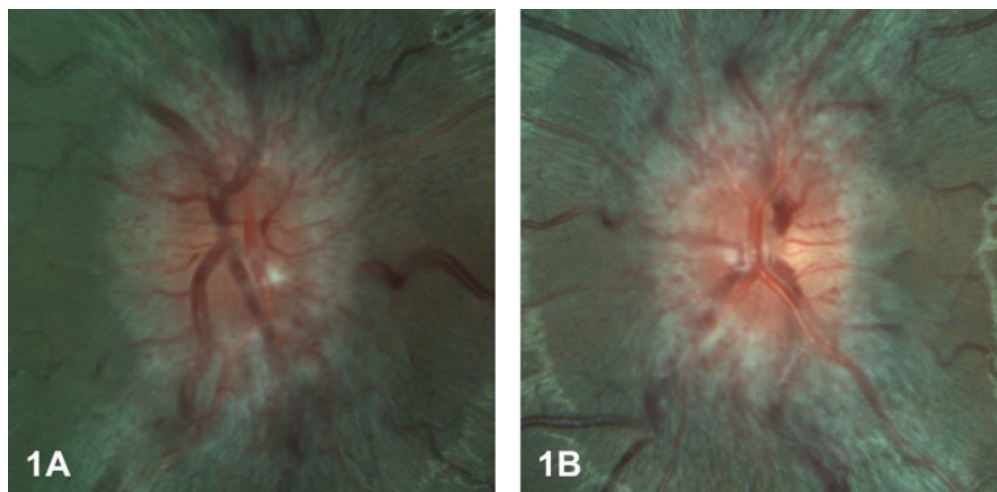


Figure 1A & 1B: Right eye (1A) and left eye (1B) showed hyperemic and diffusely swollen optic discs.

Magnetic resonance imaging (MRI) of orbits showed enhancement of both optic nerves (**Figure 2**). There was no evidence of demyelination or transverse myelitis on brain and spine MRI. Lumbar puncture revealed normal opening pressure and cerebrospinal fluid findings. Infective screens (Venereal Disease Research Laboratory test, toxoplasmosis, rubella, cytomegalovirus, herpes simplex virus, human immunodeficiency virus), and screens for antinuclear antibodies and anti-aquaporin-4 antibodies were negative. Diagnosis of bilateral optic neuritis secondary to varicella infection was made based on history of preceding chickenpox, clinical, and radiological findings.

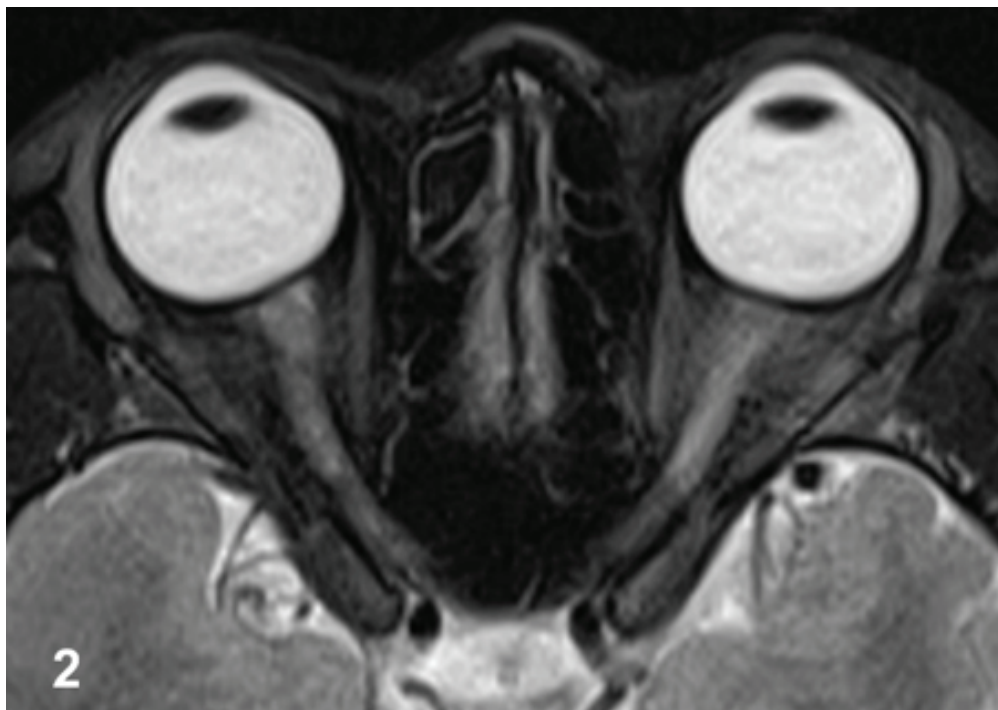


Figure 2: MRI of orbits showed contrast enhancement of bilateral optic nerve, consistent with optic neuritis.

She was treated with intravenous methylprednisolone (30 mg/kg per day with maximum 1 g daily) for five days, followed by nine days of oral prednisolone (2 mg/kg daily). Her bilateral visual acuity had markedly improved to 6/6 with normal color vision after two weeks of treatment. Subsequent review showed resolution of optic discs swelling (**Figure 3A & 3B**). One month after initial presentation, her bilateral visual acuity was 6/6 with normal optic nerve function tests. Patient had defaulted subsequent follow-up after the last visit.

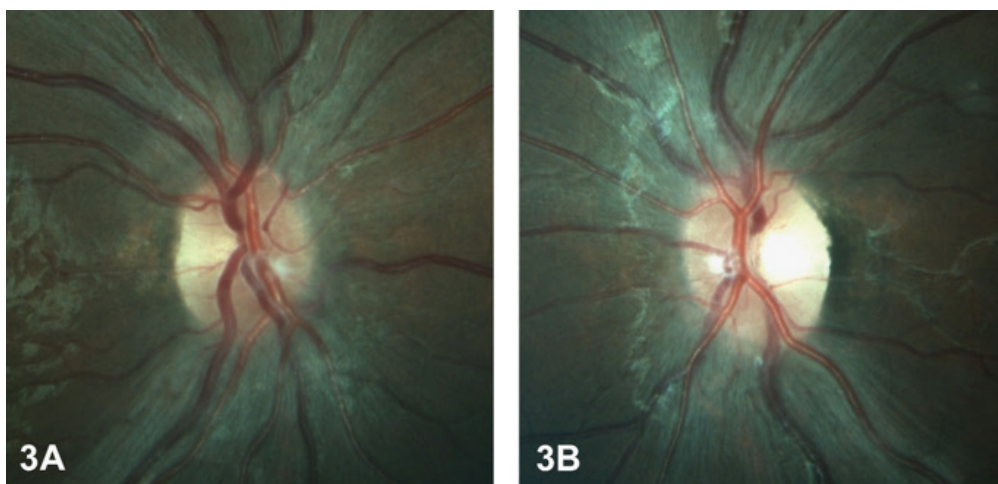


Figure 3A & 3B: Resolution of right eye (3A) and left eye (3B) optic disc swelling after treatment.

Discussion

Optic neuritis in the pediatric population is uncommon.² The presentation is usually bilateral and more severe compared to that in adults. However, the visual prognosis is better in children.^{1,3,4}

Optic neuritis usually presents post-infection or post-immunization in pediatrics. However, if it is associated with other neurologic features, childhood multiple sclerosis and acute disseminated encephalomyelitis should be considered in the differential diagnosis.^{1,5}

Varicella is a well-known contagious disease caused by the varicella-zoster virus. It may lead to neurological complications, including encephalitis, transverse myelitis, Guillain-Barré syndrome, facial nerve palsy, and cerebral ataxia, but optic neuritis has rarely been described. Ocular manifestations may occur at any time during the course of the disease or post-varicella infection.^{1,5} The course of post-varicella optic neuritis is reported to be significantly more severe and often includes acute retinal necrosis in immunocompromised individuals.²

The pathogenesis of varicella infection leading to optic nerve involvement is not well understood. It has been postulated to occur via direct nerve invasion by the virus or an autoimmune-mediated disease process. In our case, there was a three-week interval from the onset of varicella eruption to the development of symptoms. The delayed onset may suggest a secondary autoimmune process. The postulated mechanisms for this process include molecular mimicry between viral and neural antigens and incorporation of virally coded antigens into neural tissue.^{2,3,5}

Acute demyelinating optic neuritis and transverse myelitis were safely excluded in this case by MRI study of the central nervous system. Lumbar puncture is not routinely performed in all cases of optic

neuritis. It should be considered only in atypical cases with bilateral presentation and both neurological and infective symptoms.⁶ Confirmatory serologic testing for varicella is indicated only when there is an unclear medical history.⁴

Studies have shown evidence of irreversible injury and functional decline after resolution of optic neuritis in children. These include reduced color vision, visual field defects, thinner optic nerve fiber layers, and optic atrophy.^{7,8}

The use of corticosteroids in treating optic neuritis in the pediatric population is controversial. Based on the Optic Neuritis Treatment Trial (ONTT), the visual benefit from treating acute optic neuritis in adults with intravenous corticosteroid is only limited to an accelerated rate of recovery with no change of final visual outcome. It also reduces the rate of recurrences and risk of development of a second demyelinating event.^{7,9} However, there is still no standardized guideline for intravenous corticosteroid treatment among pediatric patients. In our case, we opted for a short course of systemic corticosteroid in view of the disease severity (bilateral involvement and poor initial visual acuity), with the aim to halt the progression of optic neuritis.

Conclusion

Pediatric patients who experience sudden vision impairment with recent preceding varicella infection should be urgently evaluated to rule out optic neuritis. Timely treatment is of utmost importance for halting the progression of optic neuritis and preventing detrimental sequelae.

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How does this paper make a difference to general practice?

1. Varicella-zoster infection is a common contagious disease in our population.
2. General practitioners should aware that optic neuritis, although rare, can be a complication of chickenpox infection in an immunocompetent patient.
3. Early diagnosis of optic neuritis and intervention are important for halting its progression and preventing sequelae.

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Urinary frequency: going beyond the tract

Rahmat R

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Abstract

Obsessive-compulsive disorder (OCD) is a common anxiety disorder which can be chronic and sustained. An OCD sufferer experiences intrusive and repetitive thoughts, impulses, and behaviors, which ultimately cause extreme discomfort. We report a case of a patient that primarily presented with lower urinary tract symptoms who was subsequently treated with antibiotics. Nonetheless, the symptoms persisted.

In subsequent consultations, the patient clarified the compulsive nature of his symptoms and was treated as a case of OCD. Therefore, it is crucial for physicians to correctly identify the nature of the symptoms to manage the disorder properly and to avoid unnecessary consultation and treatment. To the best of our knowledge, this is the first report of other presentations of OCD.

Introduction

In recent years, awareness about obsessive-compulsive disorder (OCD), a mental health condition, has increased. The disorder is clinically characterized by recurrent intrusive thoughts (obsessions) and repetitive behaviors (compulsions) that affect daily routine and impair function, which causes distress.¹ The obsession induces stress and anxiety, while the compulsion serves to reduce anxiety.² The presentation of OCD can be confusing and the patient can be misdiagnosed for up to a decade before proper treatment is initiated.³ Similar to other psychiatric disorders, the patients frequently present to physicians in specialties other than psychiatry. Another treatment barrier can be shame, and people with the illness suffer in silence.⁴ The following case report is an example of a patient with OCD symptoms who presented to primary care several times with similar complaints before being diagnosed with OCD. The patient and the treating physician did not expect the patient's lower urinary tract symptoms to indicate an illness beyond the tract. To best of our knowledge, this is the first case report of OCD causing frequent urination.

Case Description

A 20-year-old patient accompanied by his mother was seen at an outpatient clinic at a university hospital with a five-month history of lower urinary tract symptoms. He reported urinary frequency associated with incomplete voiding and terminal urinary dribbling sensation. He had experienced such symptoms previously. He first sought consult on this matter in October 2017 and was seen

by a medical officer at that time. During the consultation, nothing of significance was found in the physical examination. Laboratory analyses including full microscopic examination of urine and random blood sugar were found to be within the normal range. At the end of the consultation, he was treated for symptomatic urinary tract infection. He was prescribed with antibiotics, 250 mg of Cefuroxime twice daily for one week, and scheduled for follow-up care in two weeks.

On the second visit, the patient reported persistence of the symptoms despite completing the antibiotics. There was no active treatment at the consultation and he was scheduled for renal function testing in two weeks.

On the third visit, the patient was accompanied by his mother and claimed symptoms had persisted and there was no improvement. The problem created distress for both of them. On further evaluation, he denied taking over-the-counter medications or recreational drugs and seldom consumed caffeinated drinks. On systemic review, there was no fever, dysuria, hematuria, low back pain, or loss of weight or appetite. There was no family history of cancer and no significant issues were found in the HEADSS (home, education, activities, drugs, suicidality, and sex) assessment.

The patient claimed the condition had disturbed his daily routine especially related to religious activities. His mother also felt disturbed by his everyday habit. He needed to go to the toilet repeatedly, rushed to urinate more often before prayer than at other times and frequently changed clothes because he

claimed he had terminal urinary dribble on his pants. When asked, he explained he had a strong feeling or thought of urinary dribble on his pants and the feeling was stronger just before any religious activities such as prayer. To suppress this thought, he frequently went to the toilet to urinate to empty his bladder. Sometimes he would spend half an hour in the toilet to satisfy his need to feel that his bladder was empty and clean of dribble. He considered this practice a waste of his time which was stressful for him and impacted his daily activities. He denied experiencing any other symptoms to suggest delusions or a mood disorder. Based on the symptoms, and the absence of organic cause for his problem, the diagnosis of OCD was discussed with the patient as the criteria based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) were fulfilled. The case was referred to a psychiatric clinic for shared care. He was seen by a psychiatrist and prescribed 20 mg of Fluoxetine every morning and scheduled cognitive behavioral therapy. Currently, the patient is still under follow-up and very much satisfied with the treatment by the psychiatry team.

Discussion

OCD is a highly heterogeneous disorder, presenting with a range of symptoms vary from patient to patient. Based on the DSM-5, the criteria for OCD include the presence of obsessions, compulsions, or both. Commonly, when obsessions arise, sufferers attempt to suppress abrasive thoughts with other thoughts or actions. Both obsessions and compulsions can cause anxiety and distress in the sufferers as well as their families, especially when the symptoms involved are time-consuming, thus affecting their daily routine.¹ Generally, symptoms of OCD include fear of or obsession over contamination by dirt or germs, constant checking compulsions, repetition of intrusive thoughts of a somatic, aggressive, or sexual nature, and excessive concern with order and symmetry.⁶ These symptoms can be easily recognized by most physicians. Nonetheless, sufferers of OCD can sometimes present atypical symptoms, hindering proper diagnosis and treatment. For example, Singh et al. (2009) reported OCD presenting with symptoms of hearing difficulties, only recognized after negative test results and multiple consultations to explain the symptoms.⁷

In the present case, the patient fulfilled the criteria of the DSM-5 for OCD. He experienced repetitive thoughts of urine dribbling and staining his pants, and he found it difficult to ignore the thought. To neutralize the obsessions, he manifested repetitive behavior by frequent urination, consistent with compulsion criteria. Previously, Ahn et al. (2016) showed a correlation between overactive bladder syndrome and obsessive-compulsive disorder in Korean women, suggesting the need for further exploration of the association between overactive bladder and OCD⁸. Indeed, the presentation of OCD can be confusing and can be misdiagnosed as other disorders, leading to unnecessary investigations and ineffective treatment. Ultimately, the patient becomes dissatisfied because of non-resolving symptoms. Unrecognized and untreated OCD affects the quality of life and daily activities⁹ not only for the patient but also the family members. In this case, the patient was feeling dysphoric over frequent urination which was mistakenly treated as urinary tract problems. This may be because the main symptom presented is rarely reported as a possible presentation in OCD patients. In one similar report, an 18-year-old female was diagnosed with OCD after multiple consultations with physicians on her symptom of frequent micturition.¹⁰ Therefore, it is crucial for primary healthcare professionals to be able to identify symptoms of OCD or to refer any atypical presentation for a second opinion. As with other mental illness, if OCD is suspected, the patient should be managed as per guidelines and referred to a psychiatrist for proper assessment, diagnosis, and treatment.

Conclusion

OCD can manifest with various symptoms and in this present case, urinary frequency. Symptoms unexplained by tests and a physical examination may require further evaluation, including consideration of the possibility of psychiatric illness which can be obscured and frequently missed. This is vital to avoid misdiagnosis, lengthy consultations, and unnecessary investigations and treatment.

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TEST YOUR KNOWLEDGE

A red and swollen nose

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Case History

A 36-year-old woman with a history of type-2 diabetes mellitus and dyslipidemia presented to a general practice facility with a four-day history of a red, swollen, and painful nose. She had been feeling feverish and noticed some discharge from the tip of her nose on the morning of presentation. She couldn't recall any trauma or insect bite to the area. She denied plucking her nasal hair or picking or blowing her nose excessively. There was no history of other dermatological conditions. Her medications were extended-release metformin (2g at night), modified-release gliclazide (60mg in the morning) and simvastatin (20mg at night), but she admitted to not taking them regularly. She was unsure of her glycemic and lipid control as she had not seen any doctor for her chronic conditions in more than one year.

Clinically, she was alert and oriented. Her temperature was 36.5°C, blood pressure was 128/72 mmHg and pulse was 86 beats per minute. Her weight and height were 74.5kg and 164cm, respectively, making her body mass index (BMI) 28 kg/m². Capillary blood glucose was 12 mmol/L.

Examination revealed an erythematous, tender swelling over the nasal tip with a central punctum. There was crusting over the right vestibule. There were no gingival, buccal or facial swelling, nor sinus or facial tenderness. Her nasal passages were otherwise clear. There was no cervical lymphadenopathy.



Figure 1. The tip of the nose showing localized edema, erythema, with a central punctum and minimal crusting.

Questions

1. What is the diagnosis?
2. How should this condition be treated?
3. What are the more severe complications of this condition?

Answers

1. She had nasal vestibulitis with nasal tip abscess. Nasal vestibulitis (NV), nasal furunculosis (NF), or nasal vestibular furunculosis (NVF) is a localized infection of the hair-bearing nasal vestibule.¹ Dahle proposed the nomenclature NVF because it is specific to the nasal vestibule and the acute focal symptoms present.² It is associated with minor trauma to the area from nose picking, hair plucking, excessive nose blowing, and topical nasal steroid use.^{2,3} *Staphylococcus aureus* may be the most common causative agent.¹
2. Mild cases can be treated with warm compresses and topical mupirocin.⁴ If there is no response, oral antibiotics should be used. More severe cases involving midfacial cellulitis or abscess formation such as in this patient, should be treated with systemic antibiotics.
3. These are potential severe intracranial complications, including^{5,6}
 - Ophthalmic vein thrombosis
 - Cavernous sinus thrombosis
 - Orbital abscess.⁷

The infected area involves the “danger triangle” zone of the face, which consists of the area from the corners of the mouth to the bridge of the nose, including the nose and maxilla.^{8,9} There is consistent communication between the facial vein and cavernous sinus that is important in the spread of infection.¹⁰

Case continued

She was admitted under an otolaryngologist and was started on intravenous ceftriaxone and analgesics. Her abnormal blood results

included a white cell count of 13.05, (normal $4.0-10.0 \times 10^3/\mu\text{L}$), C-reactive protein of 17.7 ($<5.0 \text{ mg/L}$), erythrocyte sedimentation rate of 30 (0-20 mm/hr) and HbA1c of 11.9% (106 mmol/mol). No further pus was obtained from the exploration and aspiration of the nasal tip punctum.

Her symptoms improved after three days of intravenous antibiotics, and she was discharged with a course of oral cefuroxime. She was counseled for regular follow up and treatment adherence to ensure good blood glucose control. This would help reduce the infection risk. An appointment was scheduled for a week post-discharge to review her progress, fasting lipid profile, and blood glucose.

Discussion

Previous reports suggest that NVF is commonly presented in clinical practice.² Given the benign initial symptoms, patients will normally present to a primary care facility. Hence, it is important for primary care doctors to be aware of this condition and understand the potentially severe complications. Mild cases can be managed with topical or oral antibiotics. Other infections to be considered around the perinasal area include impetigo and cellulitis.

There is a surprising lack of published literature on this condition. We found only three case reports published in English on intracranial complications from NVF.^{6,7,9} In a retrospective review of 118 cases admitted to a tertiary medical center, the complication rates were 78.81% and 48.30% for mid-facial cellulitis and nasal vestibule abscesses, respectively.¹ The authors hypothesized that intracranial complications were not observed because appropriate treatment was given or

these complications are actually very rare.¹ It has also been proposed that the spread of infection was due to the facial veins being in direct communication with the cavernous sinus, and the absence of valves in the facial veins facilitated the infection process.⁸ Another study, however, demonstrated that the facial and superior ophthalmic veins do possess valves.¹⁰ Hence, they proposed that the existence of communication between the facial vein and cavernous sinus and the direction of blood flow are important in the spread of infection from the face.¹⁰

Key points

- Mild cases of nasal vestibulitis/nasal vestibular furunculosis can be treated with warm compresses and topical antibiotics.
- Systemic antibiotics should be initiated for patients not responding to oral antibiotics, those with midfacial cellulitis or abscess formation, or more severe complications.
- Ophthalmic vein thrombosis, cavernous sinus thrombosis, and orbital abscess are rare but serious intracranial complications.

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Conflict of Interest

Authors declare none.

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How does this paper make a difference to general practice?

- This paper highlights that although nasal vestibulitis/nasal vestibular furunculosis may be a common presentation to general practice, we should be aware of the rare but potentially severe intracranial complications.

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Bluish swelling on the floor of the mouth

Hassan BM, Intan Suhana MA, Megat Mustaqim MI

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Case summary

A healthy, six-year-old girl presented to the clinic with a three-day history of swelling on the floor of her mouth (**Figure 1**). The swelling was painless and was not associated with discharge or bleeding inside her mouth. She also denied any fever, significant loss of weight or appetite, halitosis, dysphagia, and odynophagia. There was no other neck or chest swelling.

On physical examination, her face and neck appeared normal and symmetrical. Cervical and submandibular lymph nodes were not palpable. However, there was an ill-defined, rounded, bluish swelling approximately 2 cm in diameter on the left floor of the mouth lateral to the frenulum. The swelling was soft with a smooth surface but non-tender upon palpation. There was no bleeding or discharge noted in the oral cavity. Other oral structures appeared normal despite multiple caries on her deciduous teeth.



Figure 1. Clinical picture showing the swelling on the floor of the mouth.

Questions

1. What is the most likely diagnosis?
2. What are the differential diagnoses?
3. What are the possible causative factors for this condition?
4. How would you manage this patient during this consultation?
 - a. Prompt referral to a surgeon.
 - b. Perform aspiration under local anesthesia.
 - c. Observe the size and review the patient after 3 months.
5. In a situation where the primary care physician is unable to manage this case, to whom should this case be referred?
 - a. ENT surgeon.
 - b. Plastic surgeon.
 - c. Oral and maxillofacial surgeon.

Answers

1. The most likely diagnosis is an oral ranula. Ranulas can be further classified into three clinical types: intraoral ranulas, plunging ranulas, and mixed ranulas.
2. Differential diagnoses for ranulas include abscess, cervical thymic cysts, thyroglossal duct cysts, branchial cleft cysts, cystic hygromas, submandibular sialadenitis, intramuscular hemangiomas, cystic or neoplastic thyroid disease, laryngoceles, lipomas, and dermoid cysts.^{1,2}
3. Ranulas can occur spontaneously or as a result of local trauma to the floor of the mouth and obstruction of the sublingual salivary gland duct.

4. Answer: C

Parents and patient will be counseled that not all ranulas require treatment. In this case, as the size of the ranula is small and does not interfere with oral functions, observation is advocated. Parents and patient will be taught to monitor closely for any changes in appearance or size. An appointment will be given in three months to review the progression.

5. Answer: C

Discussion

A patient with oral pathology often meets their primary care physician (PCP) to seek

treatment. It is therefore essential for PCPs to equip themselves with an adequate knowledge of common dental problems so that they can manage these conditions appropriately or refer the case to a dentist/oral surgeon promptly.

A ranula is a mucus-filled cavity in the floor of the mouth caused by a damaged salivary gland.³ It can also be congenital or iatrogenic, such as trauma of the mouth and occlusion of salivary gland ducts.⁴ The term “ranula” originates from the Latin word “rana,” which indicates the appearance of the abdomen of a frog. Intraoral ranula can occur in patients as young as three months old and up to 80 years old.⁵ The incidence of intraoral ranula is highest among patients in their second and third decades of life,⁵⁻⁸ but it can also spike among patients in their first ten years of age.⁹ In terms of gender, ranula is generally thought to be equally common in both males and females.⁷ However, a few studies have found a higher prevalence in either females^{5,8,9} or males.⁶

A simple intraoral ranula typically presents with swelling in the floor of the mouth and only involves the mucous membranes.¹ Clinically, it appears round or oval in shape, bluish in color, mobile and soft in consistency, and fluctuant upon palpation,^{5,9} as opposed to lipomas and tumors of the salivary glands.⁴ Further enlargement of the swelling might lead to dysphagia, difficulty in speech, or even airway blockage.^{5,8} In pediatric patients under five years old, an untreated ranula can lead to obstructive sleep apnea, and delay in seeking treatment can eventually lead to failure to thrive.⁶ Intraoral ranulas are equally common on the right and left sides of the mouth.^{7,9} They commonly present with unilateral swelling, but, in rare cases, they may progress to involve both sides and present as a bilateral swelling.^{5,7} The size of ranulas can be less than 1 cm or larger than 2 cm in diameter.⁷

A plunging ranula presents differently from an intraoral ranula. It appears as a neck swelling that infiltrates and extends beneath the mylohyoid muscle. It is often confused with other neck pathologies.¹ Thus, further investigations might be required to differentiate a ranula from other neck pathologies such as a thyroglossal duct cyst, a cystic hygroma, an intramuscular hemangioma, or a neoplastic thyroid.^{1,2,5}

In terms of investigation, for ranula smaller than 2 cm, fine-needle aspiration of the

lesion can aid the diagnosis and will reveal a straw-colored aspirate. Additionally, a histopathological examination will demonstrate the presence of granulation tissue and a chronic inflammatory reaction.⁵

In an outpatient setting, a simple way to investigate a ranula is via a surgical sieve, which can be used to know the site, size, shape, and consistency of a ranula. However, a high-resolution ultrasound is recommended over other imaging modalities as it is readily available, involves no radiation, and does not require sedation. Additionally, an ultrasound can also demonstrate herniation of sublingual glands and help in determining the extent of cervical space involvement of the pseudocyst for a plunging ranula.¹⁰ It will appear as a homogeneous cystic mass which has a well-circumscribed border.¹¹ In a more advanced setting, an MRI or CT scan is preferred if the ranula is larger than 2 cm to ascertain the extent of the lesion.⁸ In plunging ranulas, a CT scan image will show a classical tail sign extending from the sublingual gland through the mylohyoid muscle, which differentiates it from other pathologies.¹⁰

A pediatric patient with a small and asymptomatic ranula might not require surgical intervention, as it may spontaneously resolve after few months.¹⁰ The parents should be advised to monitor its size in case it becomes larger and interferes with oral functions. Observation for six months is appropriate to give time for the ranula to spontaneously resolve, thus preventing unnecessary complications related to treatment.^{8,10} However, if the ranula is persistent, symptomatic, or increases in size, treatment must be considered.¹⁰

In general, patients with symptomatic and large ranulas of more than 2 cm in diameter require treatment. To date, there is no medication that can be prescribed by a PCP to accelerate the resolution of a ranula. Thus, a referral to an oral maxillofacial surgeon for further treatment is warranted.

Sclerotherapy and carbon dioxide laser excision are the commonly used non-surgical methods to treat ranulas.^{8,10} Sclerotherapy is performed with OK-432 injected into the lesion, which initiates an inflammatory reaction and subsequent destruction of the ranula wall.⁸ The patient might experience transient fever and pain after the procedure; however, there

are fewer adverse effects and complications such as scarring and deformity of the injected site as compared to surgery.¹⁰ The other non-surgical method is laser excision by carbon dioxide, which generates heat and subsequently ruptures the ranula and secures the minor salivary gland and ducts.¹⁰ This technique also has lower complication and recurrence rates and also reduces the risks of damaging the submandibular nerve duct and tissue scarring.¹⁰

There are various surgical methods to treat ranulas with varying degrees of recurrence. These surgeries should be performed only by an oral maxillofacial surgeon who is adequately trained for such procedures to avoid serious complications following the operation. Among the techniques are the aspiration of ranula content, marsupialization, ranula excision, sublingual or submandibular gland excision, combined ranula and sublingual/submandibular gland excision, and, lastly, excision of the ranula and both salivary glands.^{7,8}

Patel et al. (2009) reported that, among all procedures, aspiration of ranula has the highest recurrence rate (81.8%), followed by sclerotherapy (49.4%), ranula excision (44.4%), submandibular gland plus ranula removal (33.3%), and marsupialization (24.2%).⁷ Treatments that resulted in lower recurrence rates were sublingual gland plus ranula excision with unspecified incision (2.2%) and sublingual gland excision (1%), while no recurrence were reported after sublingual gland plus ranula excision through transoral and cervical

approaches (0%) and submandibular gland excision (0%).⁷

Ranula surgery is not without complication. Bleeding and hematoma can occur during or following the surgery.^{7,9} Numbness of the tongue and damage to the Wharton's duct during the evacuation of sublingual gland intraorally have been reported in some instances.^{7,9} The ranula itself could also grow in size if aspiration is performed as the method of the treatment.⁵

The surgery could also harm the marginal mandibular, lingual, and hypoglossal nerves if the surgery is done through a cervical approach.⁸ Additionally, this approach also poses a higher risk of oro-cervical fistula and scar formation.⁸ Thus, the choice of the surgical approach should be based on the extension of the ranula cyst to prevent unwanted complications.⁸

In conclusion, a ranula is a mucocele that results in a damaged salivary gland. Small ranulas are usually asymptomatic and can spontaneously resolve. However, they can also grow in size and lead to pronounced symptoms and complications. In this case, the PCP scheduled for a regular appointment every three months for observation. In this case, the prognosis was good, as it resolved on its own without any specific treatment. However, a referral letter to a dentist was given to treat multiple caries of her deciduous teeth.

How does this paper make a difference to general practice?

Patients with this oral condition may attend primary care clinics to seek medical treatment. This paper highlights that small intraoral ranulas are benign and do not require emergency referral to a dental surgeon. This paper also provides guidance to PCPs for diagnosing ranulas correctly and managing these cases appropriately, especially for PCPs who have never encountered ranula cases before.

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TEST YOUR KNOWLEDGE

A young man with chronic dry cough

Shalihin SE, Osman IF, Harun Z, Mukhali HB, Gnathimin B

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In primary care, chest X-rays are commonly performed to assess patients presenting with a prolonged cough. However, the extent to which the films are accurately interpreted depends on the skill of the doctors. Doctors with insufficient experience may miss an exact diagnosis when evaluating a film, especially in patients with nonspecific symptoms, such as in the case discussed in this paper. This case involved a persistent dry cough with an underlying diagnosis that would have been missed if the findings of the chest X-ray had not been properly analyzed.

Case History

A 31-year-old male security guard presented with recurrent dry cough, which he'd had for the past year. There was no sputum production, sore throat, fever, atopic or constitutional symptoms, hemoptysis, shortness of breath, orthopnoea, or chest pain. He had no history of active or passive smoking, regular medication intake, or exposure to hazardous pollutants. His family history was negative for smoking, bronchial asthma, and malignancies.

Clinically, he was afebrile. His vital signs were stable, with a blood pressure of 130/84 mmHg, heart rate of 88 beats per minute (bpm), and respiratory rate of 20 breaths per minute. There were no features of respiratory distress (e.g. usage of accessory muscles), cachexia, or cervical lymphadenopathy. The oropharyngeal examination results were unremarkable. Examination of the respiratory system revealed equal bilateral chest movements. The lungs were resonant on percussion. However, slightly reduced breath sounds over the upper lobe of the patient's left lung were noted during auscultation. No further sounds were heard, such as crepitations or ronchi. There was no cervical lymphadenopathy.

Below is the chest X-ray of this patient, taken in erect position and posteroanterior view.

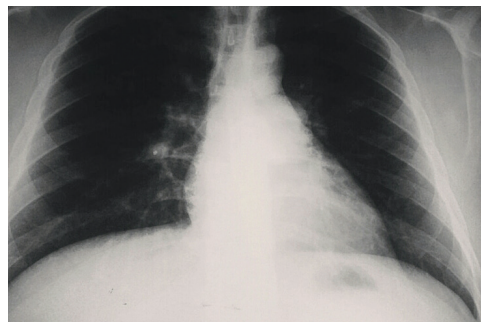


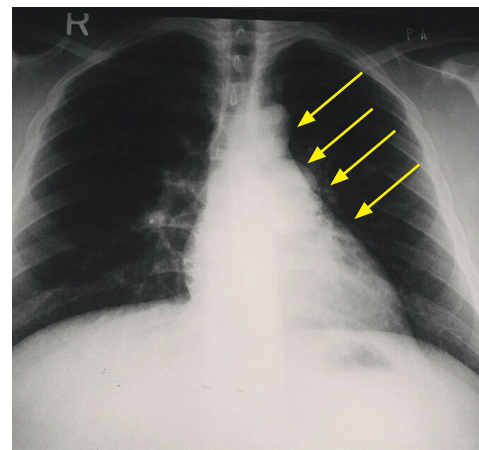
Figure 1. Erect chest X-ray of the patient in posteroanterior view.

Questions

1. Describe the chest X-ray finding(s).
2. What is the most likely diagnosis?
3. What investigation is needed to confirm this diagnosis?
4. What is the management?

Answer:

1. There is a large, loculated mass just medial to the left hilar region and upper left heart border, with obscuration of the adjacent thoracic aorta. No other lung lesion or suspicious bony erosion can be seen. (Based on the radiologist's chest X-ray report).



2. Mass in the superior segment of the left lung, most likely lung carcinoma.
3. Initial investigation includes assessment for pulmonary tuberculosis. However, for any case of suspected lung carcinoma, a CT scan of the thorax is necessary to identify the possible lung mass and highlight further characteristics of the mass. Definitive investigation would include biopsy and histopathological examination of the lung mass.

4. Surgical resection offers the best opportunity for long-term survival and remission in patients with resectable non-small-cell lung carcinoma, with adjuvant chemotherapy according to cancer stage.

Discussion

Lung carcinoma typically presents with hemoptysis and constitutional symptoms as well as a history of chronic cigarette smoking.¹ Due to the lesions' radio-opacity and nodular appearance, a chest X-ray can pick them up in more than 90% of cases.² However, those features can be mistakenly interpreted as normal if they are obscured by the heart shadow, thereby leading to delays in diagnosis and commencement of treatment.³

Lung carcinoma should be suspected regardless of symptoms if the chest X-ray shows new focal lesions, pleural effusion, pleural nodules, enlarged hilar or paratracheal nodes, or atelectasis.⁴ However, these findings can occasionally be obscured by the cardiac borders. In such cases, it is important to search for a positive silhouette sign to identify indicators of underlying masses or adjacent pathologies.⁵ Normally, adjacent anatomical structures of differing densities and consistencies will form a hard contour, or "silhouette." Accordingly, the loss of specific contours can help narrow down the location of a disease process. This phenomenon is known as the "silhouette sign," denoting the loss of normal soft tissue interfaces caused by pathologies which replace or displace the otherwise air-filled lungs.⁶ This sign is commonly found in the heart, mediastinum, chest wall, and diaphragm in chest X-ray films.³ In our patient's case, the adjacent lesion that disrupted the left heart border arose from the upper lobe of the left lung, therefore suggesting the possibility of a left upper lobe mass.

The delayed diagnosis was also attributable to the atypical presentation and absence of obvious radiological findings. While the patient was a non-smoker and had no alarming or constitutional symptoms, there is an ongoing increase in the occurrence of lung carcinoma in non-smokers, owing to the presence of other risk factors in need of further exploration, such as second-hand smoke.⁷ Additionally, non-small-cell lung carcinomas (NSCLC) can be of insidious onset, producing no symptoms until the disease has reached an advanced stage.⁸ This is one possible explanation for the

isolated cough in our patient. Nevertheless, the manifestation of symptoms depends on the location of the mass. Early recognition of these symptoms is beneficial to patient outcome.

In suspected lung cancers of any radiological appearance, tissue diagnosis via bronchoscopy or image-guided biopsy is necessary.^{4,9} Even in the absence of suspicious findings or in the case of X-ray misinterpretation as normal, a patient who presents to primary care with a chronic cough should be referred to a respiratory physician for further assessment if the cause of the cough cannot be identified through adequate initial evaluations.⁹ Following the diagnosis of a carcinoma, complete staging should be performed using a positron emission tomography (PET) scan, as cancer stage is a major determinant of the mode of treatment.⁴

Following the detection of the silhouette sign and highly suspicious lung masses, our patient benefitted from early referral to a respiratory physician at our tertiary center. Computed tomography (CT) of the thorax and bronchoscopy plus lung mass biopsy were performed, after which the diagnosis of lung adenocarcinoma was made. A whole body PET-CT scan confirmed that the lung cancer was in an early stage, lacking any metastases or involvement of other body parts. The soft tissue mass measured $4.5 \times 3.7 \times 3 \text{ cm}^3$ and was confined to the superior segment of the left lung, with few adjacent small nodules. The patient is currently stable and awaiting the earliest possible surgery date.

Surgery is the treatment of choice for patients with NSCLCs of stages I to IIIA.⁸ However, patients with resected lung cancers have a high risk of relapse and are therefore treated with adjuvant chemotherapy. Meanwhile, patients with NSCLCs of stages IIIB–IV are usually offered chemotherapy with an option of surgery. Radiotherapy is a reasonable mode of treatment in patients who are not candidates for surgery. Adjuvant radiotherapy following resection of the primary tumor may have a role in treatment, but this remains controversial.⁸

As a conclusion, accurate interpretations of chest X-rays and awareness of the silhouette sign in primary care providers, coupled with relevant clinical findings, can save patients from the morbidity and mortality of a delayed cancer diagnosis.

Conflict of Interest

Nil

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How does this paper make a difference to general practice?

Chronic cough is one of the most common complaints in primary care, most of which are benign cases. However, a diagnosis of lung carcinoma should be suspected in non-smokers or even those without constitutional symptoms in view of the frequent late presentation of the cancer, especially in NSCLCs. Accordingly, appropriate and adequate assessments should be performed, including referrals to tertiary centers if indicated or whenever a diagnosis cannot be made. The silhouette sign can play an important role when the lesion is obscured by an intrathoracic structure, especially one located behind the cardiac borders. Strong clinical suspicion, in the presence of adequate clinical assessments, will definitely lead to a timely diagnosis and therefore a good prognosis.

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TEST YOUR KNOWLEDGE

Inflammation of the Gums

Intan Suhana MA, Farha A, Hassan BM

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Case summary

An 18-year-old woman presented to the clinic with painless bleeding of her gums upon brushing her teeth. The bleeding stopped spontaneously, and there was no other bleeding tendency. On further questioning, the patient had irregular menses and was taking the oral contraceptive pills (OCP) Diane-35ED® to regulate her menses. She had been on this medication for four months. She was not on any other medication and had no chronic illness.

Upon examination, she appeared healthy. On extraoral examination, her face and neck were normal and symmetrical. The submandibular and sublingual lymph nodes were not palpable. Intraorally, her marginal gingiva was erythematous and slightly edematous but was non-tender upon palpation (**Figure 1**). The rest of the gingiva appeared normal in color, size and contour. The permanent dentition showed white spots on the dental enamel, a sign of hypomineralization or fluorosis. Oral hygiene was unsatisfactory, as dental plaque was visible along the marginal gingiva and interdental papillae.



Figure 1. Clinical picture showing erythematous and oedematous marginal gingiva

Questions

1. What is the most likely diagnosis?
2. What are the symptoms and signs of this condition?
3. What are the risk factors of this condition?
4. What is the treatment needed for this condition?

Answers:

1. The most likely diagnosis is plaque-induced gingivitis. A differential diagnosis is non-plaque-induced gingivitis, which can be due to trauma, an allergic reaction, or an infection, such as viral infection (herpetic gingivostomatitis).
2. Symptoms and signs of gingivitis include bad breath (halitosis), gum bleeding during brushing or flossing, erythema, swelling, and tenderness of the gums.

3. Risk factors of gingivitis include dental plaque accumulation, plaque retentive areas (calculus and defective restorations), hormonal changes (during puberty, menopause, pregnancy, or OCP intake), systemic diseases (diabetes and HIV), drugs, smoking, aging, low vitamin C intake, as well as a family history of gingivitis.
4. Treatment for gingivitis includes oral hygiene instruction (OHI) and full mouth scaling. This patient was also advised to return for regular follow-ups for every three to four months. OCP was continued as this condition can be managed by the removal of the dental biofilm.

Discussion:

Gingivitis is defined as an inflammation of the gums. It occurs when microbial plaque (bacteria) accumulates on the tooth surface as a result of ineffective tooth brushing. Therefore, effective tooth brushing is crucial to ensure adequate removal of food debris, which prevents further development of the plaque. Gingivitis is classified as localized when approximately 30% or less of the gingival tissue bleeds upon periodontal probing, and generalized if it is more than 30%.¹ In gingivitis, there is no evidence of periodontal tissue destruction and loss of tooth attachment observable from x-ray film.¹ Thus, gingivitis is reversible and preventable with proper oral hygiene practices.²

Patients with gingivitis can present with halitosis and painless gum bleeding, either spontaneously

or during tooth brushing.¹ However, to diagnose gingivitis, a thorough examination of gingival changes such as color, consistency, texture, and size should be performed.³ The inflamed gum will appear erythematous and edematous, and bleeds upon probing.⁴ In contrast, normal and healthy gingivae look pale pink and are tightly adapted, with knife-edge margins.⁵ As gingivitis progresses, the gum will become fluctuant and pointed with purulent exudates.⁶

Various factors have been recognized as gingival inflammation triggers. The local risk factors are dental plaque and plaque retentive factors such as calculus, overhanging retention, tooth anatomic factors (e.g., enamel pearl) and few others. Systemic diseases and specific malnutrition are also commonly associated with gingival inflammation and hypertrophy. These include hematological malignancy (leukemia), poorly controlled diabetes mellitus, smoking, and low intake of calcium and vitamin C.^{4,7}

Sex hormone fluctuation is also a recognized risk factor for gingivitis, especially during puberty, menstruation, and pregnancy.^{4,7} Apart from that, several medications are well known to implicate gingival tissue overgrowth. These include calcium channel blockers (nifedipine), immunosuppressants (cyclosporine), antiepileptics (phenytoin), and OCP.⁸⁻¹⁰

OCP is one of the most common culprits behind gingivitis in women. It has been reported that OCP-induced gingivitis can occur after only one month of OCP usage, leading to gum bleeding and swelling, particularly at the anterior mandibular segment of gum.¹⁰ A comparison between non-OCP and OCP users revealed that OCP usage is associated with increased gingival sulcus bleeding and probing pocket depth.¹¹ OCP users also have poorer oral hygiene and more severe gingival inflammation than non-OCP users.¹²

How does OCP aggravate plaque-induced gingivitis, as it has in this case? The increased level of steroid hormones exaggerates the inflammatory reaction upon exposure to the existing dental biofilm.¹¹ It was found that estrogen and progesterone receptors are present in gingival and periosteal tissue, which is capable of metabolizing these hormones.⁹ Progesterone stimulates vasodilatation and increases the permeability of the blood vessels in the gingiva, while estrogen promotes the proliferation of gingival fibroblasts and blood vessels, triggers the development of gingival connective tissue, and

increases gingival inflammation even without plaque accumulation.⁹

This patient's oral hygiene was poor, with a visible accumulation of dental plaque. The bacteria in the built-up plaque on the tooth surface will then enter the gingival tissue, especially the gingival sulcus, and cause the marginal area to become susceptible to microbial infection. Microbial species typically involved in gingivitis are *Streptococcus* sp., *Fusobacterium* sp., *Actinomyces* sp., *Veillonella* sp., *Treponema* sp., and a few others.² If left untreated, gingivitis can progress to periodontitis, which can cause irreversible damage not only to the gum but also to the surrounding bone that supports the teeth.

Treatment for patients with gingivitis varies depending on the type of gingivitis. For allergy-induced gingivitis, avoiding the allergen is the primary mode of treatment. For plaque-induced gingivitis, the principal aim of treatment is to reduce the dental biofilm and to eliminate the inflammation. Thus, prompt removal of all dental biofilm or plaque from the tooth surface and gingival sulcus is essential. Mild plaque, tartar and stain can be removed by effective toothbrushing. The patient should be taught how to perform effective toothbrushing techniques to ensure good personal plaque control and maintain optimal oral hygiene. The harder deposits might require scaling of the teeth performed by a dentist, followed by a series of appointments to assess and review the gum condition after treatment. The use of mouthwash is also useful in preventing the development of plaque and gingivitis.¹³ Following treatment, the patient should be assessed regularly at follow-up appointments every 3-4 months to review the progress of the treatment.¹⁴

A patient with mild drug-induced gingivitis can be treated with the non-surgical approach described above.¹⁴ Those with more severe presentations might require cessation of the offending drug. Patients with significant gingival hypertrophy might need corrective surgery to recontour the surface of gingival tissue.¹⁴ As this patient had mild gingivitis with no significant gingival hypertrophy, the OCP can be continued as long as the patient can maintain good oral hygiene.

This patient was also found to have dental fluorosis, which appeared as white spot lesions on the tooth surface. Fluorosis is characterized by hypomineralization of tooth enamel due to excessive ingestion of fluoride during childhood. The treatment of this condition is dependent on

its severity. A mild case, such as this patient's, does not require specific treatment unless desired for cosmetic reasons. For moderate to severe cases, the

options of treatment are bleaching, microabrasion, composite restorations, and, lastly, restoration of the teeth using ceramic veneers.¹⁵

How does this paper make a difference to general practice?

Gingivitis is a prevalent gum disease, and patients could come to a primary care clinic to seek treatment. This paper provides crucial knowledge to primary care physicians, enabling them to make a definitive diagnosis and refer the patient to a dentist early during the condition. Early referral allows patients to receive prompt treatment to prevent progression to periodontitis.

A primary care physician would have an overview of common aggravating factors in gingivitis, as well as several medications that could lead to gingival inflammation and hypertrophy, which may require modification of the patient's drugs.

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