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Editorial

As 2019 draws to a close, this third edition of the Asian Journal of Medicine and Health Sciences brings together an unconventional set of essays that examine not just advances in medicine but also turn an introspective lens on the role of the medical profession within larger social contexts.

As health professionals and future professionals-in-making, the authors in this volume have shone a light on the importance of community health to elevate the larger goal of public health. The review on breast cancer and self-breast-examination is an invaluable topic as breast cancer is the second most common type of cancer in Malaysia; awareness and early self-diagnosis of a lump in the breast therefore is a corner stone in its treatment and prognosis. *H.pylori* plays a key role in upper gastrointestinal diseases including adenocarcinoma of stomach. The authors' attempt to find out the prevalence of *H.pylori* among Malaysian patients undergoing upper GI endoscopy is a step forward in early detection of the organism.

One of the studies in this volume conducts a deep-dive into a worrying spate of occurrences of Dengue among the residents of Kampong Sri. Another study on attitudes toward sexual health among undergraduates in Ipoh, Perak has highlighted the vulnerability of young people to sexual health problems and unwanted pregnancies and calls for early intervention and education on sexual health. Another, examines the effectiveness of Complementary and Alternative Medicine for pregnancy and postpartum care among women who gave birth in a tertiary hospital in Perak and this study underscores the ways in which Complementary and Alternative Medicine is used throughout the lifecycle of

pregnancy and how their use differs with attitudes and demographic factors. An article looks into the quality of life of patients undergoing dialysis due to chronic renal diseases. In keeping with the theme of introspection, one of the pieces in this volume also uses abductive reasoning to highlight ethical challenges faced by medical students.

Further, keeping pace with the advancement in the field of medicine, one author reflects on additive manufacturing for creating 3D images and fabricating different body parts like kidney, blood vessel, skin and heart.

All these pieces offer unique on-the-ground insights not just into the practice of medicine but its interplay with the larger institutional architecture. In addition to encouraging pieces to look inwards towards the medical profession, this edition features new and exciting cases such as rare manifestations of military tuberculosis and a cat scratch leading to reactive arthritis and sporotrichosis.

As always, this has been an exciting volume to curate and it is my hope that you as the reader are as excited to join us in continuing to seek new ideas, dilemmas and solutions.

I offer my heartfelt thanks to all the authors for their contributions to lead AJMHS on the path to success and all the reviewers for their altruistic support in reviewing our articles.

Last but not the least I offer my gratitude and thanks to our beloved Dean, Associate Professor Dr Syed Rahim Syed Hamid for his constant encouragement and support and Associate Editors and few other members of editorial team who had contributed immensely for successful publication of this young journal.

- **Dr Basanta Kumar Mohanty,**
Chief Editor, AJMHS

REVIEW ARTICLE

BREAST LUMPS AND METHODS OF SELF EXAMINATION – A REVIEW.

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Abstract

Breast lump is a common issue and disease as females are concerned. It may present as painful lump or painless lump depending on its pathology. It is a very common finding around the world. The common breast lumps (Aberration normal development and involution of breast (ANDI), breast abscess, galactoceles, fat necrosis of breast, breast cysts phyllodes tumour, fibroadenoma and cancer breast) occurring in women are reviewed in this paper about their clinical presentation and management. The understanding of benign breast disease and malignant breast disease is more important for the general practitioners who are having more exposures to common breast lesions. The knowledge about the malignant breast lesions especially in early stages when these require radical and curative treatment, is more important on patient point of view as well. This chapter discusses about Breast Self-Examination (BSE) which would help family physician to educate the women for regular monthly examinations in different positions. Early detection of breast cancer is more important for curative treatment before this reaches advance stage when it will require palliative treatment. Patients presenting lumps in the breast are roughly from 40% to 70%. We are getting patients with breast lump in different route when they look for treatment. Some women notice their lump by breast self-examination. Few are identified through screening programs and some are diagnosed by surgeons. Sometime, most of breast lumps cases are diagnosed to be non-malignant and these cases are to be in active follow up for further evaluation to rule out malignancy. Small lumps are sometime not detected by patients and doctors in heavy breasts of fatty females. In Malaysia, Carcinoma of breast is the most common malignancy in women.

Keywords: *Breast lump, benign tumours, cancer breast, breast infection, Breast self-examination*

Introduction

More outpatients in general surgical clinic present with complaints of breast disorders. Lot of psychological disturbances could be noted when there are palpable lumps in the breast noticed by Malaysian young and old women. Sometime, most of breast lumps cases are diagnosed to be non-malignant and these cases are to be in active follow up for further evaluation to rule out malignancy future¹. Most of women in USA present lump in the breast as their main complain of the breast². Small lumps are sometime not detected by patients and doctors in heavy breast of fatty females. Now in Malaysia, carcinoma of breast is 18% which is the most common among the population³. According to the statistics about 3738 women were diagnosed with breast cancer in Malaysia in 2003. Carcinoma of breast is the most common and second most common cause of admission in public hospitals in Malaysia. The mortality rate for carcinoma breast is about 6-8% of all deaths caused by cancers⁴. Following the awareness made through various sources of media by government and other organizations about the breast carcinoma, many women are coming to surgical or breast clinic whenever they feel something abnormal in their breast.⁵ Malaysian Cancer Registry says that chances of cancer breast for a woman is one in 19 of Malaysian ladies during their life time. Each year, Malaysian public hospital is able to diagnose about 4000 new cases reporting to health systems. Breast cancer is currently the most common female cancer in Malaysia, accounting for 30.4% of all cancers diagnosed among women⁶. Another statistics states that cancer breast is now most common type and increasing death rate of women around the world⁷. There are chances of increasing incidences of breast cancer from other types of premalignant conditions like atypical ductal and lobular hyperplasia though many types breast lumps are benign and non-proliferative diseases^{8,9,10}.

Lumps:

ANDI of Breast (Aberration normal development and involution of breast) - ANDI can be defined as a breast disorders and some small aberrations during normal process of development of breast which are caused by cyclical hormonal response and involution. This includes fibrosis, adenositis, cystic diseases of breast and fibroadenosis. Clinically teen-age girls present in breast clinic with following complaints.

- Vague lump (not sure about lump) in the breast.
- History of periodic cyclical pain over breast.
- Lumps keep on changing site of breast and rarely side of the breast.
- On examination
 - Not tender and not warm
 - freely mobile lump in the breast
 - firm in consistency, irregular surface and poorly defined margin.

When middle aged and elderly women present as fibro-adenosis with features of irregular surface and poorly defined margin which are the classical finding for carcinoma of breast, breast surgeon should investigate (Mammogram and Biopsy) thoroughly to rule out carcinoma.

Common symptoms for ANDI are pain in the breast, palpable swelling in the breast and feeling of lumpiness in the breast. Green and brown colour discharge through nipple are usual. Those days it was named as fibrocystic disease of breast. The histological findings did not support clinical findings of breast conditions and there were no abnormal findings noted in histology¹¹.

Benign lumps:

Love et al stated a classification of benign breast disorders based on symptoms and physical findings. Based on clinical condition, this is the classification of benign breast condition^{12, 13}.

- I. Physiological swelling and tenderness
- II. Nodularity
- III. Mastalgia (breast pain)
- IV. Dominant lumps
 - A. Gross cysts (macro cysts)
 - B. Galactocoeles
 - C. Fibroadenoma
 - V. Nipple discharge
 - A. Galactorea
 - B. Abnormal nipple discharge
 - VI. Breast infections
 - A. Intrinsic mastitis
 - 1. Postpartum engorgement
 - 2. Lactational mastitis
 - 3. Lactational breast abscess
 - B. Chronic recurrent sub-areolar abscess
 - C. Acute mastitis associated with macrocystic breasts
 - D. Extrinsic infections

Benign diseases of breast lump are classified into

- A. Cystic
- B. Solid.

Cystic:

- 1. Inflammatory:
 - Abscess/Antibioma
- 2. Non inflammatory
 - a. Neoplastic:
 - Cystosarcoma
 - b. Non neoplastic:
 - Galactocele
 - Fibro adenosis

Solid:

- Fat necrosis
- Fibro adenoma

Breast abscess: Lactating mothers are commonly affected and present with pain and tender lump. *Staph.aureus* is the common causative organism. Ultrasound would be the best investigation to confirm and the Incision & drainage is the treatment of choice.

Galactocele:

This can be described as a variety of retention cyst which is loaded with milk in enlargement of mammary gland of lactating breast. On palpation there would be no tenderness and it would be firm

in consistency which simulates differential diagnosis of solid tumour of the breast. On histological examination, there is cyst which contains milk and the cyst measures about 2 to 6 cm of diameter. There will be flattened cuboid epithelium in the cyst lining. The presence of milk is confirmed chemically by positive mucic acid test. There will be adjacent pressure necrosis and chronic inflammatory findings with active apocrine glands¹⁴. Ultrasound would help to diagnose and simple excision is the treatment.

Benign Cyst/s: This is common in middle age with presentation of painless lump. Simple big cyst has smooth surface and well defined margin. Ultrasound would help to diagnose. FNAC/Aspiration cytology is necessary to rule out malignancy. Recurrent cyst after complete aspiration cannot exclude malignancy. Simple excision is the treatment and need to send the tissue for HPE.

Fat Necrosis: It is nonviable adipose tissue from traumatised or ischemic breast tissue and replaced with fibrous tissue and is common in old woman with history of trauma or recent surgery. It presents as painless lump with skin retraction some time. X-ray, ultrasound and biopsy are necessary when there is strong suspicion of malignancy. Excision may be needed on cosmetic ground.

Breast fibroadenoma: A fibroadenoma is a painless, unilateral (rarely bilateral) benign condition of breast tumor. This occurs commonly in females from the age of 16 to 35. Fibroadenomas are freely mobile with smooth surface and well defined margin. It usually grows during pregnancy and tends to shrink during menopause which supports the hormonal etiologic theory.

A. Pericanalicular- the proliferation of stromal cells around epithelial structures

B. Intracanalicular- the proliferation of stromal cells compressing epithelial cells into clefts

Ultrasound features of fibroadenoma include a range of different presentations that most frequently are consistent with presentations seen in a benign mass. The most frequent features include a round hypo echoic mass with a circumscribed borders; however, complex presentations that overlap with complex or

malignant masses such as calcification and heterogeneity are also detectable. When classified by the BIRADS system, in a fraction of the cases, moderate suspicion to malignancy was reported¹⁵. Investigation may be needed when there is suspicion of malignancy, otherwise excision and biopsy can be performed. Sometime fibroadenoma is treated without surgery and can be monitored with proper clinical review. It usually does not turn to malignancy.

Phyllodes tumour: It is type of giant fibroadenoma and rapidly growing breast tumor. It is an uncommon breast tumour when compares with other subtypes of histological varieties and the statistical report says that it occurs in less than 1% of cancers of breast^{16,17}. On examination, there would be dilated veins over the breast. There may be ulceration and fungation over breast mass and axillary nodes are not palpable. This type of breast tumour contains rare fibroepithelial cells type which ranges from 0.3% to 0.5% when compared to all type of breast pathologies^{18, 19}. Phyllodes tumours are more common in middle aged females and the average size of tumour is about 4 cm. Giant phyllodes tumour type have more than 10 cm in size (20%). Family physicians usually face these situations of lesions in the breast though they are very busy in their regular clinical activities. The common lesions are fibroadenoma, non agiosarcoma, myofibroblastoma, hamartoma, phyllodes tumour, agiosarcoma and metastatic carcinoma²⁰. Treatment for phyllodes type of tumour is excision of lump if the lump is small and simple mastectomy when it is big phyllodes tumour breast. If it is a malignant variety or big in size with malignant potential, treatment can be either wide local excision with 2cm clear margin of breast tissue or radiotherapy²¹. Sometime it may need a revision of surgery, if inadequate margin of breast tissue is noted. The radiotherapy following surgery would reduce the incidences of local recurrences in the cases of malignant and borderline varieties^{22, 23}. The proper and correct histopathological diagnosis before surgery make the correct treatment plan which would avoid revision surgery. The core needle biopsy for phyllodes tumour breast is more reliable and high sensitivity value than FNAC which reveals only

cell's information and not tissue's information of vascular and capsular invasion²⁴.



Fig. 1 shows huge Right breast lump with dilated veins in a case of phyllodes tumour

Carcinoma breast:

Most common malignant tumour in women (7 to 8%)

Etiology:

Women have some situations where there is high level of estrogen in blood namely nulliparity, young age at first birth and delayed menopause which are risk factors for the benign and malignant breast lesions^{25,26}.

- Age and sex
- Diet and environment factors and fat intake increases risk²⁷.
- Higher social class
- Attained menarche in young age and delayed menopause
- Nulliparity has high risk
- Lactating mother with breast feeding protects
- Positive family history
- Smoking (active and passive)

Pathological type:

- Ductal Carcinoma 90%
- Lobular Carcinoma 10%

Clinical features:

The common conditions for women to have consultation with clinicians are nipple discharge, palpable masses and breast pain. Women worry lot when they have pathological or physiological nipple discharge and 10 to 15% of them with benign breast conditions uses to complain abnormal discharge through nipple²⁸.



Fig -2 shows asymmetry of breast, Left nipple retraction and higher level than Right breast.

- Upper outer quadrant
- Hard, irregular lump
- Nipple retraction
- Dimpling, puckering of skin
- Peau d' orange
- Skin nodules/ulceration
- Nipple discharge
- Fixation to pectoralis

Spread:

- Direct ... to muscles of chest wall.
- Lymphatics ...to axillary lymph nodes.
- Blood stream ...to organs like liver, lung and brain.

Diagnosis: Triple assessment is the best for the diagnosis of breast lesions which includes clinical examination (history taking and physical examination), imaging (and mammogram) and biopsy (fine needle aspiration cytology -FNAC and tissue core biopsy).

Treatment: After staging (clinical and radiological – CT scan) of cancer breast and Multi-Disciplinary Meeting (MDM), treatment can be planned as Surgery, Chemo and Radio therapy accordingly. Especially in postmenopausal women, aromatase is the main oestrogen source. In oestrogen-receptor positive breast cancer, aromatase inhibitors (anastrozole and letrozole) are commonly used as alternate medication in postmenopausal women²⁹. All the above mentioned non-steroidal which reversibly stop these enzymes where there are transformation of androstenedione and

testosterone into estrogen. The medicines showed increased positive effects^{30, 31} for postmenopausal women. These drugs are in better body tolerance when compared with preceding hormonal therapy³². A study shows that majority of breast lumps in their locality were benign. The importance of histopathological analysis of lumps cannot be overemphasized, especially by the uncommon findings of breast cancer in two females in their early 20s, and tuberculosis in another⁵.

Breast Self -Examination (BSE):

For the awareness and identification of cancer breast in the beginning level, BSE is very useful to the society. Women are supposed to this examination routinely as shown in the pictures (Fig-3). The incidences of cancer breast can be reduced if the women are aware and doing this BSE regularly²⁹.

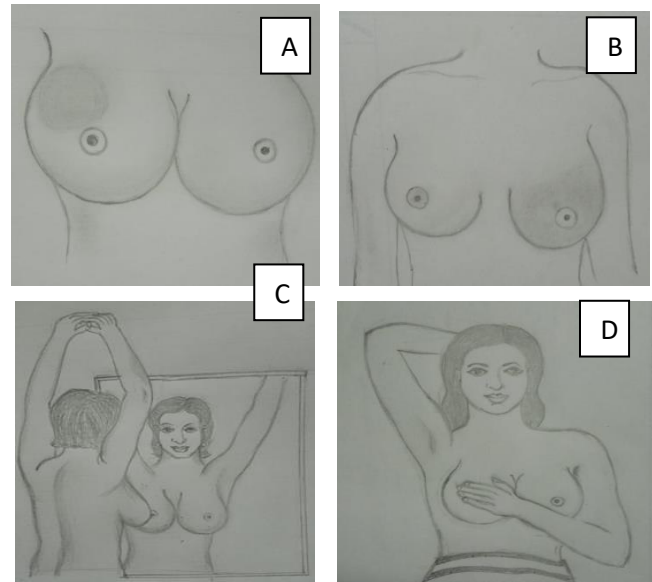


Fig-3

A-Asymmetry of the breast

B-Nipple level

C-Method viewing breasts in front of mirror by keeping both hands up position

D-Method of palpating

Methods of examination:

The time for monthly BSE examination can be 2 to 3 days after monthly period and the women who attained the menopause can do this examination on the 1st date of each month. Examination is by lying position of a woman and this position makes all tissues of breast rest over chest wall. Then she has to place her right hand behind her head. With the middle fingers of her left hand, gently yet firmly press down using small motions to examine the entire both breasts. Next, examination of armpit, nipple have to be carried out. Then let her stand in front of a mirror with her arms by her side. She has to look at her breasts directly and in the mirror for changes in skin texture, such as dimpling, puckering, indentations, dilated veins, nipple positions and deviations. These examinations should be done with her arms raised above as well.

It is not very important to remember and follow all 34 steps of breast self-examination since they may forget to follow the procedures in scheduled time. The women have to notice any changes in their breast and inform immediately to the family physicians at the time of their consultation³⁴. There would be minimized delay of report of any

signs and symptoms which are noticed by women during breast self examination³⁵.

Conclusion

The family physicians and the women have to have adequate knowledge about breast lumps. The early diagnosis and treatment for breast cancers is more important if they have good knowledge. SBE is more useful for the women for early detection of any lumps in the breast. Our main goal is to cure cancer patients or prolong their life considerably, ensuring a better quality of life. Women need to have adequate knowledge of breast diseases since breast cancer is common and dangerous disease and they need to go for regular checkup and mammogram if they are above 40 years.

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References

1. Buccimazza I. Approach to the diagnosis of a breast lump. A breast lump raises the fear of breast cancer in all women. A breast lump raises the fear of breast cancer in all women, CME January 2011; 29 (1): 11.
2. Figueroa JD, Pfeiffer RM, Brinton LA, Palakal MM, Degnim AC, Radisky D et al. Standardized measures of lobular involution and subsequent breast cancer risk among women with benign breast disease: a nested case-control study. *Breast Cancer Research & Treatment* 2016; 159(1):163-172.
3. Malaysia Cancer Statistics 2007; 6.1, 25, 7.1,35. file:///C:/Users/ITD/Downloads/Malaysian_National_Cancer_Registry_Report_2007-2011%20(1).pdf (accessed on 15.09.2019.)
4. Ministry of Health, Malaysia: Clinical Practice Guidelines– &Management of Breast Cancer. Dec 2002. <http://www.acadmed.org.my/cpg/> CPG on Management of Breast Cancer (accessed on 15.09.2019.)
5. Gabriel E N. Breast Lumps: A 21-Year Single-Center Clinical and Histological Analysis. *Nigerian Journal of Surgery. Br Med J.* 1978; 1:260–1.
6. National Cancer Registry, Malaysia 2003. The second report. Kuala Lumpur, Malaysia, Ministry of Health, 2003. file:///C:/Users/ITD/Downloads/Malaysian_National_Cancer_Registry_Report_2007-2011%20(1).pdf (accessed on 15.09.2019.) (Accessed on 15.09.2019.)
7. Ertem G, Kocer A..Breast self-examination among nurses and midwives in Odemis health district in Turkey, *Indian Journal of Cancer* 2009; 46 (3): 208-13.
8. Dupont WD, Parl FF, Hartmann WH, Brinton LA, Winfield AC, Worrell JA, et al. Breast cancer risk associated with proliferative breast disease and atypical hyperplasia. *Cancer.* 2006; 71:1258–65.
9. Hartmann LC, Sellers TA, Frost MH, Lingle WL, Degnim AC, Ghosh K, et al. Benign breast disease and the risk of breast cancer. *N Eng J Med.* 2005; 353:229–37.
10. Jensen RA, Page DL, Dupont WD, Rogers LW. Invasive breast cancer risk in women with sclerosing adenosis. *Cancer.* 1989; 64:1977–83.
11. Aaron N. The ABC of benign breast disease.October 2009 Vol.27 No.10 CME 455
12. Love SM., Gelman RS., Silen W. Fibrocystic disease of the breast – A nondisease. *New England Journal of Medicine.* 1982; 307: 1010 -14.
13. Louis J, H. Jekel. Aberations in the normal development and involution of the breast (ANDI) <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.554.8496&rep=rep1&type=pdf> (accessed on 15.09.2019.)
14. James M. W,Ann A, Michigan.Galactocele of the breast. *The American journal of surgery.* 1964; 108 (3); 357-360.
15. Namazi A, Adibi A, Haghighi M, Hashemi M et al. An Evaluation of Ultrasound Features of Breast Fibroadenoma. *Adv Biomed Research.* 2017;6:153 (4 pages)
16. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5735562/> (accessed on 15.09.2019.)

17. Yohe S, Yeh IT. "Missed" diagnosis of Phyllodes tumor on breast biopsy: pathological clues to its recognition. *Int J Surg Pathol* 2008; 16(2):137–42.
18. Farias-Eisner GT, Small K, Swistel A, Ozerdem U, Talmor M. Immediate Implant Breast Reconstruction with Acellular Dermal Matrix for Treatment of a Large Recurrent Malignant Phyllodes Tumor. *Aesthetic Plast Surg*. 2014; 38(2):373–8.
19. Kario K, Maeda S, Mizuno Y, Makino Y, Tankawa H, Kitazawa S. Phyllodes tumor of the breast: a clinicopathologic study of 34 cases. *J Surg Oncol*. 1990; 45(1):46–51.
20. Rowell MD, Perry RR, Hsiu JG, Barranco SC. Phyllodes tumors. *Am J Surg*. 1993; 165(3):376–9.
21. Rumi K, Sangeetha P, Thamilselvam P. Unusually large breast tumour in a middle-aged woman. *Canadian Family Physician*. 2014; 60(2); 142–146.
22. Liang MI, Ramaswamy B, Patterson CC, McKelvey MT, Cordillo G, Nuovo GJ, et al. Giant breast tumors: surgical management of phyllodes tumors, potential for reconstructive surgery and review of literature. *World J Surg Oncol*. 2008; 6:117. doi: 10.1186/1477-7819-6-117.
23. Tan PH1, Thike AA, Tan WJ, Thu MM, Busmanis I, Li H, et al. Predicting clinical behaviour of breast phyllodes tumours: a nomogram based on histological criteria and surgical margins. *J Clin Path*. 2012; 65(1):69–76. doi: 10.1136/jclinpath-2011-200368.
24. Barth RJ, Jr, Wells WA, Mitchell SE, Cole BF. A prospective, multi-institutional study of adjuvant radiotherapy after resection of malignant phyllodes tumors. *Ann Surg Oncol*. 2009; 16(8):2288–94. doi: 10.1245/s10434-009-0489-2.
25. Ibrahim AA. A huge phyllodes tumor in the breast: a case report. *Electron Physician*. 2018 Jun; 10(6): 6951–6955.
26. Hislop T, Elwood J. Risk factors for benign breast disease: a 30-year cohort study. *Can Med Assoc J*. 1981; 124(3):283.
27. Parazzini F, Vecchia C, Franceschi S, Decarli A, Gallus G, Regallo M, et al. Risk factors for pathologically confirmed benign breast disease. *Am J Epidemiol*. 1984; 120(1):115–22.
28. Peter G. Role of Dietary Fat in the Causation of Breast Cancer: Point. *Cancer Epidemiology, Biomarkers & Prevention*. American Association for Cancer Research. 1999; 8(1): <https://cebp.aacrjournals.org/content/8/1/3>. (Accessed on 15.09.2019.)
29. Chandak SR, Omar T. A study on clinical profile and management of lump in breast at tertiary rural hospital, Wardha, Maharashtra, India. *International Surgery Journal* Chandak SR et al. *Int Surg J*. 2017; 4(3):998–1001.
30. Bonnetterre J, Buzdar A, Nabholz JM, et al. Anastrozole is superior to tamoxifen as first - line therapy in hormone receptor positive advanced breast carcinoma. *Cancer*. 2001; 92(9):2247 – 2258.
31. Nabholz JM, Falkson C, Campos D, et al. Docetaxel and doxorubicin compared with doxorubicin and cyclophosphamide as first-line chemotherapy for metastatic breast cancer: results of a randomized, multicenter, phase III trial. *J Clin Oncol*. 2003; 21(6):968–975.
32. Mouridsen HT, Palshof T, Brahm M, et al. Evaluation of single-drug versus multiple-drug chemotherapy in the treatment of advanced breast cancer. *Cancer Treat Rep*. 1976;61(1):47–50.

33. Waldman SA, Terzic A. Pharmacology and therapeutics: principles to practice. Canada: Elsevier; 2009. 1536 p.SLUCare physician group. Breast self-exam
34. <http://slu.adam.com/content.aspx?productId=117&pid=1&gid=001993> (accessed on 15.09.2019.)
35. Brett J, Austoker J. Evaluation of breast awareness training resource pack for primary care nurses: final report. Cancer Research Campaign: Oxford; 1999. <https://www.oncolifecentre.com/post/11/Breast-Cancer-Treatment-In-Malaysia> (accessed on 15.09.2019.)
36. Richards MA, Westcombe AM, Love SB, Littlejohns P, Ramirez AJ. Influence of delay on survival in patients with breast cancer: a systematic review. *Lancet*. 1999;353:1119–1126

ORIGINAL ARTICLE

THE PREVALENCE OF HELICOBACTER PYLORI INFECTION IN PATIENTS UNDERGOING OESOPHAGO-GASTRO-DUODENOSCOPY IN PERAK, MALAYSIA.

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Abstract

Helicobacter pylori has been established as the pathogen responsible for various upper gastrointestinal conditions ranging from peptic ulcer disease to malignancies such as gastric adenocarcinoma and mucosa associated lymphoid tissue lymphoma. In this study the prevalence of this organism among patients undergoing oesophago-gastro-duodenoscopy as outpatients was investigated utilizing the rapid urease test of endoscopic gastric biopsies. Out of 278 respondents, we discovered that the prevalence was 40.3% with a slight female preponderance. Ethnic differences were also noted with a much higher (>40%) percentage of Indians and Chinese testing positive for the organism compared with the Malays (23.8%). A larger proportion of the respondents who had the organism were found to have positive OGDS findings compared with those who did not have the organism.

Introduction

Helicobacter pylori was first discovered in 1983 by Warren JR, & Marshall BJ.¹ About half the world's population is infected by this bacterium but the distribution of the infection across the world is not even.² Reports show that the prevalence rates are higher in the less developed countries in Asia, Africa and South America; whereas the more developed countries in Europe and North America have lower prevalence.³ *H. pylori* was cultured in 1983 and since then it has been recognized as the main cause of chronic gastritis, peptic ulcer disease, gastric adenocarcinoma and gastric mucosa associated lymphoid tissue (MALT) lymphoma.⁴ Ever since this great discovery was made, new diagnostic tests have been developed and a proper eradication strategy was formulated. This discovery has led to the change in mindset of clinicians dealing with patients with dyspepsia. So many thousands of unwarranted elective operations such as vagotomy and gastric drainage procedures, and gastric resections for peptic ulcers have been avoided and this has mitigated the sufferings of millions of people all over the world. However surgical intervention is still needed in dealing with the complication of peptic ulcers.

In 1982, Marshall and Warren were able to culture these organisms and identified *Helicobacter pylori* as the cause of 95% of duodenal ulcers and about 70% of gastric ulcers. *H. pylori* bacteria are transmitted by the faecal-oral route, usually in childhood.^{5,6} The prevalence of infection is inversely related to the quality of households and public sanitation, and entire families becoming infected are not uncommon. The first report of *H. pylori* in Malaysia was in 1986.⁷ The prevalence of this infection was reported to be declining in a study that looked at the prevalence of this infection in Malaysia at 2 time periods over a 10 year interval. The prevalence dropped from 51.7% in 1989/90 to 30.3% in 1999/2000.⁸ Hassan, et al. reported a high seroprevalence of exposure to *H. pylori* among the indigenous communities living

in the periphery of Crocker Range, Sabah in East Malaysia.⁹ However, a serological survey by Ayub and Raj reported a low prevalence rate seen in Malays (4.2%) among blood donors and (4.8%) in people attending health clinics in Kelantan, West Malaysia.¹⁰ Developing countries generally have higher rates of *H. pylori* carriage than those found in developed countries.

Goh found that the prevalence of *H. pylori* infection was 91% in duodenal ulcer and 74% in those with gastric ulcers.¹¹ *H. pylori* infection if not identified and treated adequately can lead to morbidity. Serious complications of peptic ulcer e.g. perforation, peritonitis and haemorrhage may even lead to mortality. The clinical importance of this organism is its close association with peptic ulcer disease and gastric cancer. Although most individuals infected by *H. pylori* will not experience any symptoms clinically, it is estimated that 10-20% of the infected individuals will develop gastric and duodenal ulcers.^{4,12} In addition, those infected carry a 1-2% lifetime risk of developing gastric cancer and 1% risk of gastric MALT lymphoma.⁴ Furthermore its eradication leads to the cure of peptic ulcers, and prevents the development of gastric cancer in the individuals who have not developed pre-cancerous lesions.¹³⁻¹⁷

Eradication of *H. pylori* infection is of paramount importance as there is a definite relation between chronic *H. pylori* infection to adenocarcinoma of the stomach, particularly the cagA genetic type (cagA pathogenicity island). The study was to determine the prevalence of *H. pylori* infection amongst patients who undergo Oesophago-gastro-duodenoscopy (OGDS) in Hospital Raja Permaisuri Bainun, Ipoh and Hospital Sungai Siput, Perak, Malaysia by performing endoscopic biopsy and rapid urease test.

Materials and Methods

The study was a prospective study that was conducted for a period of 12 months commencing

from 1st June 2009 to 31st July 2010. The respondents were selected from those who have been referred for OGDS in the above mentioned two hospitals as day care patients. Informed consent was obtained from every single respondent. The total number of patients undergoing OGDS in these two hospitals is around 500-600 per year. OGDS is performed almost daily in Hospital Raja Paramaisuri Bainun, Ipoh, five days a week and twice a month in hospital Sungai Siput by the specialists of the hospitals and the surgeons of Universiti Kuala Lumpur Royal College of Medicine Perak. The total number of respondents in our study was 278.

The patients' data including name, age sex, ethnicity and presenting complaints such as epigastric pain, vomiting, haematemesis or malena was recorded in the questionnaire. Inclusion criteria was all those below the age of 80 yrs and exclusion criteria are those patients with severe co-morbidities and complications of peptic ulcers e.g. perforation and haemorrhage. Upper gastrointestinal (GI) endoscopy aims at detecting any evidence of acute or chronic oesophagitis, gastro-oesophageal reflux disease (GERD), gastritis, peptic ulcers, and tumours in the oesophagus and stomach. However, this study was mainly to identify the presence of *H. pylori* infection in this selected group of patients. The upper GI endoscopies were performed by the surgeons of Hospital Raja Paramaisuri Bainun, Ipoh and the two of the researchers from UniKL Royal College of Medicine Perak. In Hospital Sungai Siput, OGDS was being performed once in two weeks. Biopsies of the stomach were performed and tested for urease production.

Prior written permission was obtained from the Directors of Hospital Raja Permaisuri Bainun, Ipoh and Hospital Sungei Siput before the commencement of the study. Written permission was also obtained from the head of the Department of Sugery Hospital Raja Permaisuri Bainun, Ipoh who was also a co-researcher. The necessary permission was sought for and obtained from the ethical committee of the Ipoh hospital. Registration of the project was also done with the

National Medical Research Register, Ministry of Health, Malaysia.

Discussion

The prevalence rates of *H. pylori* infection varies globally, from continent to continent, country to country and even to different communities within any country. The differences in exposure rate reflects socioeconomic factors including large families and crowded living conditions. People living in over-crowded living conditions with poor sanitation have a higher incidence of *H. pylori* infection.¹⁸ Ethnicity may contribute independently but there are limited epidemiological data from South East Asia regarding this issue. Mazlam reported a study in Malaysia that 56% of Indian, 45% of Chinese and only 11% of Malays gastroscoped with non-ulcer dyspepsia were infected.¹⁹ In a study from Singapore, Indian Asians had a higher prevalence of antibodies to *H. pylori* than either Chinese or Malay. The incidence is certainly less in western world where living conditions are better and people have higher economic status and better sanitation.

The transmission is through oral ingestion, mainly within families in early childhood and has been documented by vomitus, saliva, faeces or possibly also through water sources in developing countries.^{5,6} To colonize the stomach, *H. pylori* must survive the highly acidic environment in the lumen and burrow into the mucous to reach its niche, close to the epithelial cell layer.²⁰ It survives in the acid environment by producing urease, which converts urea to ammonia and thereby generating localized areas of neutralization.²¹ The bacterium also produces a host of other virulence factors: adhesions, vacuolating cytotoxin A, proteases, phospholipases and the microorganism's cytotoxin-associated gene pathogenicity island. Not only do these enhance its survival, it also produces an increased inflammatory response and damages the epithelium.²²

The clinical importance of this organism is its close association with peptic ulcer disease and gastric cancer. Although most individuals infected by *H. pylori* will not experience any

symptoms clinically, it is estimated that 10-20% of the infected individuals will develop gastric and duodenal ulcers.^{4,12} Those infected carry a 1-2% lifetime risk of developing gastric cancer and 1% risk of gastric MALT lymphoma.⁴ Furthermore its eradication leads to the cure of peptic ulcers, and prevents the development of gastric cancer in the individuals who have not developed cancer precursor lesions.¹³⁻¹⁷

If symptomatic, the patients usually present with dyspepsia and other symptoms typically associated with peptic ulcer disease.²³ Very often, there are no other symptoms but an additional history of: abdominal mass, early satiety, protracted vomiting, jaundice and a family history of gastric cancer, may indicate the development of gastric cancer. The diagnosis of *H. pylori* infection is made via invasive and non invasive testing. It can be tested non-invasively with a blood antibody test, stool antigen test, or with the carbon urea breath test.²⁴ However, the most reliable test is by means of an endoscopic biopsy with a rapid urease test, histological examination and microbial culture.²⁵

The standard treatment to eradicate the infection is the one week proton pump inhibitor-based triple therapy (with clarithromycin and either amoxicillin or metronidazole).²⁶ The eradication therapy has radically changed the treatment of peptic ulcers and has made cure possible without surgery.^{15,27} However, there are an increasing number of individuals who harbour antibiotic resistant strains of the bacterium.²⁸ This often resulted in initial treatment failure, necessitating additional therapy or alternate strategies, such as the quadruple therapy (bismuth colloid is added).^{24,29,30,31} In addition, research in the area of developing a vaccine to prevent against *H. pylori* infection is currently ongoing.^{32,33}

Eradication of *H. pylori* infection is being carried out by using one proton pump inhibitor and two antibiotics as per the Ministry of Health guidelines: viz. Amoxicillin 1g.b.i.d, Clarithromycin 500mgs b.i.d., and Pantoprazole 40mgs b.i.d. for one week(7days). Gastric ulcers are biopsied to identify early dysplastic changes

and followed up by regular OGDS till the ulcers heal.

Conclusion

In our prospective study for one year by performing endoscopic biopsy and rapid urease test, we found that the prevalence rate in our set up is fairly high (40.3%). The ethnic distribution shows that the highest number of positive cases was seen among the Indians followed by the Chinese, and the Malays seem to have a much lower rate. The highest incidences were between the ages of 41 to 80 years with a slight female preponderance. Out of 278 respondents none of the patients had any evidence of adenocarcinoma of the stomach or MALT lymphoma. Majority of the patients had antral gastritis, corpus gastritis, duodenitis and peptic ulcers. All patients with gastric ulcers were biopsied but no case of carcinoma of the stomach was detected. All those patients who had positive urease test were treated by the triple regime as per the Ministry of Health guidelines; two antibiotics and one proton pump inhibitor (Amoxicillin 1g BID, Clarithromycin 500mg BID and Pantoprazole 40 mg BID) . The duration of treatment is for one week. Our policy is to identify those patients who are harbouring the infection and eradicate it in those who are symptomatic. OGDS is performed for all the patients who have symptoms of dyspepsia, peptic ulcers, upper gastrointestinal bleeding and suspected malignancy.

Acknowledgment

We would like to thank the Hospital Raja Permaisuri Bainun, Ipoh and Hospital Sungai Siput administration and Dr. Yan Yang Wai, the Head of Surgical Department and his team for allowing us to perform and assisting us greatly in the completion of this study.

We would also like to thank Universiti Kuala Lumpur and Universiti Kuala Lumpur Royal College of Medicine for the financial assistance and encouragement to produce this report. of KDC, YB Lee Kim Shin, for giving his approval to conduct this study at the dialysis centre.

Results:

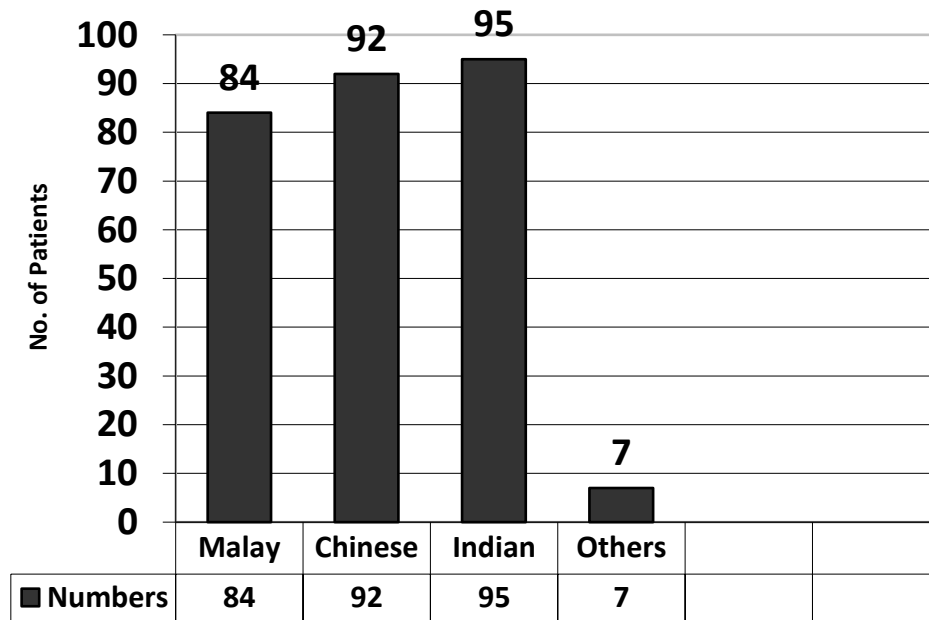


Figure 1. Ethnic Distribution

Out of the 278 respondents, there were 30.2% Malays, 33.1% Chinese, 34.2% Indians and 2.5% others.

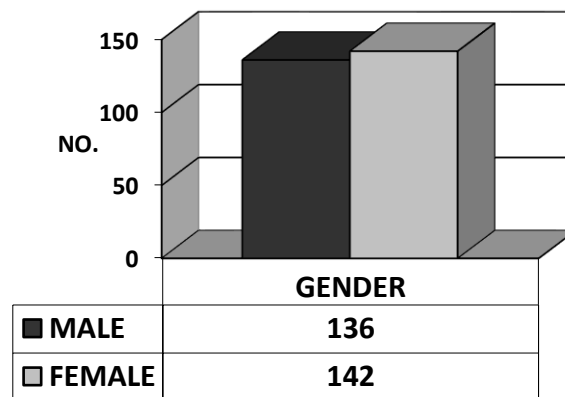


Figure 2. Gender Distribution

The gender distribution was fairly even with 49% male and 51% female respondents.

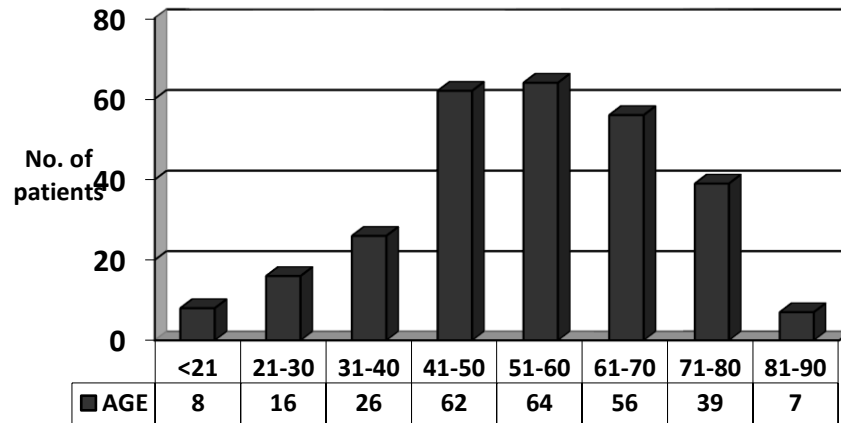


Figure 3. Age Distribution

The ages of the respondents ranged from 19 to 85 years with the peak age group of 51-60 years (23%) and gradually decreasing numbers in the younger and older age groups.

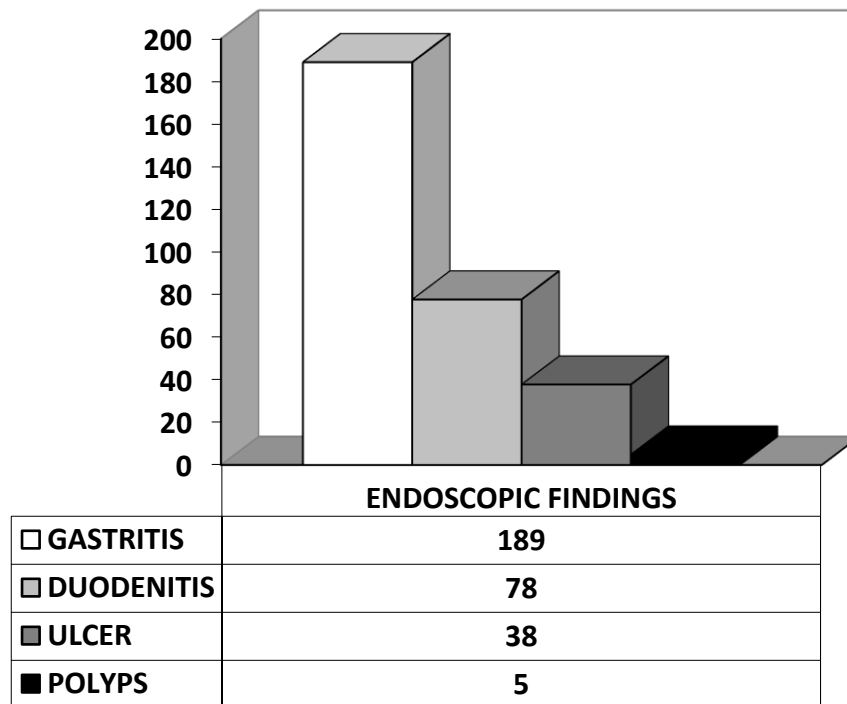


Figure 4. Endoscopic findings

The majority of the patients was found to have gastritis (68.0%), followed by lesser numbers with duodenitis (28.1%), ulcers (13.7%) and polyps (1.8%). Some patients had more than one endoscopic finding and 54 patients (19.4%) had normal OGDS findings.

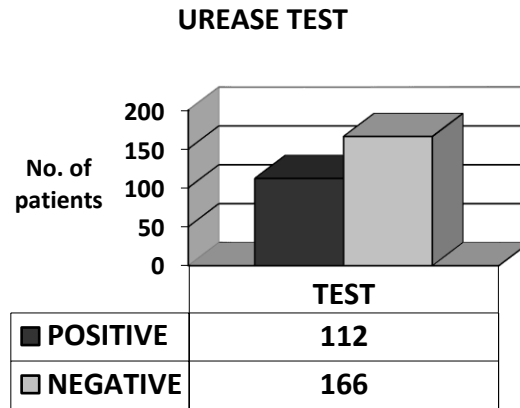


Figure 5. Urease test results

112 of the respondents (40.3%) were found to have a positive urease test result.

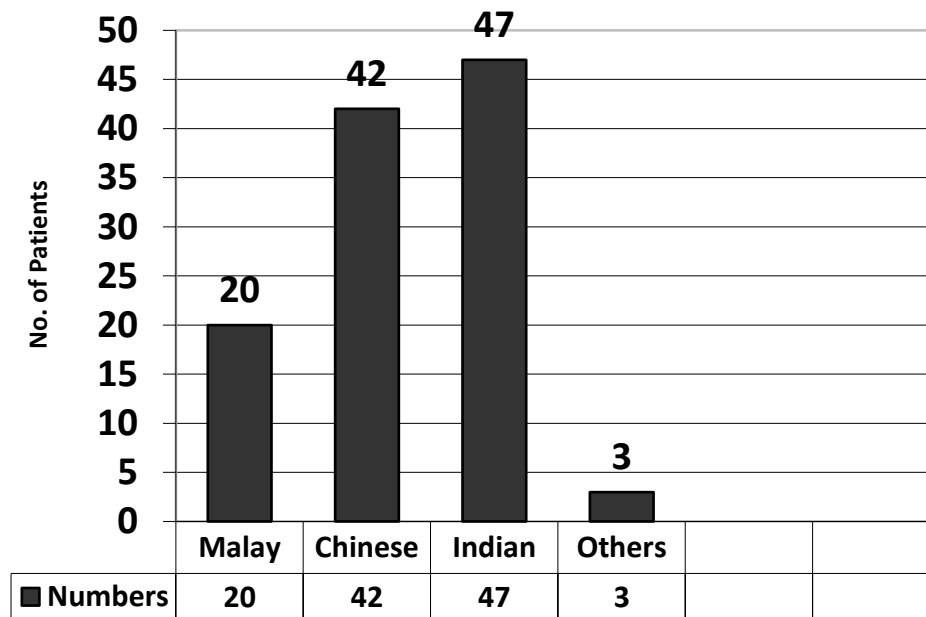


Figure 6. Ethnic Distribution of patients with a positive urease test result

Comparing with the overall distribution of the respondents, we found that the ethnic distribution of those with a positive urease test result is different with a much lower percentage of Malays (23.8%) with a positive test result compared with the other 3 ethnic groups: Chinese (45.7%), Indian (49.5%) and others (42.9%).

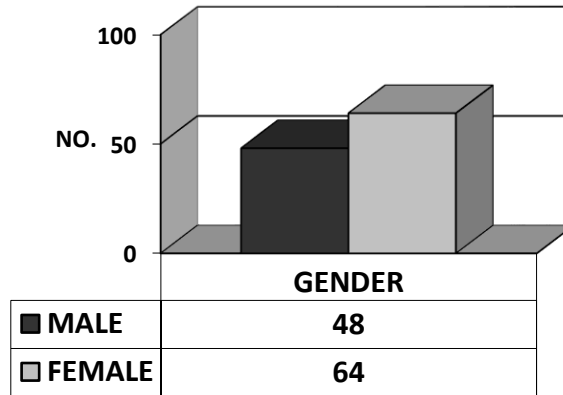


Figure 7. Gender Distribution (Positive urease test)

It is also noted that more female patients were tested positive with the urease test (45.1% of all female respondents) as compared with the male patients (35.3% of all male respondents).

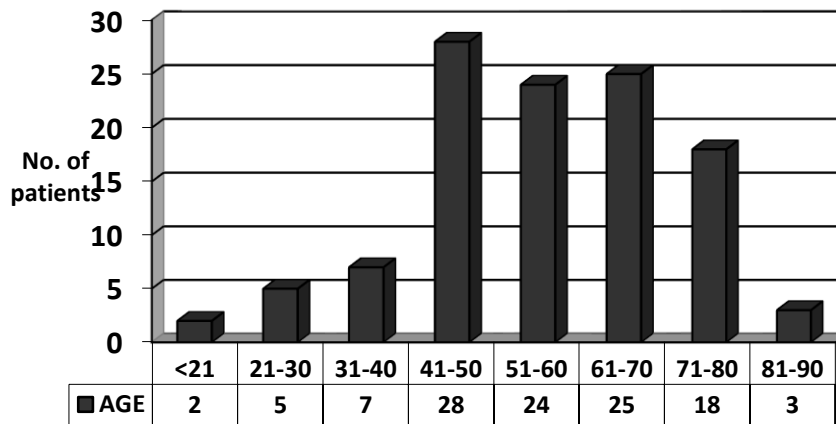


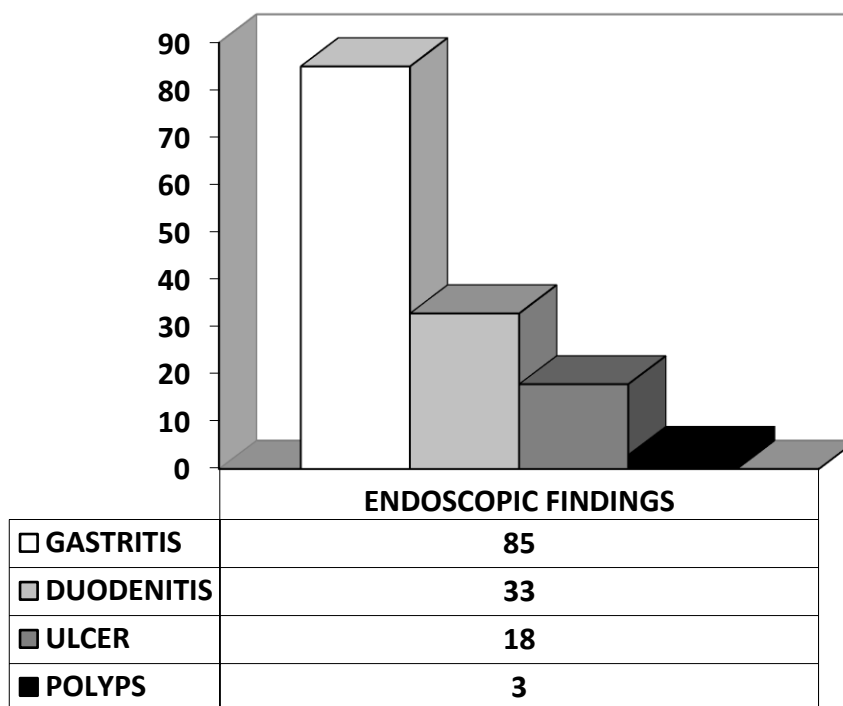
Figure 8. Age Distribution (Positive urease test)

There were fewer patients with a positive urease test among the younger age groups (<21 to the 31-40 age groups) in comparison with the total number of respondents that underwent OGDS.

Age (years)	Number of patients		Percentage of patients with a positive test (%)
	Number of patients with a positive test	Total number of respondents	
<21	2	8	25
21-30	5	16	31.3
31-40	7	26	26.9
41-50	28	62	45.2
51-60	24	64	37.5
61-70	25	56	44.6
71-80	18	39	46.2
81-90	3	7	42.9

Most of the older age groups recorded a more than 40% positive test result except for the 51-60 years group (the group with the largest number of respondents).

Endoscopic Findings (Positive urease test)



Endoscopic Findings	Number of patients		Percentage of patients with a positive test (%)
	Positive urease test	Overall	
Gastritis	85	189	45.0
Duodenitis	33	78	42.3
Ulcer	18	38	47.4
Polyps	3	5	60.0
Normal OGDS	12	54	22.2

Only 22.2% of the respondents with a normal OGDS finding were tested positive whereas more than 40% of all the patients with positive findings were tested positive.

The percentage of patients with positive OGDS findings among those with a positive urease test (100 out of 112 patients; 89.3%) was higher than those with a negative test (124 out of 166 patients; 74.7%).

References

1. Warren JR, Marshall BJ. Unidentified curved bacilli on gastric epithelium in active chronic gastritis. *Lancet*. 1983; i: 1273-5 (letter).
2. Pounder RE, Ng D. The prevalence of *Helicobacter pylori* infection in different countries. *Aliment. Pharmacol. Ther.* 1995; 9 Suppl 2:33–9.
3. Graham DY, Adam E, Reddy GT et al. Seroepidemiology of *Helicobacter pylori* infection in India. Comparison of developing and developed countries. *Dig Dis Sci*. 199; 36: 1084-8.
4. Kusters JG, van Vliet AH, Kuipers EJ. Pathogenesis of *Helicobacter pylori* infection. *Clin Microbiol Rev.* July 2006; 19(3): 449–90.
5. Malaty HM, El-Kasabany A, Graham DY, et al. Age at acquisition of *Helicobacter pylori* infection: a follow-up study from infancy to adulthood. *Lancet*. 2002; 359: 931-35.
6. Brown LM, Thomas TL, Ma JL, et al. *Helicobacter pylori* infection in rural China: demographic, lifestyle and environmental factors. *Int J Epidemiol*. 2002; 31: 638-45.
7. Goh KL, Peh SC, Jalleh R, Wong NW, Tan HS. Non-ulcer dyspepsia and *Campylobacter* infection. *Proceedings Malaysian Society of Pathologists, 12th Annual Scientific Meeting, 7-9th August 1987.*
8. Goh KL, et al. Time trends in peptic ulcer, erosive reflux oesophagitis, gastric and oesophageal cancers in a multiracial Asian population. *Aliment Pharmacol Ther.* APR 2009; 29(7): 774-80

9. Hassan AKR, Rapae A, Bohari H, Ismail G. Sero-epidemiological studies of Helicobacter pylori infection among the indigenous communities in eastern Malaysian states of Borneo. World Federation of Public Health Association (WFPHA) 10th International Congress on Public Health. 19-22 April 2004, The Brighton Centre, Brighton, UK.
10. Ayub A M, Raj S M, Visvanathan R. Helicobacter pylori infection in North-Eastern Peninsular Malaysia. Evidence for usually low prevalence. Scan J Gastroenterology. 1994; 29:209-213.
11. Goh K L. Prevalence of and risk factors for Helicobacter pylori infection in a multi-racial dyspeptic Malaysian population undergoing endoscopy. J Gastroenterology Hepatology. 1997; 12:29-35.
12. Boyanova, L (editor). Helicobacter pylori. Caister Academic Press. 2011. ISBN 978-1-904455-84-4.
13. Coghlan JG, Gilligan D, Humphries H et al. Campylobacter pylori and recurrence of duodenal ulcers – a 12-month follow-up study. Lancet. 1987; ii: 1109-11.
14. Marshall BJ, Goodwin CS, Warren JR et al. Prospective double-blind trial of duodenal ulcer relapse after eradication of Campylobacter pylori. Lancet. 1988; ii: 1437-42.
15. Rauws EA, Tytgat GN. Cure of duodenal ulcer associated with eradication of Helicobacter pylori. Lancet. May 1990; 335(8700): 1233-5.
16. Forbes GM, Glaser ME, Cullen DJ et al. Duodenal ulcer treated with Helicobacter pylori eradication: seven-year follow-up. Lancet. 1994; 343: 258-60.
17. Wong BC, Lam SK, Wong WM et al. China Gastric Cancer Study Group. Helicobacter pylori eradication to prevent gastric cancer in a high-risk region of China: a randomized controlled trial. JAMA. 2004; 291: 187-94.
18. Huang SSS, Hassan AKR, Choo KE, Ibrahim MI and Davis TME. Prevalence and predictors of Helicobacter pylori infection in children and adult from Penan ethnic minority of Malaysian Borneo. American Journal Tropical Medicine & Hygiene . 2004; 71(4), 444-450.
19. Mazlam M Z. Helicobacter pylori infection in Malaysia. Med J Malaysia. 1995; 50:205-207.
20. Ottemann KM, Lowenthal AC. Helicobacter pylori uses motility for initial colonization and to attain robust infection. Infect Immun. April 2002; 70 (4): 1984–90.
21. Bartnik W. Clinical aspects of Helicobacter pylori infection. Pol Arch Med Wewn. 2008; 118(7-8): 426-30.
22. Lopes JE. Helicobacter pylori infection: Update on diagnosis and management. JAAPA. July 2010; 23(7): 20-23.
23. Conroy RT, Siddiqi B. Dyspepsia. Prim Care. 2007; 34(1): 99-108.
24. Stenstrom B, Mendis A, Marshall B. Helicobacter pylori - The latest in diagnosis and treatment. Aust Fam Physician. August 2008; 37(8): 608–12.
25. Logan RP, Walker MM. ABC of the upper gastrointestinal tract: Epidemiology and diagnosis of Helicobacter pylori infection. BMJ. October 2001; 323(7318): 920–2.
26. Mirbagheri SA, Hasibi M, Abouzari M, Rashidi A. Triple, standard quadruple and ampicillin-sulbactam-based quadruple therapies for H. pylori eradication: a comparative three-armed randomized clinical trial. World J. Gastroenterol. August 2006; 12(30): 4888–91.

27. Graham DY, Lew GM, Evans DG, Evans DJ, Klein PD. Effect of triple therapy (antibiotics plus bismuth) on duodenal ulcer healing. A randomized controlled trial. *Ann. Intern. Med.* August 1991; 115(4): 266–9.
28. Yakoob J, Abid S, Abbas Z, Jafri SNW. Antibiotic susceptibility patterns of *Helicobacter pylori* and triple therapy in a high-prevalence area. *B J Biomed Sc.* 2010; 67(4): 197-201.
29. Fischbach L, Evans EL. Meta-analysis: the effect of antibiotic resistance status on the efficacy of triple and quadruple first-line therapies for *Helicobacter pylori*. *Aliment. Pharmacol. Ther.* August 2007; 26(3): 343–57.
30. Graham DY, Shiotani A (). New concepts of resistance in the treatment of *Helicobacter pylori* infections. *Nat Clin Pract Gastroenterol Hepatol.* June 2008; 5(6): 321–31.
31. Zheng Q, Chen WJ, Lu H, Sun QJ, Xiao SD. Comparison of the efficacy of triple versus quadruple therapy on the eradication of *Helicobacter pylori* and antibiotic resistance. *J Dig Dis.* October 2010; 11(5): 313-18.
32. Kabir S. The current status of *Helicobacter pylori* vaccines: a review. *Helicobacter.* April 2007; 12(2): 89–102.
33. Czinn SJ, Blanchard T. Vaccinating against *Helicobacter pylori* infection (Review). *Nat Rev Gastroenterol & Hepatol.* March 2011; 8(3): 133-40.

ORIGINAL ARTICLE

DETECTION OF NUCLEAR APPENDAGE IN PERIPHERAL BLOOD NEUTROPHIL LEUKOCYTES FOR SEX DETERMINATION.

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Abstract

Background: Sex determination can be done by the detection of drumstick-shaped nuclear appendage that is present in neutrophil leukocytes from peripheral blood smear of female subjects.

Objectives: This study was conducted to identify a drumstick-shaped nuclear appendage on neutrophil leukocytes from peripheral blood smear and to analyse the sensitivity, specificity, positive predictive value and negative predictive value of the test in gender determination.

Materials and Methods: A total of 110 randomly selected blood smears (from 40 male and 70 female subjects) with age range from 19-22 years, were stained with Jenner-Giemsa stain. At least 100 well-stained neutrophils per slide were double-blindly studied by the observers.

Results: Sixty-six out of 70 female subjects and 36 out of 40 male subjects were correctly identified. There was 4 false positive result on the male subjects and 4 false negative results on the female subjects in the detection of nuclear appendage. A 94.28% sensitivity, 90% specificity, 94.28% positive predictive value and 90% negative predictive value for the study was calculated.

Conclusions: The identification and detection of nuclear appendage from neutrophil leukocyte is an easily applicable method that is useful as a screening method in sex determination. Overall, the method also has a high sensitivity, specificity and predictive values.

Keywords: *Neutrophil leukocytes; Nuclear appendages; Sex determination*

Introduction

The first researchers who had demonstrated a morphological sex difference on the nuclei from the cells of the nervous system of mammals were Barr and Bertram in 1949¹. It was followed by an extension of the observation to human skin and the method was applied to determine the genetic sex in hermaphrodites². The evidence of structural difference between the nuclei of the neutrophils in the two sexes was then reported by Davidson and Smith in 1954³. Hence, it was also known as “Davidson’s bodies”. It was reported that these dumbbell-shaped nuclear appendages strongly correlated with female subject and is useful in sex determination. Three percent of neutrophils leukocytes from normal females display a nuclear appendage as a drumstick-shaped mass of dense chromatin, which is 1.5 µm in size. It is attached to one of the nuclear lobes by a thread-like neck to the rest of the nucleus. The presence of nuclear appendage in the female leukocytes represent major part of the XX chromosome mass in female. In contrast, the absence of nuclear appendage in the neutrophil leukocytes can be taken to indicate that there are fewer than two X chromosomes in the cell and this can represent them as males. Sex chromatin is derived from one of the two X chromosomes in the female which replicates its deoxyribonucleic acid much later than the other and is thus positively heteropyknotic^{4,5}. Observation on morphology and comparison between 2 different stains: Leishman’s and Field presented a moderate agreement in gender determination⁶.

This study was conducted to identify only a drumstick-shaped nuclear appendage on neutrophil leucocytes from peripheral blood smear using Jenner Giemsa stain and to analyse the sensitivity, specificity, positive predictive value and negative predictive value of the test in gender determination.

Materials and Methods

This research work was conducted with the permission from the Institutional Ethical

Committee. Subjects were medical student volunteers from the University Kuala Lumpur – Royal College of Medicine Perak (UniKL RCMP). Out of 259 students, a convenient random sampling selection was chosen and a total of 110 subjects with age range from 19-22 years were selected which included 40 male students and 70 female students. Ethical issues were considered by anonymizing the collected data, slides were labeled in code number and the detail particulars were not revealed. Letter of consent was given to each subject and the research was conducted only with the permission from the subjects. Venous blood samples were collected into potassium EDTA tubes and thin-blood film were prepared. The blood smears were stained with Jenner-Giemsa method. Duplicate films were prepared from each subject. Only a very small number of films which were technically unsuitable were rejected. The blood smears were examined under light microscope on oil immersion lens after scanning. A double-blind method of study was applied by keeping unknown the observer about the sex of the subject until after examination of the smear. A brief preliminary pilot observation was performed to be familiar in identification of the nuclear appendages from the randomly selected blood films, before a proper observation was performed. Each person independently counted 100 well-stained neutrophils for each slide, from the tail-end of the smears. Detecting the typical drumstick nuclear appendage was regarded as positive or female subject and without detection of the nuclear appendage was regarded as negative or male subject.

Exclusion Criteria: subject who refused to participate in this research.

Statistical analysis: Data were collected and plotted on two-by-two table. The test results were expressed in percentage sensitivity, specificity, positive predictive value and negative predictive value⁷.

Results

Peripheral blood collected from 40 males and 70 female subjects, with age range between 20-24 years were observed for sexual differences. Female subjects with identifiable drumstick nuclear appendages were categorized under true positive. Female subjects without being able to identify drumstick nuclear appendages were categorized under false negative. Male subjects without drumstick nuclear appendages were categorised under true negative, and male subjects wrongly identified to have drumstick nuclear appendages were categorised as false positive. A drumstick morphology of the nuclear appendage is identified as a round head and a thin stem (Fig.1). No other non-specific morphologies were counted in as positive nuclear appendage. Figure 2 is a histogram showing total number of subjects detected and not detected for the nuclear appendage in the neutrophil.

A correct identification of sex was made in 36 out of 40 blood smears from the male subjects and 66 out of 70 blood smears from the female subjects. The sex was erroneously observed as male for 4 female subjects and 4 females as male subjects. Table 1 shows the total number and percentage of drumstick positive and negative female and male subjects of the study group. A 94.28% sensitivity, 90% specificity, 94.28% positive predictive value and 90% negative predictive value of the subjects from the study group were calculated as shown in Table 2.

Discussion

Typical nuclear appendages are identified as 'drumstick' that are found in the neutrophils. Identification and detection of the nuclear appendage helps confirm a female subject and absence of nuclear appendage is considered as male subject. Our study demonstrated a high sensitivity (94.28%) and specificity (90%) of the test as well as high positive predictive value (94.28%) and negative predictive value (90%). A recent study done by Tupakula S et al in 2014 was performed on counting in other non-specific appendages such as minor lobes, racket structures and small clubs that were observed in males and

that sessile nodules were found only in females. They had demonstrated that the incidence of drumstick neutrophil nuclear appendage is a valuable data for sex differences⁴. Another recent study had mentioned that drumstick appearance is the true morphology found out in an average of 5.4 in female and 2.1 in male subjects, whereas the non-specific forms sessile nodules average 0.6 in females and 0.3 in males and the tag and hook forms were 2.9 in females and 7.4 in males. They had reported that it is essential to consider all forms of neutrophilic nuclear appendages for morphological sex differentiation⁸. Chatterjee et al in 2014 found drumstick as a predominant feature in identification of cytological sex⁵. Moreover, a recent study done by Zoja and Rita in 2018 had mentioned that only drumstick appendage is sex-specific and considered for sex diagnosis and drumsticks are significantly higher in females than in males⁹. Hence, we decided to focus only on typical drumstick appendages rather than other non-specific morphologies. We believe this could be the false positive findings of the drumstick in the male subjects in our study. Nodules with a short thick neck and sessile nodules, although nearly diagnostic of the female neutrophils, are more difficult to distinguish from other nodules found in both sexes and can result in more false negative and false positive findings. It might also be due to technical error and intra or inter observer variation.

Brahimi et al had mentioned that blood smear is a reliable tool to determine gender as well as in determining the hormonal influence on the subject. Neutrophils bear the same amount of appendages in both gender, but the number of drumstick form is significantly greater in females and the increase in the number of tag form appendages is significant in male, and that this might be a manifestation of a high androgen level in men¹⁰. Thus, more information could be obtained if we performed our study by further counting in other non-specific morphological features on the nuclear appendage and the hormonal status of the subject.

Other than neutrophil nuclear appendages, studies have also shown that identification of buccal Barr bodies and cells from the dental pulp could be applied as reliable parameters in medico-legal cases for sex determination^{8, 11, 12, 13, 14}. Further comparative study on the significant value of sex determination using neutrophil nuclear appendages and Barr body identification will be of great value. The usefulness of drumstick nuclear appendage in chronic myeloid leukaemia was traced back since 1961 by Tomonaga et al, and recently, continuation studies on myeloproliferative disorder and leukaemia has found out much support on further anti-leukemic therapy¹⁵⁻¹⁷.

Recently, Selvi et al in 2018 have mentioned that Davidson bodies in blood smear are highly specific when compared to Barr bodies in buccal smear. Morphological gender determination using Davidson bodies in haemato-pathology is easy, reliable, less time consuming and cost effective¹⁹. The identification of nuclear appendage in sex detection can be used as a mass screening test as it is easy to perform, able to obtain immediate result and cost-effective, although it may not be a confirmatory diagnostic test. Recent advances in technology aids in identifying X chromosome-specific nucleic acid probe confirms the position of the X chromosomes in the drumstick structure of leukocyte nuclei by *in situ* hybridization are considered confirmatory methods for sex determination. The demonstration of human chromosome abnormalities, and the

determination of sex linked disorder can also be done by using this simple technique^{12, 18}.

Conclusion

Based on our findings, higher percentage of female subjects are found to have presence of nuclear appendage in neutrophil while higher percentage of male subject are found to have absence of nuclear appendage in neutrophil. Thus, there is evidence of a significant association between gender of the persons and the presence or absence of nuclear appendage in neutrophil leukocytes. It is a simple test that can be performed with little training and experience and therefore is a suitable cost effective test as a screening test to perform in remote areas where sophisticated and expensive facilities are not available. However, we believe that a further confirmatory test such as karyotyping should be performed in critical and specific situation such as medico-legal cases and ambiguity in sex.

Acknowledgement

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Conflict of interests

The authors declare no conflict of interests for the publication of this article.



Figure 1. A typical drumstick nuclear appendage identified in the peripheral blood smear of a female subject.

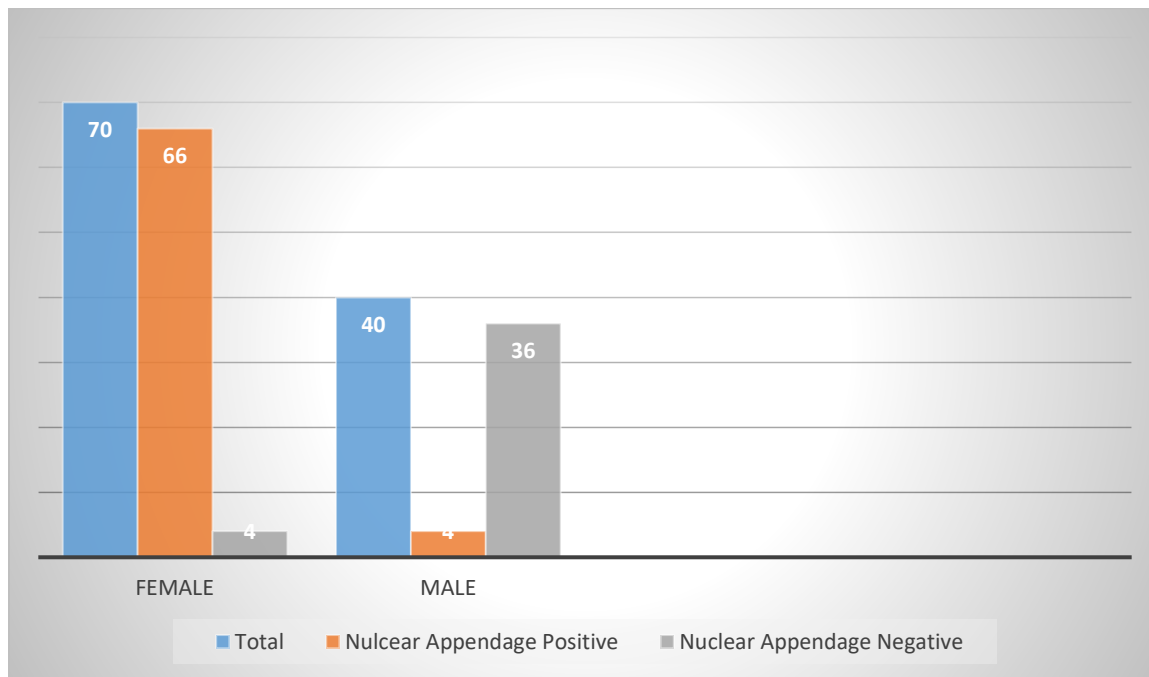


Figure 2. Histogram showing total number of subjects detected and not detected for nuclear appendage

Table 1. Total number (n) and percentage (%) of drumstick positive and negative female and male subjects of the study group.

Sex (n)	Drumstick Positive		Drumstick Negative	
	n	%	n	%
Male (40)	4	3.64	36	32.73
Female (70)	66	60	4	3.64

Table 2. Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of sex determination by the detection of nuclear appendage in the subjects from the study group.

Total Number of Subjects (n-110)			
Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
94.28%	90.0%	94.28%	90.0%

References

1. Barr ML and Bertram EG. A Morphological Distinction between Neurones of the Male and Female, and the behaviour of the nucleolar satellite during accelerated nucleoprotein synthesis. *Nature* 1949;163: 676–77.
2. Moore KL, Graham MA and Barr ML. The detection of chromosomal sex in hermaphrodites from a skin biopsy. *Surg. Gynecol and Obstet* 1953; 96:641-48.
3. Davidson WM and Smith DR. A morphological sex difference in the polymorphonuclear neutrophil leucocytes. *The Brit Med J* 1954; 2:6–7. <https://doi.org/10.1136/bmj.2.4878.6>
4. Tupakula S, Velichety SD, Thyagaraju K. Sexual dimorphism in morphology and morphometry of neutrophil drumsticks. *Int J Anat Res* 2014; 2:720-6.
5. Chatterjee S. Reliability of sexual dimorphism in blood. *Indian J Physiol Pharmacol* 2014;58: 400-2.
6. Shalini Gopal, Rashmi Naik, Ahmed Mujib BR & Arun Kumar N. Gender determination using Peripheral Blood Smear. *Intl J Anat Research* 2018; 6:5079-82.
7. Gerstman BB and Cappucci DT. Evaluating the reliability of diagnostic results: Special report. *J Am. Vet. Med. Assoc* 1986;188: 248-51.
8. Rashmi V and Manjula A. Reliability of nuclear appendages in morphological sex differentiation. *IJMSPH International J of Med Sc and Pub Health* 2017;6: 783-785.
9. Zoja M and Rita I. Sex Chromatin in Peripheral Blood Neutrophils and Sex Determination. *Case Reports in Clinical Medicine* 2018;7: 55-62.
10. Brahimi M, Adda A, Lazreg H, Beliali H, Osmani S, and Bekadja MA. Can sex be determined from a blood smear? *Turk J Haematol* 2013;30: 53-7.
11. Kaur N, Sidhu R, Chandra S and Taneja N. Buccal Barr Bodies: accuracy and reliability in Sex Determination. *Saudi J. Oral. Dent. Res* 2017;2: 168-173. DOI:10.21276/sjodr

12. Revi AVS, Prakash AR, Killampalli LK, Rajinikanth M, Sreenath G, and Sabiha PB. Gender determination using barr bodies from teeth exposed to high temperatures. *J Forensic Dent Sci* 2017;9: 44.
13. Dahiya K. To Evaluate and Compare Barr Bodies and Davidson Bodies—A Forensic Study. *J Inno Dentistry* 2016; 6:1-2.
14. Suaza GI, Roa HI and Cantin LM. Sex Chromatin in Dental Pulp, Performance of diagnosis and Gold Standard Generation. *Int. J. Morphol* 2010; 28:1093-96.
15. Tomonaga M, Matsuura G, Watanabe B, Kamochi and Ozono N. Leukocyte Drumsticks in Chronic Granulocytic Leukemia and Related Disorders. *Blood* 1961; 18:581-91.
16. Wondergem MJ and Ossenkoppele GJ. Genotyping by Morphology. *Blood* 2011;117: 2566.
17. Smetana K, Mikulenkova D and Klamova H. Morphometric and Densitometric Analysis of Heterochromatin during Cell Differentiation Using the Leukaemic Granulocytic Lineage as a Convenient Model. *Folia Biologica (Praha)* 2017;63: 1-5.
18. Kahwash BM, Nowacki NB and Kahwash SB. Aberrant “Barbed-Wire” Nuclear Projections of Neutrophils in Trisomy 18 (Edwards Syndrome). *Case Reports in Hematology* 2015; 1-4. <http://dx.doi.org/10.1155/2015/163857>
19. Selvi S, Prasad H, Rajmohan M, Sri Chinthu KK, Prema V and Mahalakshimi L. Comparison of Davidson Bodies with Barr Bodies. *Int’l J of Current research* 2018;10: 69805-07.

ORIGINAL ARTICLE

STUDY ON KNOWLEDGE, PRACTICE OF PREVENTIVE MEASURES AND ITS EFFECTIVENESS ON HEALTH PROMOTION ON DENGUE AMONG THE RESIDENTS OF A VILLAGE IN IPOH, PERAK.

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Abstract

Introduction: The incidence of dengue has risen dramatically high over the last few decades worldwide. Some three billion people are at risk of getting infected with dengue. In Malaysia the total number of dengue cases has been rising annually. In Perak, the number of cases for dengue fever and hemorrhagic dengue fever increased from 421 cases per 100000 population in 2012 to 1024 cases per 100000 in 2013 accounting for an increase of 143.2%. This study aimed to assess the knowledge, practice of preventive measures and effectiveness of health promotion related to dengue among residents of a village in Ipoh.

Methodology: This cross sectional study was conducted in 2015. Simple random sampling was applied to choose the samples.

Results and discussion: Out of a total of 408 respondents, 61.3% and 74% obtained good scores in knowledge and preventive practice measures respectively. The highest misconceptions occurred on behavior aspects of the Aedes mosquitoes (46.6%) and availability of vaccinations for dengue (40.7%) while 65% of respondents allow fogging activities to be conducted at 2pm (noon). Significant associations were shown between types of occupation and knowledge ($p=0.017$), level of education and practice ($p=0.022$), previous exposure among family members and practice ($p=0.016$), and between knowledge and practice ($p=0.011$). In conclusion, despite having good knowledge about dengue and potential breeding sites of the Aedes mosquito, the number of dengue cases rising could be due to a quarter of population having poor preventive practices.

Keywords: *Dengue, Knowledge, Practice, Health Promotion*

Introduction

Dengue fever, also known as breakbone fever, is a mosquito-borne tropical disease caused by the dengue virus. The symptoms include fever, headache, muscle and joint pains, and a characteristic skin rash that is similar to measles. In a small proportion of cases, the disease develops into the life-threatening dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs¹.

Dengue fever is transmitted by the bite of an *Aedes* mosquito infected with any one of the four dengue viruses. Although most infections are self-limiting a proportion of cases develop severe complications such as dengue hemorrhagic fever which can carry a significant risk of death. The incidence of dengue is on a dramatic rise around the world in recent decades. As no vaccine is currently available, primary prevention is considered the most effective measure in controlling dengue. Each time an outbreak occurs, the local health authority will plan and carry out various types of promotional and educational activities that aim to increase knowledge of dengue and change dengue preventive behaviour among communities at the centre of the outbreak. According to The World Health Organization (WHO) dengue has been classified as a neglected tropical disease (NTD). However, the argument has always been that if dengue was, in first place, really neglected or not. It would be more important for the sake of prevention and control of dengue to recognize the advantage of including dengue in the list of NTDs². One study (2013) estimate indicates that 390 million dengue infections occur every year (95% credible interval 284–528 million), of which 96 million (67–136 million) manifest clinically (with any severity of disease)³. Another (2012) study, of the prevalence of dengue, estimates that 3.9 billion people in 128 countries are at risk of infection with dengue viruses⁴.

These promotional activities can be carried out through various methods such as individual home

visits, or at the population level through the mass media. Health promotion and educational intervention like, 'search and destroy' activities, advice on the need to seek immediate medical attention in patients with fever, and proper disposal of rubbish are usually the focus of behavioral-change promotion activities. The promotional and educational messages are usually delivered using small group discussion, public lecture, live public announcement, demonstration, distributing printed materials, putting up posters, bunting and billboards, community source reduction and community dengue-cleanliness program and health exhibitions⁵.

The current survey explores the knowledge, the practice of prevention and the effectiveness of health promotion related to dengue infection among residents of a village in Ipoh, Perak.

Materials and Methods

This cross sectional study among villagers was conducted in Kampung Sri Kinta, Ipoh Perak. The study was conducted from 8th until 24th June 2015. We calculated the sample size by using OpenEpi website Version 3.03a, setting an estimated prevalence of 50% with confidence level 95 %. Our calculated sample size was 252, however, in order to take account for the non-respondents, we decided to take extra 20% samples. Out of 300 houses selected for this study, only occupants from 259 houses agreed to participate. From those 259 houses, we managed to get 408 respondents. Our inclusion criteria were only limited to maximum four people above 15 years of age in any given house.

A simple random sampling method was followed to choose the houses. The questionnaire was designed by the research team in bilingual which were Bahasa Malaysia and English. The questionnaire was divided into four parts which were sociodemographic, knowledge, preventive practice and health promotion. The questionnaire

was pretested among 20 people to ensure that, the questions were easily understood.

Selected houses were approached and a set of self-administered questionnaires were given once they consented to participate in the study. A maximum number of four people aged 15 and above in any single house were able to participate in this study.

In the first part of the questionnaire, the questions were to obtain the villagers' sociodemographic information which was age, gender, race, education level, occupation, marital status and history of dengue. For the second part, the questions were designed to test the villagers' knowledge on dengue. They consisted of 15 multiple choice questions with one correct answer. One mark would be given for each correct answer and no mark would be given for a wrong answer. The median was used as a cut-off point, villagers who obtained 12 or more marks were considered as having "good knowledge".

For the third part of the questionnaire, it consisted of eight questions which aim to know the correct practice that they had done to prevent dengue as well as one descriptive question. One mark was given for each correct practice and no mark was given for the wrong practice. Those villagers who obtained a median score of 6 or more were considered to have good preventive practices.

The last part of the questionnaire enquired on whether the villagers had ever been involved in a health programme on dengue in the past six months. They were also asked if they understood the information provided in pamphlets from the Ministry of Health. Consent forms were obtained from respondents before they answered the questionnaire. All responses from the participants were kept confidential. Data was analyzed using SPSS version 17. The significance level was set at $P < 0.05$.

Result

Selected socio-demographic characteristics of respondents were shown. The mean age of respondents was 42 years with a standard

deviation of 19.9. The respondents were divided into 6 age groups, and the highest percentage of respondents was from the age group of 13-22 years (30.1%). The respondents consist of 243 (59.6%) female and 165 (40.4%) male. All were Malay race. In reference to education, the highest percentage of respondents did have a secondary school education only (59.8%). When asked about their marital status 61% of respondents said they were still married. The respondents of this study have different occupation. However, most of them were housewives and students (29.7% and 20.8% respectively). When respondents were asked about any family history of dengue, only 20.3% of them said yes. (**Table 1**)

From the above diagram, we can see that 61.3% of the respondents from Kampung Sri Kinta have good knowledge on dengue fever whereas, 38.7% of the respondents were having poor knowledge on dengue fever. (**Figure 1**)

When, we carried out the survey on the practice of prevention steps on dengue, majority (74.0 %) of the respondents were practicing good preventive measures. Twenty six percent of the respondents had poor preventive practice. (**Figure 2**)

The association between knowledge and preventive practice was found to be significant. Among the respondents, 64.9% have good knowledge and good practice while 49.1% have bad knowledge and bad practice (**Table 2**).

Another significant association was found between understanding the health promotion pamphlet and knowledge. Of our respondents, 65.8% understood the pamphlet and had good knowledge scores while 61.6% of the respondents who did not understand the pamphlet had poor knowledge on dengue. We assumed that if they understood the pamphlet, it meant the message was effectively transferred from the pamphlet to the villagers. (**Table 3**).

Discussion

Dengue is one of the major public health problems, which can be controlled with active participation of the community. Thus, this study aimed to measure the knowledge about dengue, assess the practice in preventive measure and evaluate the effectiveness of health promotion in terms of understanding the health promotion pamphlet related to dengue.

Our study revealed that more than two thirds of the respondents were well equipped with the essential knowledge on dengue fever. Our finding is similar to one recent study which was conducted in a place not very far from our study's place. Firdous et al (2017) found that majority of the people in Dewan Bandaraya Ipoh⁶. (61.6%) had a good knowledge on dengue infection.

Although we did not ask about the sources of knowledge on dengue from our respondents, we assumed that most of them would have got it either from TV or internet sources. Moreover, most of our study's respondents had received printed media concerning dengue on few occasions, mostly through health campaigns. Of these, 85.8% found that the information was easy to understand.

In a study conducted in Westmoreland, Jamaica, it was found that media plays a very important role on the level of awareness among individuals. Respondents indicated that Radio and Television were the predominant sources of information regarding dengue. Secondly, only about half of participants obtained information about dengue disease from health workers⁷.

Our study showed that, almost 75% of the respondents had good practices in preventing dengue. The association between knowledge and practice, was found to be statistically significant. Thus, an increment of knowledge on dengue would and should result in a better practicing on preventing it. This finding is contrary to what

researchers in Gujrat India, where a survey among University students showed that instead of having the knowledge people still not utilize the measure of door and windows net coverage, application of mosquito repellent oil & bed covering nets. These strategies may be considered costly and prime importance may be given by government to enhance the implementation of knowledge into practice through community mobilization⁸. In the same context, our study results are consistent with previous studies conducted in Pakistan⁹ but inconsistent with findings of study in Philippines¹⁰ Jamaica⁷ and India¹¹.

Our study has also revealed that 26% of the respondents scored poorly in preventive practices. Most of those scoring poorly were those who had primary education or were uneducated. The higher the level of education a person receives is expected to promote better preventive practices. More over the study we conducted showed that, nature and type of occupation have no influence on the preventive practices.

Merely attending a health promotion program does not result in good preventive practices. There was no significant association between attendance to those kinds of programs and preventive practice. In any health promotion program, participants are only being educated theoretically. It has been suggested that the habit of preventive practices is influenced by self-motivation.

Conclusion

Knowledge about dengue infection is an essential element to keep the infection rate low. However, without good preventive practices among the population, it will be difficult to control the vectors. Knowledge among the respondents was good enough and preventive practices were good too yet, reported cases of dengue are on the rise. Strengthening the health campaigns and coming up with new technologies to target the recalcitrant population is important to overcome dengue.

Table 1. Selected Socio- demographic Characteristics of Respondents

Age: Mean ± SD (years)	42.2 ±19.9	
	Frequency	Percentage(%)
Age groups		
13-22	123	30.1
23-42	72	17.6
43-52	67	16.4
53-62	47	11.5
63-72	78	19.1
Above 72	21	5.1
Gender		
Male	165	40.4
Female	243	59.6
Education		
None	9	2.2
Primary School	104	25.5
Secondary School	244	59.8
Tertiary	51	12.5
Marital Status		
Single	132	32.4
Married	249	61.0
Divorced	5	1.2
Others	22	5.4
Occupation		
Unemployed	187	45.8
Employed	136	33.4
Students	85	20.8
Family history of dengue		
No	325	79.7
Yes	83	20.3

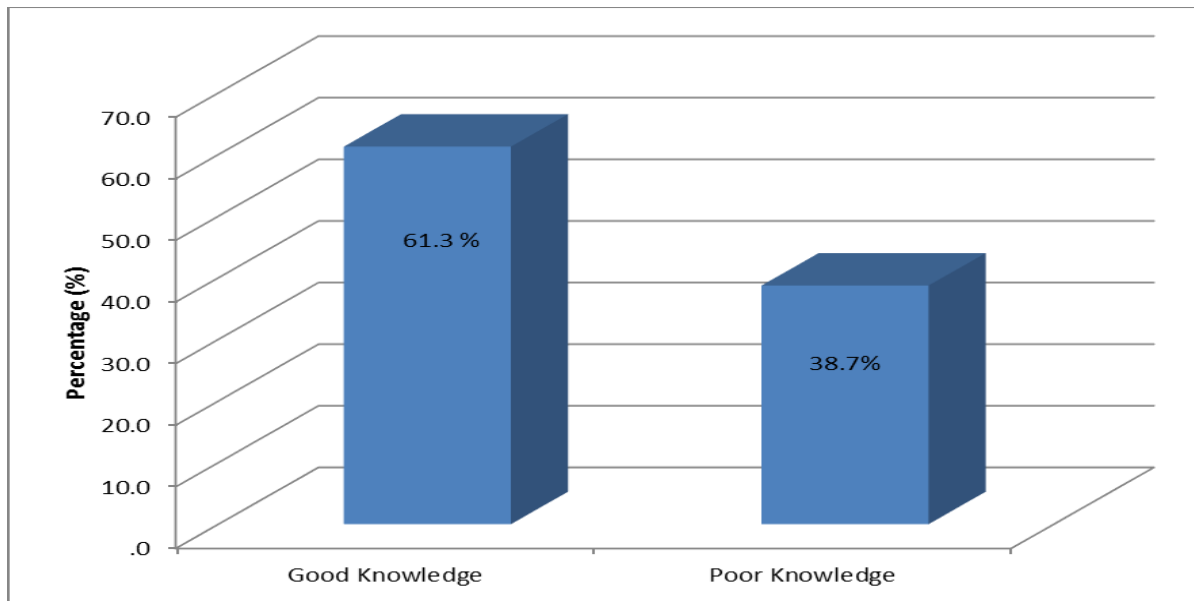


Figure 1. Percentage of knowledge on dengue fever in Kampung Sri Kinta

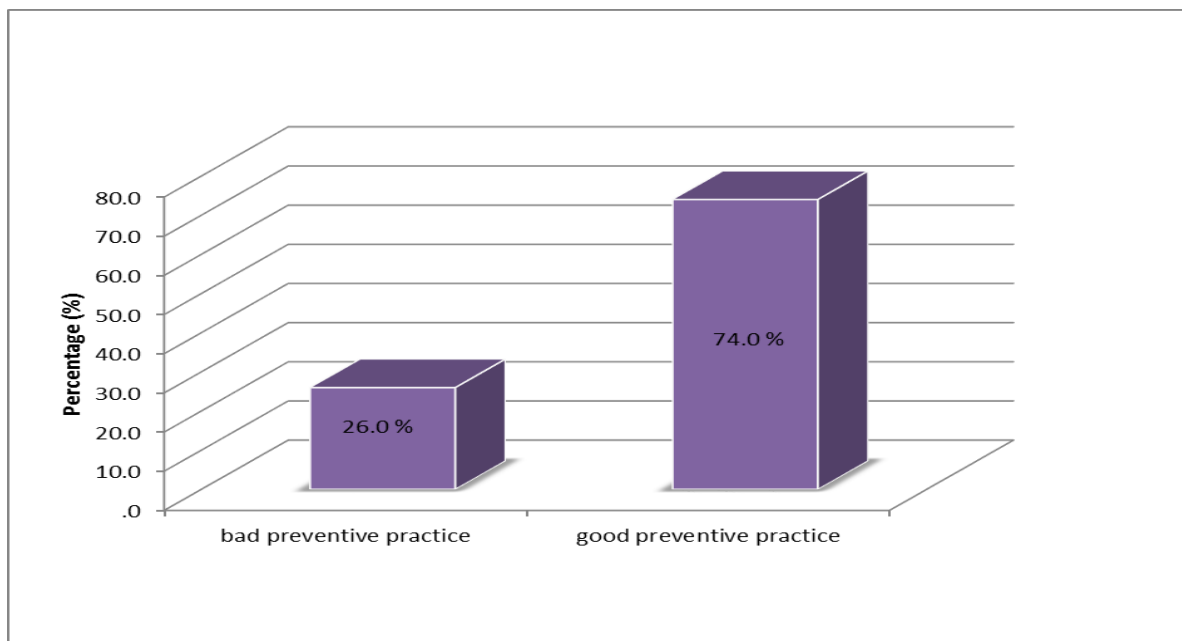


Figure 2. Percentage of villagers in Kampung Sri Kinta that practice prevention steps on dengue fever in Kampung Sri Kinta

Table 2. Association between knowledge and practice

Association between knowledge and preventive practices							
Knowledge							
	Good		Poor		Total		Statistical significance (p-value)
	Number	Percent (%)	Number	Percent (%)	Number (n=408)	Percent (%)	
Practice							
Good	196	64.9	106	35.1	302	100	0.011
Bad	54	50.9	52	49.1	106	100	
TOTAL	250	61.3	158	38.7	408	100	

Table 3. Association between knowledge scores and understanding health Promotion

Association between knowledge scores and understanding health promotion pamphlet							
Knowledge							
	Good		Poor		Total		Statistical significance (p-value)
	Number	Percent (%)	Number	Percent (%)	Number (n=408)	Percent (%)	
Understanding pamphlet							
Easy	210	65.8	109	34.2	319	100	0.00
ard	20	38.5	32	61.6	52	100	
TOTAL	230	62.0	141	38.0	371	100	

References

1. J Thompson F, Caltabiano M. The health belief model and dengue fever preventative behaviours: a pilot programme. *International Journal of Health Promotion & Education* 2009, 48(1): 0–19.
2. Olaf Horstick, Yesim Tozan and Annelies Wilder-Smith. Reviewing Dengue: Still a Neglected Tropical Disease? *PLOS Neglected Tropical Diseases*, 2015 <https://doi.org/10.1371/journal.pntd.0003632>.
3. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL et.al. The global distribution and burden of dengue. *Nature*. 2013; 496:504–7. doi:10.1038/nature12060.
4. Brady OJ, Gething PW, Bhatt S, Messina JP, Brownstein JS, Hoen AG et al. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. *PLoS Negl Trop Dis*. 2012; 6: e1760. doi:10.1371/journal. Pntd.0001760.
5. Isa, Affendi et al. Mediation Effects of Self-Efficacy Dimensions in the Relationship between Knowledge of Dengue and Dengue Preventive Behaviour with Respect to Control of Dengue Outbreaks: A Structural Equation Model of a Cross-Sectional Survey. *Tropical Diseases* 2013, 79 e2401.

6. Firdous J, Mohamed A, Al Amin M, Ihsan M, Imadi MF, Khairul Hakim M, Afiq M and Muhamad N. Knowledge, Attitude and Practice Regarding Dengue Infection among Ipoh Community, Malaysia. (2017) *J of Applied Pharmaceutical Science* 7 (08), 099-103.
7. Shuaib F, Todd D, Campbell-SD, Ehiri J, Jolly P. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. *West Indian Med J.* 2012; 59(2): 139-146
8. Ujala N, Umar FR, Muhammad ZL, Razi H, Tahir M, and Rahila N. Knowledge, Awareness and Practices about Dengue Fever among University Students. *Pakistan J of Medical and Health Sciences* 2013, 7(4):1097-99.
9. Jahan F, Dengue fever (DF) in Pakistan. *Asia Pacific Family Medicine* 2011; 10:1
10. Yboa BC and Labrague LJ. Dengue Knowledge and Preventive Practices among Rural Residents in Samar Province, Philippines. *American Journal of Public Health Research*, 2013;1(2): 47-52
11. Abedi AJ, Khan Z, Ansari A, Amir JN. Is knowledge and attitude correlating with practices? A kap study on dengue fever. *J Epidemiol Community Health* .2011: 65 (1)

ORIGINAL ARTICLE

EVALUATION OF THE SEVERITY AND MONITORING THE PROGRESS OF TREATMENT OF IDIOPATHIC CONGENITAL TALIPES EQUINOVARUS BY PONSETI METHOD.

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Abstract

Introduction: Congenital talipes equinovarus (CTEV), commonly known as the ‘club foot’ is a developmental disorder of the lower limb that is related with socioeconomic difficulties. Ponseti method is considered as the most popular and successful method of treatment for CTEV children. This study was aimed to evaluate the severity and monitoring the progress of initial treatment of CTEV children. Materials and methods: Forty two patients with 58 idiopathic CTEV feet treated at a hospital outpatient clinic from January 2017 to February 2018 were included in the study. Ponseti method and Pirani score system were used and the results were calculated after wearing brace for three months duration at the end of serial casting. Results: The patients in the study were in the age range of 14 days to 12 months. The mean number of changing of casting was 7.2 times. Casts were changed 1.9 times more in the severe cases than mild cases. Thirty six (85.7%) cases needed percutaneous tenotomy. There was no need to perform tenotomy for the mild cases. The initial achievement rate was 90.5 % and there were 9.5 % relapsed cases because of incorrect wearing of the brace. Statistically significant score differences were seen before and after treatment (P-value <0.000). Conclusion: Ponseti method of treatment was not free from complications but there were no major problems. Ponseti method was observed to be useful and had good outcome in the treatment for CTEV children.

Keywords: Ponseti method, congenital talipes equinovarus, Pirani score

Introduction

Congenital talipes equinovarus (CTEV) is a very common congenital deformity of foot that occurs in 1 in 10,000 live births.¹ Normal feet deliver the static support for walking and running and also satisfy an important aesthetic function.²

There could be four deformities of the foot. There could be cavus deformity due to tightness of flexor hallucis longus tendon and flexor digitorum tendon. Adduction deformity could be due to tightness of tibialis posterior tendon and intrinsic adductor muscles. Varus deformity of calcaneum and equinus deformity is due to shortening of tendon Achilles. CTEV is common in Myanmar and most of orthopaedic surgeons there preferred to do surgery for treating CTEV before Ponseti method was introduced. In developing countries, there are about 80 % of children with CTEV deformity living in rural area.³

For severity and monitoring the treatment of the CTEV, Pirani scoring system is useful. The Pirani system has six categories. The mid-foot deformities consists of curvature of lateral border of the foot, medial crease and uncovering of the lateral head of talus to navicular. Hind-foot categories are posterior crease, emptiness of the heel and degree of dorsi-flexion. Each deformity could have three scores contingent on the severity which are 0, 0.5 and 1. The normal foot has a score of 0 and the worse is 6.^{4,5}

Ponseti method is a conservative treatment for clubfoot involving a gentle manipulation of the child's foot and the application of toe-to-groin casts. After casting phase is finished, foot-abduction brace is worn with or without tendon Achilles tenotomy. The treatment phase should begin as early as possible. The first cast is done to correct the cavus deformity only. The heel is never directly manipulated. The gradual correction of the hind-foot and midfoot are such that the heel will naturally move into a correct position. When adduction and varus of the

calcaneum bone is corrected, the tight Achilles tendon may be cut with local anesthesia to correct the equinus deformity. Cast is applied for holding the corrected position for 3 weeks. After removal of cast, foot abduction brace is fitted, which consists of a pair of shoes attached to an adjustable bar at 70 degrees abduction and 20 degrees dorsiflexion.⁶ Brace protocol is a major problem associated with relapse. Parents are strictly educated to be completely compliant with the brace treatment.⁷

The objective of the study is to evaluate the severity and monitor the progress of treatment of idiopathic CTEV by Ponseti method. This study was taken up because, to the best of our knowledge, there were no similar studies from the Myanmar region.

Materials and Methods

Our study was a hospital based prospective cohort study designed to evaluate the severity and monitoring success of treatment of CTEV children by Ponseti method. Forty-two patients of less than one year of age with 58 feet of idiopathic CTEV deformity from outpatient clinic of Yangon Children Hospital, university of Medicine I, Yangon, Myanmar were included in this study.

Inclusion criteria: Idiopathic CTEV, age under one year

Exclusion criteria: Syndromic CTEV cases, age over one year and recurrent CTEV cases were excluded from the study.

An informed written consent was obtained from the parent or guardian. Ethical approval was obtained from the University of Medicine ethics and research committee. Patients' bio-data, clinical examination and Pirani score at presentation were entered into a structured information sheet. According to the Pirani Score

system, the pre-treatment feet were divided into three groups, namely, severe feet with Pirani score of 6, moderate feet with Pirani Score of 5.5 and mild feet with score of 5.8

Technique

Ponseti method is divided into 2 phases. First, deformity was corrected by serial gentle manipulation and plaster of Paris (POP) casting and tenotomy if required. Then maintenance of correction deformity by wearing the brace 23 hours per day for 3 months duration was done.

There were 4 deformities of CTEV. They were cavus, adduction, varus and equinus. The first step was correction of cavus deformity. Then correction of adduction and varus and lastly the correction of equinus deformity was done.

Three minutes duration of gentle manipulation for stretching the ligaments, joint capsule and tendon was done. Then toe-to-groin POP cast was applied with knee flexed position in 90 degree. Consultant paediatric orthopaedic surgeons assisted by orthopaedic postgraduate students in the paediatric orthopaedic department offered treatment to all cases. Patients were allowed go back home after explaining to take care of POP at home. Patients were not required to be admitted in the hospital. After one week, patients came to hospital for removal of old POP cast. Then manipulation and changing of POP cast was done on a weekly basis till the correction was done. The patients' parents were educated on taking care of the POP at home.

First, one or two time correction was needed for correction of deformity of cavus. Placing the thumb over the lateral part of talar head and elevating the first ray of forefoot, POP cast was applied in this position. After one week, POP cast was removed at outpatient clinic.

Next, adduction was corrected by placing the thumb on talar head and reducing the navicular bone on talar head. Repeated correction and POP

casting was done to get 70 degrees of abduction. When adduction and varus correction was achieved and dorsiflexion was less than 15 degree, percutaneous tendon Achilles tenotomy was done by local anesthesia with 1% lignocaine at minor operating theater at outpatient clinic. POP cast was then applied for three week duration after tenotomy. After three weeks, POP cast was removed and locally made foot abduction brace was worn. Patient must wear the brace for 23 hours a day for 3 months duration. The patients' parents were educated about the appropriate ways of wearing the brace as it was important that patient was wearing the brace correctly.

After 3 months, the patients were monitored with Pirani score system. The good result was Pirani score 0, fair result was Pirani score 0.5 and poor result was Pirani score 2.8

During the 3 months, those patients who did not wear the brace correctly and completely, got relapse of the deformity. The relapsed deformity was treated after 3 months follow up. Two of relapsed CTEV patients could be treated with repeated POP casting with Ponseti method. One adducted deformity case was treated with anterior tibialis tendon transfer. Achilles tendon lengthening was done for 1 equinus deformity case.

Results

Background of patients

Total 42 patients were involved in the study with mean age of 4.34 months (SD 3.46), showing that the youngest case was 0.5 months and the oldest case was 1 year. Among them, 17 (40.5%) were females and 25 (59.5%) were males.

Among the patients, 38.1% had deformity in the right foot, 23.8% in the left foot and 38.1% in both feet. Pirani score before treatment was 5.69 in average, showing minimum score as 5 and

maximum as 6. Pirani score before treatment was categorized into mild (5), moderate (5.5) and severe (6). Out of 42 cases, 24 (57.1%) were severe, 10 (23.8%) were moderate and 8 (19%) were mild. (Figure.1)

Number of POP cast changes and Tenotomy

The number of POP cast changes varied from 6 to 10. It was changed for 6 times in 10 (23.8%) patients, 7 times in 18 (42.9%) patients, 8 times in 10 (23.8%) patients and 10 times in 4 (9.5%) patients. Tenotomy was done in 36 (85.7%) cases.

Bonferroni test was carried out as a post-hoc test after ANOVA analysis. There were significant differences in number of POP cast changes between severe and mild cases and also between severe and moderate cases. POP cast changes were nearly 2 times (1.9 times) more in the severe cases than mild cases and it was 1 time more in severe cases than moderate cases. The differences were statistically significant as both p-values were less than 0.05 (CI=1.06, 2.77 for severe vs mild and CI=0.33, 1.01 for severe vs moderate). (Table.1)

Average score after treatment was 0.46 (SD 0.619) with minimum score 0 and maximum score 2. Those who showed good result was 18(42.9%), fair result was 19 (45.2%) and poor result was 5 (11.9%) (Figure 2).

Out of total 42 cases, tenotomy was not done in 6 cases of mild club foot cases and the rest of the cases went through tenotomy. Among the tenotomy cases, 2 (5.6%) were mild, 10 (27%) were moderate and 24 (66.7%) were severe club foot cases (Figure 3).

Highest percentage of good results were seen in mild cases (75%), followed by 40% of good result in moderate cases and 33.3% in severe cases. More poor outcomes were demonstrated among the severe cases compared to moderate cases,

showing 16.7% and 10% respectively. However, association between severity before treatment and outcomes after treatment were statistically not significant (p-value>0.05). (Table 2)

Average Pirani score before treatment was 5.69 and after treatment was 0.46. Paired sample t test was carried out to find out any significant mean score differences in between before and after treatment. Statistically significant score difference was seen in between before and after comprising $t=53.22$, $df = 41$, $p\text{-value} < 0.000$ (CI=5.028, 5.424) (Table 3).

Discussion

Of the study population, there was a male preponderance (1.4:1). It has been reported that CTEV is 2-2.5 times more common in males than females. The study of Cowell and Wein and Yamamoto had showed a male and female ratio of 3:1.^{9,10}

In our study right foot and left foot ratio was 1.6:1. The right foot is being affected slightly more often than the left. Among the patients, those with both feet affected were 38.1%. In our study one third of total cases had bilateral involvement. According to a study by Rasit et al., there were 33% bilateral cases.¹¹ Wallander study also showed that 46% were bilateral cases.¹²

In our study, average number of changing the POP cast was 7.2 times. Laaveg et al., reported that the average times of changing the cast was 8 times¹⁴. In our study severe cases had changed the POP cast 1.9 times than mild cases. Total time of changing of cast was correlated with the severity of the Pirani scoring system. When the case was more severe, there was more the need to change the cast. Agarwal et al showed positive correlation between the initial Pirani score and the number of casts to achieve full correction.¹³

In our study, the tenotomy was done for 85.7 % of cases. In a study carried out by Laaveg et al,

tenotomy was done on 78% of total cases.¹⁴ In our study, the severe cases and moderate cases tenotomy was done and in 6 mild cases was no need to do tenotomy. Scher et al showed that the more severe the foot deformity, the more probable that a tenotomy could be needed.¹⁵

In our study, the pre-treatment Pirani score in mild cases showed good results in 75% of cases. Severe and moderate cases had poor results. However, association between severity before treatment and outcome after treatment were statistically not related. CTEV treatment was done in two phases. Wearing the brace is important for getting the relapsed deformity. Matuszewski reported that the children who did not use the orthosis had high recurrence rate.⁶ Göksan showed that bracing period is very effective and potentially demanding phase of treatment of CTEV.¹⁶

Out of 42 cases, success was achieved in 90.4%. Morcuende and Kulambi reported 90% of success rate.^{17, 18} Parents' education and taking care of patients had a key role in achieving good result of treatment. Pirani scoring system had been shown

to be of prognostic importance in the initial conservative management of CTEV patient.

We noticed that patient who did not use the brace as prescribed, experienced recurrence. During the treatment, only four got back the residual deformity. But 2 cases responded with repeated POP casting. In other 2 cases only minor soft tissue surgery was done.

The limitation of this study was the small number of patients and short follow up. Our outcome is only initial phase of the treatment. It is needed to study the long term outcomes and follow up in the bracing phase.

Conclusion

Ponseti method is an excellent conservative method for treatment of CTEV deformity. Current treatment of CTEV has moved away from operative treatment to conservative treatment. The patients who have lower Pirani score at initial visit respond better and faster. This study showed that Ponseti method was useful and applicable treatment of idiopathic CTEV children.

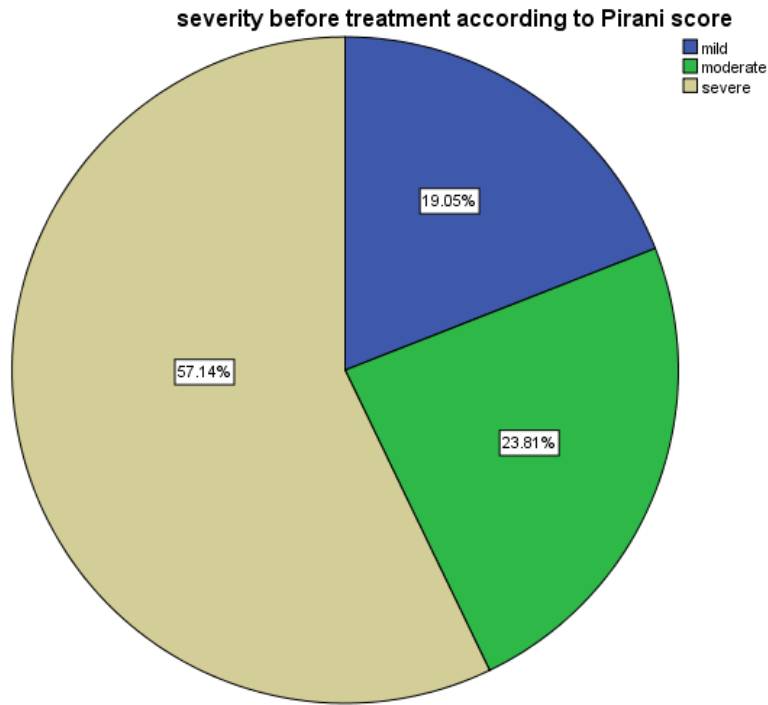


Figure 1. Severity before treatment

Table 1. Severity before treatment and the number of cast changes

(I) severity before treatment according to Pirani score	(J) severity before treatment according to Pirani score	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
severe	mild	1.917*	.342	.000	1.06	2.77
	moderate	1.117*	.316	.003	.33	1.91

* The mean difference is significant at the 0.05 level.

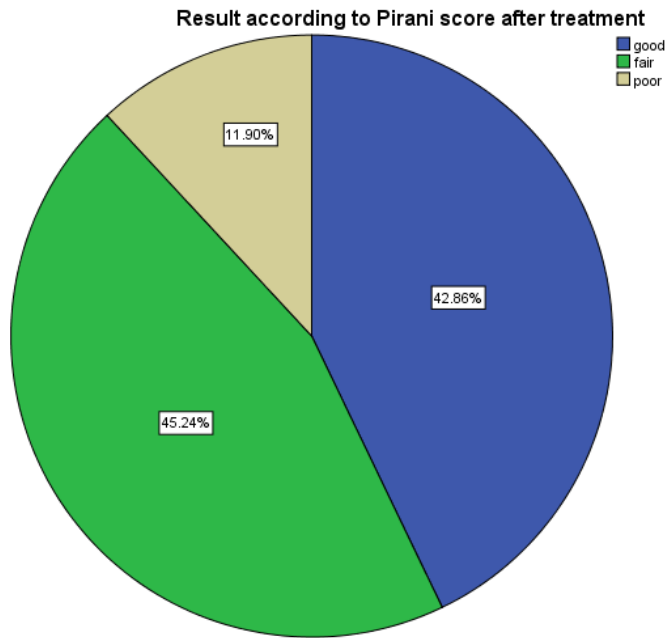


Figure 2. Result after the treatment

Table 2. Score comparison between before and after treatment

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Score before treatment - Score after treatment	5.226	.636	.098	5.02	5.42	53.23	41	.000

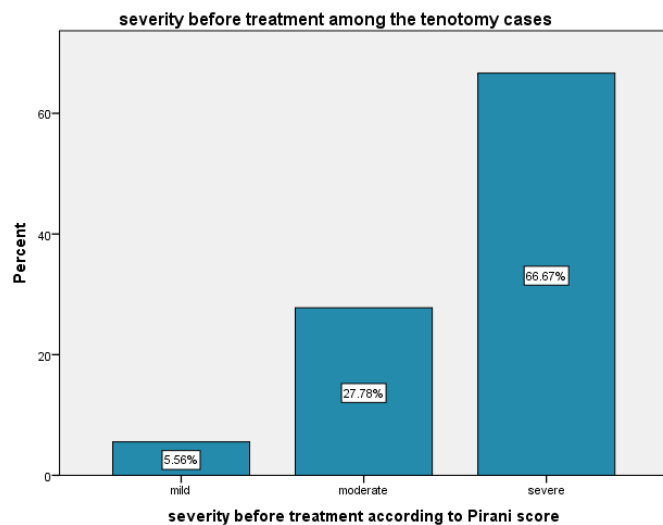


Figure 3. Severity before treatment

Table 3. Severity before treatment vs Pirani score after treatment

			Result according to Pirani score after treatment			Total	X ² (p-value)
			good	fair	poor		
severity before treatment according to Pirani score	mild	Count	6	2	0	8	4.790 (.309)
		% within severity before treatment according to Pirani score	75.0%	25.0%	0.0%	100.0%	
	moderate	Count	4	5	1	10	
		% within severity before treatment according to Pirani score	40.0%	50.0%	10.0%	100.0%	
	severe	Count	8	12	4	24	
		% within severity before treatment according to Pirani score	33.3%	50.0%	16.7%	100.0%	
Total		Count	18	19	5	42	
		% within severity before treatment according to Pirani score	42.9%	45.2%	11.9%	100.0%	

References

1. Dobbs MB, Gurnett CA. Update on Clubfoot: Etiology and Treatment. *Clin Orthop Relat R.* 2009; 467(5):1146-1153.
2. Ostrowski J, Karski T, Matuszewski L. The role of the modified skin incision, the range of tendon lengthening and capsulotomy for the results of operative treatment of the congenital clubfoot. *Pol J Environ Stud.* 2006; 15(6B):296-298.
3. Salzman HM. Foot focus: International initiative to eradicate clubfeet using the Ponseti method. *Foot & Ankle International.* 2009; 30(5):468-471.
4. Scher DM, Feldman DS, Van Bosse HJ, Sala DA, Lehan WB. Redicting the need for tenotomy in the Ponseti method for correction of clubfeet. *Journal of Pediatric Orthopedics.* 2004; 24(4):349-352.
5. Pirani S, Hodges D, Sekeramayi F. A reliable and valid method for assessing the amount of deformity in the congenital clubfoot deformity. *Journal of Bone & Joint Surgery, British Volume.* 2008; 90-B (SUPPI):53.
6. Matuszewski K, Gil L and Karski J. Early results of treatment for congenital clubfoot using the Ponseti method. *Eur J Orthop Surg Trauatoi.* 2012; 22(5):403-406.
7. Zhao D, Liu J, Zhao L and Wu Z. Relapse of clubfoot after treatment with Ponseti method and the function of the foot abduction orthosis. *Clin Orthop Surg.* 2014; 6(3):245-252.
8. Changulani M, N.K. GargN.K, Rajagopal T.S, Bass A. Treatment of idiopathic club foot using the Ponseti method. *J Bone Joint Surg [Br]* 2006; 88-B: 1385-1387.
9. Cowell HR, Wein BK. Genetic aspects of clubfoot. *J Bone Joint Surg Am.* 1980; 62(8):1381-1384.
10. Yamoto H. A clinical, genetic and epidemiologic study of congenital clubfoot. *Jinrui Idengaku Zasshi* 1979; 24(1):37-44.
11. Rasit A, Azani H, Zabidah P, Merikan A, Nur Alyana B. Clubfoot: The treatment outcome using Quantitative Assessment of deformity. *Malays Orthop J.* 2012; 6(Suppl A):2-5.
12. Agarwal A, Gupta N. Does initial Pirani score and age influence number of Ponseti casts in children? *International orthopaedics.* 2014; 38(3):569-572.
13. Wallander H, Hovelius L, Michaelsson K. Incidence of congenital clubfoot in Sweden. *Acta Orthop.* 2006; 77(6):847-852.
14. Laaveg SJ, Ponseti IV. Long-term results of treatment of congenital clubfoot. *J Bone Joint Surg Am.* 1980; 62(8):1381-1384.
15. Scher DM, Feldman DS, Van Bosse HIP, Sala DA, Lehman WB. Predicting the need for tenotomy in the Ponseti method for correction of clubfeet. *J Pediatr Orthop* 2004; 24:349-352.
16. Göksan SB, Bilgili F, Eren L et al. Factors affecting adherence with foot abduction orthosis following Ponseti method. *Acra Orthop Traumatol Turc* 2015; 49(6):620-626.
17. Morcuende JA, Dolan LA, Dietz FR, Ponseti IV. Radical reduction in the rate of extensive corrective surgery for clubfoot using the Ponseti method. *Pediatrics.* 2004; 113:376-380.
18. Kulambi V, Shetty S, Ghantasala V, Bhagavati V. Treatment of idiopathic clubfoot by Ponseti method: a prospective evaluation. *Int J Res Orthop.* 2017; 3(4):800-804.

ORIGINAL ARTICLE

QUALITY OF LIFE AMONG HAEMODIALYSIS PATIENTS IN A DIALYSIS CENTRE IN THE NORTHERN REGION OF SARAWAK.

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Abstract

Background: Haemodialysis has been known to affect the patient's quality of life (QOL). The procedure may affect the social life and economic status of the sufferer.

Aim: To determine the quality of life among haemodialysis patient at Northern Region of Sarawak.

Methodology: The cross-sectional study was conducted among 100 chronic renal failure patients registered at the haemodialysis centre at Miri Red Crescent Dialysis Centre in Northern Region of Sarawak. Their quality of life (QOL) was measured using Kidney Disease Quality of Life-Short Form (KDQOL-SF) instrument, which measures the disease, physical and mental components of QOL.

Results: Overall score for three components of the KDQOL-SF was 69.1. The score of each component were 66.3, 52.6, and 39.4 respectively. There were statistically significant association between marital status and physical health component ($P=0.046$); age and physical health component ($P=0.026$); educational level and mental health component ($P=0.006$).

Conclusion: In general, QOL of patients on dialysis in this centre was good. Most of the patients had better quality of life in the kidney disease component, and mental health component, despite of having poor quality of life in the physical health component. QOL of patients will be better if they got encouragement from dialysis staff in the Centre, getting strong social support from the family and if they actively involved in social function.

Keywords: Chronic Kidney Disease, Haemodialysis, QOL, KDQOL-SF, Sarawak.

Introduction

Haemodialysis is the best treatment modality available currently for the long-term survival of chronic renal failure patients and is able to maintain patients' quality of life at a satisfactory level.¹ Although this is the best treatment available, there are still advantages and disadvantages of using haemodialysis. It restricts the patient's mobility and activity that may affect the patient's quality of life.^{2,3,4}

Haemodialysis affects the patient's quality of life (QOL) in many ways. In terms of profession, the procedure may affect their social and economic status, which may result in psychological problems.^{5,6} With increasing incidence of chronic renal failure, there is a necessity to identify the psychological problems among haemodialysis patients.^{7,8} The most common psychological problem is depression. It has a negative impact on patients' quality of life and their caregivers, including their social, economic and psychological well-being. Depression may lead to increased frequency of hospitalization, decreased compliance with treatment, decreased mobility, and high mortality rate. Patients on haemodialysis also face difficulties in work, social life and sports. It reduces feelings of autonomy, and self-esteem.^{9,10}

Most of patients on dialysis complain of pain as the main symptom. Pain is due to many factors, such as the dialysis process itself or complication of systemic diseases and painful syndromes. Pain due to venepuncture, muscle cramps, and headaches are common after each dialysis treatment.^{11,12}

To ensure good compliance to treatment, patients should have acceptable QOL. Better quality of life score is associated with better compliance, low morbidity and mortality among patients. Reduced compliance may be due to psychosocial factors such as immigration, poor family support, financial crisis, and lifelong medications, which lead to high mortality rate.^{13,14}

The QOL of chronic renal disease patients has not been widely explored in Malaysia. There is still a need to understand the QOL of different ethnic groups and in different areas of Malaysia. The purpose of this study, therefore, was to assess the quality of life and its determinants among haemodialysis patients in Northern part of Sarawak, Malaysia.

Materials and Methods

The study population included chronic renal failure patients who were on haemodialysis treatment at Miri Red Crescent Dialysis Centre Miri Chapter, and who were willing to participate. Minimum sample size was calculated using Open Epi software assuming 50% of haemodialysis patients will have a good quality of life with a precision of 9% for 95% confidence interval as 86. A total of 100 patients meeting the inclusion criteria were recruited into the study.

In this study, Kidney Disease Quality of Life Instrument Short Form (KDQOL-SF) was used as instrument.¹⁵ This tool is used widely around the world to assess quality of life in kidney disease patients and is able to compare QOL of different groups and geographic areas. This tool has been translated into various languages and validated in many racial groups. It has three components, kidney disease, mental and physical components.

KDQOL-SF questionnaire consists of 90 questions, which includes 9 questions on socio-demographics background, 44 questions on kidney disease component (KDCCS), 14 questions on mental health components (MCS), and 23 questions on physical health components (PHS). The kidney disease component includes symptom/problem list (12 items), effects of kidney disease on daily life (8 items), burden of kidney disease (4 items), work status (2 items), cognitive function (4 items), sexual function (2 items), quality of social interaction (3 items), sleep (4 items), social support (2 items), dialysis

staff encouragement (2 items), and patient satisfaction (1 item). The mental health component includes energy/fatigue (4 items), social functioning (2 items), role emotional (5 items), and emotional well-being (3 items). The physical health component includes physical functioning (10 items), role physical (4 items), bodily pain (2 items), and general health (5 items). The data collected from patients was kept anonymous and confidential to respect human dignity and privacy. The informed consent was obtained from each patient before collecting the data. Permission from Institutional Ethical Committee of Royal College of Medicine Perak was obtained prior to the study.

The data was keyed into the excel-spread sheet of KDQOL-SFTM, version 1.3 Scoring Program (v3.0), for scoring of each component in the questionnaire. Each component is scored as 0-100, with a higher score indicating better quality of life. Data was analysed using SPSS version 17.0. Descriptive statistics, cross tabulation analysis, independent T-test, ANOVA test and correlation test were used to analyse the data. Level of statistical significance was fixed at < 0.05 .

Results

Socio-demographic profiles of the patients.

Out of 100 patients participated, 99 had completed data. Data for one patient was missing and was excluded from analysis. According to table 1.0, male contributed 53.3% of the total population. Highest number of patients were above the age of 60 years (39.4%). This is associated with the highest number of diabetes mellitus cases among the elderly that is the main cause of chronic renal failure in Malaysia. Among ethnic groups, Iban contributed the highest percentage which was 30.3% of the total patients. Most of the respondents were married (74.7%) and 54.5% received their education at primary school level and below.

According to the distance range from home, 51.5% of them were having 1 to 10 Km distance to dialysis centre, whilst 21.2% lived more than 30

km or more. The main cause of renal failure among respondents was diabetes mellitus (43.4%), followed by hypertension (30.3%), and others causes (26.3%). Duration of treatment in most of the patients was 1-5 years (58.6%).

QOL Score

The mean total score of the KDQOL-SF was 69.1 ± 16.5 , while the mean for KDCS, MCS, and PCS were 66.3 ± 11.20 , 52.6 ± 8.8 , and 39.4 ± 9.3 respectively (Table 2.0). For KDCS, dialysis staff encouragement (86.6 ± 18.3) had the highest score, while burden of kidney disease (39.8 ± 28.4) had the lowest score. For MCS, social function (84.6 ± 17.1) had the highest score, while energy/fatigue (60.7 ± 18.2) had the lowest score. For PCS, pain (77.2 ± 27.1) had the highest score, while role limitation-physical (27.0 ± 29.4) had the lowest score. The total score of KDCS, MCS and PCS were classified into good and poor score with the cut-off point at 50. It was found that 93.9% of patients had a good score with KDCS, 65.7% with MCS but only 15.2% with PCS.

Association between socio-demographics characteristics and QOL

No significant association was found between KDCS and all the sociodemographic factors under study. There was a significant association between MCS and education level ($P=0.006$). Patients with education level above the primary school had better MCS. For PCS, age and marital status were significantly associated with it. Younger patients (less than 40) had significantly better PCS score as compared to older ones ($P=0.026$). The single and divorced patient had better PCS as compared to the married and the widowed ($p=0.046$).

Correlation between KDCS, MCS, and PCS score There was a statistically significant positive correlation between kidney disease component, and mental health component ($p=0.026$). Similar relationship was found between kidney disease component, and physical health component ($p=0.000$). However, correlation between mental

health component and physical health component was not statistically significant ($p=0.051$).

Discussion

Iban contributed the highest number of patients in this study (30%). Generally, most of the patients in this centre had good score for kidney disease and mental health component but poor score for physical health component. This finding is consistent with findings from a study done in Hospital Kuala Lumpur.¹⁶ Higher scores were seen in “dialysis staff encouragement”, “social support”, and “social function” domain. Lower score was seen in “burden of kidney diseases”, and “role limitation-physical” domain. It means that QOL of patients will be good if they get encouragement from dialysis staff in the centre, get strong social support from the family and if they are actively involved in social function. Their QOL would get worse if the kidney disease deteriorated and they limited their daily activity. In Al-Jumaih’s study, patients were also found to have higher score in the “dialysis staff encouragement”, and lower score in the “role limitation-physical” domain.¹⁷ In the current study, the sexual function domain scored high, but this may not reflect the true status of the patients as only a few of them had responded to the question.

In this study, it was shown that females showed better quality of life for physical health component. The finding was inconsistent with the study by Lemos et al. study in which females had lower physical health component score than males.¹⁸ The difference of score between genders in physical health components was small and not statistically significant. Another study done in Saudi Arabia using the same instrument found that there was a statistically significant association between genders and score for all three components; males had a better quality of life in the three components.¹⁷

According to age category, patients in all age groups had good score for kidney disease component. For mental health component, patients below 30 years old age scored poorly. This was similar to AL-Jumaih’s study where patients aged less than 40 years had a better score

in the physical health component.¹⁷ It was found that younger age groups had significantly better quality of life in terms of physical health components ($P=0.026$)

All patients had good score of KDCS regardless of their marital status. In mental health component, patients who were married (53.4) and divorced (50.4) scored better than patients who were single (48.5), and widowed (48.5): although it was not significant statistically. In AL-Jumaih’s study, married respondent tended to score better in the kidney disease component.¹⁷ In the physical health component, patients who were single, and divorced had significantly better score than patients who were married, and widowed ($P=0.046$).

Patients who had education more than primary school level have better score in kidney disease component (60.0), mental health component (55.2), and physical health component (40.5) and it was statistically significant in mental health component ($P=0.006$).

Conclusion

In this study, socio-demographics had an impact on the patient’s quality of life. Although, in general most of the patients in this centre had good score for kidney disease and mental health component, they scored poorly for physical health component. Patients’ QOL would be better if they got encouragement from dialysis staff in the centre, got strong social support from the family and were actively involved in social function. Their QOL got worse if the kidney disease deteriorated and their daily activity became limited. Young patients seemed to have significantly better quality of life in term of physical health and patients with high education level had better quality of life in mental health.

Acknowledgment

The authors would like to acknowledge and extend my heartfelt gratitude to Dean of Faculty of Medicine for his encouragement and support and Chairman of KDC, YB Lee Kim Shin, for giving his approval to conduct this study at the dialysis centre.

Table 1: The sociodemographic profiles

Socio-demographic characteristics	frequency	percentage (%)
Age		
Less than 30 years old	4.0	4.0
30-39 years old	7.0	7.1
40-49 years old	22.0	22.0
50-59 years old	27.0	27.3
60 years old and above	39.0	39.4
Gender		
Male	53	53.5
Female	46	46.5
Ethnic groups		
Iban	30	30.3
Malay	25	25.3
Chinese	21	21.2
Melanau	5	5.1
Orang Hulu	12	12.1
Others	6	6.1
Marital status		
Married	74	74.7
Single	10	10.1
Widowed	10	10.1
Divorced	5	5.0
Educational level		
Primary school and below	54	54.5
Above primary school	45	45.5
Distance from home to dialysis centre		
1-10 km	51	51.5
11-20 km	23	23.2
21-30 km	4	4.0
31 km and above	21	21.2
Duration of dialysis		
Less than one year	10	10.1
1-5 years	58	58.6
6-10 years	22	22.2
More than 10 years	9	9.1
Cause of renal failure		
Diabetes mellitus	43	43.4
Hypertension	30	30.3
Others	26	26.3

Table 2: The mean score for each component of the ‘Kidney Disease Quality of Life - Short Form’ (KDQOL-SF) instrument.

	N	Score*mean \pm SD
KDCS	99	66.3 \pm 11.2
Symptom/Problem list	99	77.3 \pm 13.4
Effect of Kidney Disease on Daily Life	99	68.0 \pm 15.6
Burden of Kidney Disease	99	39.8 \pm 28.4
Cognitive Function	99	58.9 \pm 20.2
Work Status	99	42.9 \pm 31.9
Sexual Function	21	64.3 \pm 29.9
Quality of Social Interaction	99	76.5 \pm 17.9
Sleep	99	63.4 \pm 18.2
Social Support	99	81.6 \pm 25.9
Dialysis Staff Encouragement	99	86.6 \pm 18.3
Patient Satisfaction	99	69.7 \pm 22.6
MCS	99	52.6 \pm 8.8
Energy/Fatigue	99	60.7 \pm 18.2
Social Function	99	84.6 \pm 17.1
Role Limitation-Emotional	99	69.4 \pm 42.2
Emotional Well-being	99	75.6 \pm 15.2
PCS	99	39.4 \pm 9.3
Physical Functioning	99	59.8 \pm 30.3
Role limitation-Physical	99	27.0 \pm 29.4
Pain	99	77.2 \pm 27.1
General Health	99	63.3 \pm 17.8
Overall Score	99	69.1 \pm 16.5

KDCS: Kidney Disease Component Summaries; MCS: Mental Health Component Summaries; PCS: Physical Health Component Summaries. *Score ranges from 0-100, with higher score indicating better quality of life.

Table 3: Factors related to quality of life in haemodialysis patients.

		KDCS		MCS		PCS	
		Score	P-value	Score	P-value	Score	P-value
Gender							
	Male	66.51	0.873	53.86	0.129	38.70	0.407
	Female	66.15		51.17		40.26	
Age							
	Less than 30 years old	64.02	0.269	49.36	0.429	40.78	0.026*
	30-39 years old	68.73		53.48		43.16	
	40-49 years old	70.70		55.14		36.14	
	50-59 years old	64.33		50.59		38.25	
	60 years old and above	65.08		52.61		39.43	
Marital Status							
	Married	66.21	0.175	53.89	0.095	38.34	0.046*
	Single	69.95		48.46		45.61	
	Widowed	60.72		48.49		38.17	
	Divorced	72.24		50.35		45.67	
Educational Level							
	Primary school and below	64.97	0.183	50.43	0.006*	38.50	0.282
	Secondary school and above	67.99		55.24		40.53	
Distance from Home to Dialysis Centre							
	1-10 Km	69.17	0.058	52.16	0.936	39.74	0.872
	11-20 Km	64.60		52.99		39.46	
	21-30 Km	64.02		54.23		41.88	
	31 Km and above	61.83		53.14		38.17	
Cause of Renal Failure							
	Diabetes mellitus	66.54	0.848	53.21	0.682	38.88	0.307
	Hypertension	65.41		52.87		38.17	
	Others	67.08		51.33		41.79	
Years Been on Dialysis							
	Less than 1 year	67.60	0.412	53.04	0.860	36.62	0.317
	1-5 years	65.29		52.14		39.54	
	6-10 years	69.56		52.77		41.79	
	11 years and above	63.84		54.82		36.01	

KDCS: Kidney Disease Component Summaries; MCS: Mental Health Component Summaries; PCS: Physical Health Component Summaries. *Statistically significant (P-value<0.05)

Table 4: Correlation between KDCS, MCS, and PCS score.

Correlated variables	p value (0.05 is significant)
KDCS and MCS	0.026
KDCS and PCS	0.000
PCS and MCS	0.051 (NS)

KDCS: Kidney Disease Component score; MCS: Mental Health Component score; PCS: Physical Health Component score.

References

1. Dąbrowska-Bender M, Dykowska G, Żuk W, Milewska M, Staniszevska A. The impact on quality of life of dialysis patients with renal insufficiency. *Patient Preference and Adherence* 2018; 12:577–583. <http://doi.org/10.2147/PPA.S156356>
2. Vijayan A, Delos Santos, RB, Li T, Goss CW, Palevsky PM. Effect of Frequent Dialysis on Renal Recovery: Results From the Acute Renal Failure Trial Network Study. *Kidney International Reports* 2018; 3(2): 456–463. <http://doi.org/10.1016/j.ekir.2017.11.018>
3. Bal Z, Demirci BG, Karakose S, Tural E, Erkmén Uyar M, Acar NO, Sezer S. Factors Influencing Hemoglobin Variability and Its Association with Mortality in Hemodialysis Patients. *The Scientific World Journal* 2018; 8065691. <http://doi.org/10.1155/2018/8065691>
4. Kennard AL, Walters GD, Jiang SH, Talaulikar GS. Interventions for treating central venous haemodialysis catheter malfunction. *Cochrane Database of Systematic Reviews* 2017; Issue 10. Art. No.: CD011953. DOI: 10.1002/14651858.CD011953.pub2.
5. Anees M, Batool S, Imtiaz M, Ibrahim M. Socio-economic factors affecting quality of life of Hemodialysis patients and its effects on mortality. *Pakistan Journal of Medical Sciences* 2018; 34(4): 811–816. <http://doi.org/10.12669/pjms.344.15284>
6. Eckert K, Motemaden L, Alves M. Effect of Hemodialysis Compared With Conservative Management on Quality of Life in Older Adults With End-Stage Renal Disease: Systematic Review. *J Hosp Palliat Nurs*. 2018; 20(3):279-285. doi: 10.1097/NJH.0000000000000444
7. Barberis N, Cernaro V, Costa S, Montalto G, Lucisano S, Larcan R, Buemi M. The relationship between coping, emotion regulation, and quality of life of patients on dialysis. *Int J Psychiatry Med*. 2017; 52(2):111-123. doi:10.1177/0091217417720893.
8. Santos PR, de Sales Santos ÍM, de Freitas Filho JLA. et al. Emotion-oriented coping increases the risk of depression among caregivers of end-stage renal disease patients

- undergoing hemodialysis. *Int Urol Nephrol* 2017; 49: 1667. <https://doi.org/10.1007/s11255-017-1621-z>
9. Semaan V, Nouredine S, Farhood L. Prevalence of depression and anxiety in end-stage renal disease: A survey of patients undergoing hemodialysis. *Appl Nurs Res.* 2018; 43:80-85. doi: 10.1016/j.apnr.2018.07.009.
 10. Griva K, Lam KF, Nandakumar M, Ng JH, McBain H, Newman SP. The effect of brief self-management intervention for hemodialysis patients (HED-SMART) on trajectories of depressive and anxious symptoms. *J Psychosom Res.* 2018; 113:37-44. doi: 10.1016/j.jpsychores.2018.07.012.
 11. Fleishman TT, Dreiher J, Shvartzman P. Pain in Maintenance Hemodialysis Patients: A Multicenter Study. *J Pain Symptom Manage.* 2018; 56(2):178-184. doi: 10.1016/j.jpainsymman.2018.05.008.
 12. Gozubatik-Celik G, Uluduz, D, Goksan B, Akkaya N, Sohtaoglu M, Uygunoglu U, Kircelli F, Sezen A, Saip S, Karaali Savrun F, Siva. A Hemodialysis-related headache and how to prevent it. *Eur J Neurol.* 2018; 13. doi: 10.1111/ene.13777.
 13. Noghan N, Akaberi A, Pournamdarian S, Borujerdi E, Hejazi, SS. Resilience and therapeutic regimen compliance in patients undergoing hemodialysis in hospitals of Hamedan, Iran. *Electronic Physician* 2018; 10(5): 6853–6858. <http://doi.org/10.19082/6853>
 14. Nagasawa H, Tachi T, Sugita I, Esaki H, Yoshida A, Kanematsu Y, Noguchi Y, Kobayashi Y, Ichikawa E, Tsuchiya T, Teramachi H. Effect of Quality of Life on Medication Compliance Among Dialysis Patients. *Front Pharmacol.* 2018; 5: 9:488. doi: 10.3389/fphar.2018.00488.
 15. Ramatillah DL, Syed Sulaiman SA, Khan AH, Meng OL. Quality of Life among Patients Undergoing Hemodialysis in Penang, Malaysia. *Journal of Pharmacy & Bioallied Sciences* 2017; 9(4): 229–238. http://doi.org/10.4103/jpbs.JPBS_191_17
 16. Md. Yusop NB, Yoke Mun C, Shariff ZM, Beng Huat C. Factors Associated with Quality of Life among Hemodialysis Patients in Malaysia. *PLoS ONE* 2013; 8(12), e84152. <http://doi.org/10.1371/journal.pone.0084152>
 17. AL-Jumaih A1, Al-Onazi K, Binsalih S, Hejaili F, Al-Sayyari A. A study of quality of life and its determinants among hemodialysis patients using the KDQOL-SF nstrument in one center in Saudi Arabia. *Arab J Nephrol Transplant.* 2011; 4(3):125-30.
 18. Lemos CF, Rodrigues MP, Veiga JRP. Family income is associated with quality of life in patients with chronic kidney disease in the pre-dialysis phase: a cross sectional study. *Health and Quality of Life Outcomes* 2015; 13, 202. <http://doi.org/10.1186/s12955-015-0390-6>.

ORIGINAL ARTICLE

ABDUCTIVE REASONING ON ETHICS BY MEDICAL STUDENTS USING AN AUDIENCE RESPONSE SYSTEM.

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Abstract

Second year medical students were presented with six scenarios, each representing a dilemma in ethics. All of these scenarios were linked to five options, each of which could represent a possible response to the dilemma, and the students were required to choose which one of these they most favoured. A computerized audience response system was used to individualize the procedure and to ensure participation of all students. Subsequently more information was given about the circumstances of each dilemma, and the same set of options was displayed, allowing another round of voting, whereby the students could change their minds if they wished. Then more information was given, and the voting repeated. The aim was to ascertain if providing information in three stages can aid the students in selecting the (undisclosed) responses favoured by the authors. The results indicated that, on the whole, provision of further information within an ethical dilemma does not enhance the students' ability to discern what is right and proper and that in this group at least more effort must be put into the ethics instruction.

Keywords: *medical ethics; dilemmas; abduction, audience response system*

Introduction

The importance of a sound grasp of ethics by all medical personnel is universally acknowledged (General Medical Council 1993; Steinbock 2007)^{1,2}. The question is: when to introduce the concepts in the undergraduate programme? If introduced too early, memories may lapse; if throughout the course, too much curriculum time may be taken. Many take the view that since students are now coming into contact with patients much earlier in the programme, correct ethical attitudes should be inculcated as soon as possible. With this in mind, we selected a group of second year students and tried to assess how well they respond to ethical dilemmas, especially if the 'raw' dilemmas are supplemented with further information, thereby filling them out and allowing retrospective consideration of the issues. Formally, the null hypothesis was that if students are exposed to an ethical dilemma in medicine, they fail to appreciate the best or correct solution to the dilemma at first, but with more information, they will arrive at their best or correct solution. The hypothesis could not be substantiated by the results obtained.

Methods

A second-year class of 95 members were selected for the experiment. They follow an integrated five-year curriculum in which exposure to a degree of clinical medicine is effected from the first month. They had been given lectures on medical ethics in the first year without any assessment. The entire course is conducted in English. Ethnically, the class is largely Malay, with Indian and Chinese students in single numbers. Females outnumber males in a ratio of 3:1. The class was already familiar with the audience response system (Vyaz IVS) since it had been used to conduct Biochemistry revision sessions. However, advice on the use of this technology was garnered from an expert (Robertson, 2000)³. An audience response system is particularly useful in this exercise to ensure

students participated fully and are not inhibited by shyness.

A questionnaire was designed with six scenarios illustrating ethical dilemmas, fully set out in the (Appendix A) hereto. Any overt religious nuances were avoided. Previously the authors, by discussion between themselves and with colleagues, had decided on the best or correct response to each of the dilemmas, these in consonance with medical ethics as understood worldwide (World Medical Association 2008; Beauchamp and Childress, 2008; Campbell et al, 2005; Morrison, 2009)^{4,5,6,7}.

The students were asked to choose their preferred option in response to the dilemma by pressing the appropriate button on the response apparatus. Further information was then given for each case, and the same five options for each case were again displayed. This was repeated once more, so that the students were required to vote on the original options three times. The students were instructed to express their personal views, and to be prepared to change their minds as the exercise progressed. In terms of the null hypothesis, the expanding information might have allowed the students to arrive at the ethically appropriate conclusion for each of the six scenarios. Six scenarios were deemed sufficient in terms of attention span, since a rehearsal by the authors indicated that the experiment would last about one hour.

The question arises as to the mode of reasoning demanded from the students in this exercise. If one regards the introductory vignette and the first response to it, together, as the first collection of data to be logically processed, then if the second and third vignettes, together with their responses, reinforce or explain the first, this would appear to be example of abductive reasoning as normally conceptualised (Santaella 1997; Patel et al 2004)^{8,9}. (This being in contrast to both deductive and inductive reasoning.) In the present instance we were plainly trying to persuade our subjects to proceed abductively,

that is to retrospectively modify the first dualism consisting of question and response. This process is considered by many to be normative in medical reasoning and indeed also in legal reasoning and scientific investigation (Blois 1990; Patel et al 2004; Popper, 1979)^{9,10,11}.

Results

There was no consistency in the results as shown in (Table 1) below.

Discussion

For Scenario 1, involving consent for a serious operation, Some students (12%) initially thought that a hospital director is competent to sign a consent form on the patient's behalf but many were weaned on to the correct response (discharge if the patient flatly refuses consent) when the patient was clearly persisting in her refusal. A fairly large minority (32%) were initially of the opinion that a husband can sign a consent form on the wife's behalf (this perhaps being a reflection of the societal norms) but this view dwindled as the exercise proceeded. Some (11%) persisted in the view that the patient could be forced to undergo surgery, but the most favoured (and the correct) view (by 42%) was that she should be discharged.

With respect to Scenario 2, involving revealing reports to persons other than the patient, only a tiny minority thought throughout that a medical report could be issued to the husband merely because he is the husband, and another small minority appeared to favour the idea that the problem could be solved by asking the husband to collect it some other time. At the finish there was a large minority (27%) favouring the husband and wife being given the report together. However, the largest fraction (45%) took the reductionist view that, simply, the report could not be released to a husband.

Scenario 3 concerned the communication of risk. Many (69%) immediately arrived at the correct conclusion, namely the patient should decide for himself after full disclosure. Opinion did not deviate from this despite further information on the emotional state of the patient. This then could be regarded as commendable. Although at the

second stage (the doctor being harassed by the family), there was swing to the view that , if it was pointed out to the patient that eminent figures like President Clinton had safely undergone the same surgery , the patient might agree to undergo it. The final piece of information (that the patient lapsed into a state of complete terror) led the majority back to the correct conclusion.

Scenario 4 was about amending medical reports for the convenience of an applicant for a student placement. At the first stage 56% achieved the preferred answer and this dropped only slightly at the end. Worryingly however, a small number of students (varying from 5-6%) persisted in the view that the reports could be altered to help the applicant.

In Scenario 5, concerning scarce resources (a ventilator) the students reporting correctly (that another ventilator should be urgently sought) rose progressively, 38% to 44% to 52%, which is gratifying - they were unmoved by the emotional state of the mother. A large minority (37%) stuck to the view that the ventilator should be allocated to the child, on the assumption that the elderly patient could be ventilated manually, a less optimal treatment.

The response to Scenario 6, relating to the wish of a patient to die, was disappointing in that it caused much hilarity. We are at a loss to explain this, except that the students may have sensed an incongruity - the contrast between their own youthful well-being and the parlous state of a human being in extremis. (This aspect of medical ethics found by students to be amusing suggests a topic for further research.) In any case a large majority (84 %) strenuously favoured the concept that a doctor can in no circumstances do harm but some (30%) thought that the matter should be put into the hands of the patient, either by allowing him to starve himself to death or by arranging for him, in some manner to disconnect his ventilator. By the end of the three stages, fortunately no student believed that the matter should be put in the hands of relatives. There was persistently a very small minority of students yielding totally perverse responses but whether these were the same individuals throughout, or not, could not be ascertained with the technology available, and in any case the

students were told that the responses would be anonymized.

The results are summarized in Table 1 and are obviously not susceptible to statistical analysis. A more discriminatory format might have been achieved by offering a group of vignettes related to, say confidentiality, and another related, perhaps, to autonomy, and then making comparisons – this is planned for future work.

Conclusion

Although there were some encouraging features, it seems that providing a penumbra of further information to a puzzling ethical scenario does not, on the whole, help these particular students to more readily identify appropriate responses. It had been hoped that by the second year that some of the ethical principles would have rubbed off on to the students since they had been taught by both biomedical staff and clinicians from the time of their entry into the school.

Vignettes similar to our own have of course been used and recommended by many others (Goldie et al 2004; Boenik et al 2005; O'Sullivan and Toohey, 2008)^{12, 13, 14}. The inconsistency in the

responses by our students, as also noted in the study by Hebert et al. (1990)¹⁵, might indicate that different vignettes measure ethical domains in different ways. However, the students gave the impression that they enjoyed the approach, especially with the use of the 'clickers'. It will also be instructive to repeat the experiment with the same class in their fourth or fifth year, whether or not more extensive formal education in ethics is introduced. It has been found by others who were enabled to conduct longitudinal studies, in countries as widespread as the Czech republic, Scotland and Canada (and no doubt elsewhere) that ethical awareness in medical students decreases with seniority. (Slovackova 2007; Goldie et al 2004; Hebert et al 1992)^{16, 17, 18}. If this turns out to be the case in our school, a revision of the ethical curriculum is indicated.

Acknowledgements

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RESULTS

Table 1. Percentages of students achieving the ‘correct’ response to each of the six ethical dilemmas, when given further information in two later stages.

	First Stage	Second Stage	Third Stage
Scenario 1	22	16	42
Scenario 2	30	36	45
Scenario 3	69	39	66
Scenario 4	56	53	48
Scenario 5	39	44	50
Scenario 6	84	74	12
Mean ± sd	50 ± 24	44 ± 18	44 ± 16

References

1. General Medical Council. Tomorrow’s Doctors: Recommendations on Undergraduate Medical Education. London, GMC 1993
2. Steinbock, B. (ed) 2007. The Oxford handbook of bioethics. Oxford: Oxford University Press.
3. Robertson, L. J. 2000. Twelve tips for using a computerized interactive audience response system. *Medical Teacher* 22: 237-239.
4. World Medical Association: Declaration of Helsinki 2008. <http://www.wma.net/e/policy/b3.htm> (accessed 4/9/11)
5. Beauchamp, T. L., and J. F. Childress 2008. The principles of biomedical ethics, 6th ed. New York, Oxford University Press.
6. Campbell A., G. Gillett and G. Jones 2005. *Medical Ethics*, 4th edn. Oxford: Oxford University Press.
7. Morrison, E. E. (ed) *Health care ethics: critical issues for the 21st century*, 2nd edn. 2009. Sudbury, MA: Jones and Bartlett Publishers.
8. Santanella, L. 1997. The development of Peirce’s three types of reasoning: abduction, deduction and induction. http://www.pucsp.br/~lbraga/epap_peir1.htm (accessed 8/9/11)
9. Patel, V. L., J.F. Arocha and J. Zhang. 2004 Thinking and reasoning in medicine. In Holyoak, K. (ed). *Cambridge handbook of thinking and reasoning*. Cambridge: Cambridge University Press.
10. Blois, M.S. Medicine and the nature of medical reasoning. *New England Journal of Medicine* 1990; 308: 847 -849.

11. Popper, K. R. 1979. Objective knowledge: an evolutionary approach. Oxford: Clarendon Press.
12. Goldie J., L. Schwartz, A. McConachie and J. Morrison. The impact of a modern medical curriculum on students' proposed behaviour on meeting ethical dilemmas. *Medical Education* 2004; 38: 942-9.
13. Boenink, A.D., P. de Jonge, K. Samal, A. Oderwald, and W. van Tilberg .. The effects of teaching medical professionalism by means of vignettes: an exploratory study. *Medical Teacher* 2005; 27: 429-432.
14. O'Sullivan, A. J. and S.M. Toohey. Assessment of professionalism in undergraduate medical students. *Medical Teacher* 2008; 30: 280-286.
15. Hebert, P. C., E.M. Meslin, E.V. Dunn, N. Byrne and S.R. Reid . Evaluating ethical sensitivity in medical students: using vignettes as an instrument. *Journal of Medical Ethics* 1990; 16, 141-145.
16. Slovackova, L. Moral judgment competence and moral attitudes of medical students. *Nursing Ethics* 2007; 14: 320-328.
17. Goldie J., L. Schwartz, A. McConachie, B. Jolly and J. Morrison. Can students' reasons for choosing set answers to clinical vignettes be reliably rated? Development and testing of a method. *Medical Teacher* 2004; 26: 713 -718.
18. Hebert, P.C., E.M. Meslin and E.V. Dunn. Measuring the ethical sensitivity of medical students: a study at the University of Toronto. *Journal of Medical Ethics* 1992; 18:142-147.

APPENDIX A

Preferred responses are asterisked.

SCENARIO 1

- A). A 60 year old woman with poorly controlled diabetes needs an amputation of the foot to prevent septicaemia. She is otherwise alert and coherent. She however refuses to give consent for operation and demands to be discharged. As the attending physician, what would be your response?
- a) Get the hospital director to sign the consent form on her behalf.
 - b) Get the husband to sign he consent for amputation of his wife's foot.
 - c) Ignore her request and proceed with the surgery.
 - d) Discharge her *
 - e) Put the decision on hold for a better time.
- B). The husband arrived and informed the doctor that his wife is illiterate and not aware of the implication of her decision. She told her husband that she would rather die than lose her foot. The husband advised the doctor to ignore his wife's decision. What is your next line of action?
- C). The patient again refuses amputation and wants to go home. What do you do now?

SCENARIO 2

A). You were playing golf and your clinic nurse called. She informed you that somebody called up and wanted to collect his wife's medical report on her behalf. You are already aware that the patient has genital herpes. What would be your instruction to your nurse?

- a) Ask him to prove that he is the husband and then release the medical report.
- b) Ask him to come another day as you need to explain the disease to him.
- c) Ask him to get a letter from his wife allowing him to collect the report.
- d) Ask him to come together with his wife so that you can explain the disease to both of them together.
- e) Tell him that you cannot release the medical report to him.*

B). He then called you personally and you realised that he is the city mayor, one of your golf mates and that you have known him for the past 15 years. You and your wife also often go on overseas trips together with them. What would be your response?

C). A few days later, the mayor turned up alone and informed you that his wife has gone overseas and that she has instructed him to collect her medical report. You are aware of this as your wife has also gone on the same trip and that they are very close friends. What would be your response?

SCENARIO 3

A). Mr. XX, age 70, needs open heart surgery for ischemic heart disease. However he is worried that he may not survive the surgery. He refuses to sign the consent form until the doctors can guarantee that he will survive. How would you approach this problem?

- a) Give him just enough information but omit all the high risk complications so that he will be "guided" to consent for surgery.
- b) Tell him the surgery is very safe and give some examples of patients like President Clinton who have undergone the surgery.
- c) Seek out his relative to sign the consent for surgery.
- d) Tell him all the risks and let him decide. *
- e) Summarily discharge him.

B). His children arrive and plead with you to not to reveal the possible risks, in order to get him to agree to surgery. As the attending doctor, you are also aware that he will die soon if the surgery is delayed. Now that you have the "backing" from the family members, what would be your next action?

C). Unfortunately a patient at the bed next to Mr. XX went for a similar surgery and did not survive. Mr. XX is now terrified and wants to know more about the surgery and its risks. What would you do now?

SCENARIO 4

A). Mr. ZZ, a 19-year old student, came to your clinic for a medical examination necessary for entrance to a prestigious university in England. Unfortunately you found that he has undiagnosed hypertension. Mr. ZZ pleaded with you not to reveal this as he believed that he will then not be offered a place in the university. What would you do?

- a) Record him as normotensive so that he can go to England.
- b) Report him as hypertensive on the report.
- c) E-mail the university and inform them that Mr ZZ is trying to persuade you to alter his medical report.

- d) Treat his hypertension and then direct him to another clinic to get his medical examination done.*
 - e) Initiate treatment and at the same time record him as normal.
- B). His father, YY turned up and requested that you report his son as normal so that he can be enrolled in this university. He claimed that he would “lose face” if his son is rejected as he has already given a grand party to his friends to celebrate acceptance. His wife also turned up and you realised then that she is your distant cousin. She also pleads with you to help her son. What would you do now?
- C). YY, who owns many companies, now proposes to accept your clinic on his companies’ panel. He has a few thousand employees. What would be your response now?

SCENARIO 5

- A). Mr. RR, a 75-year-old man with pneumonia is on a ventilator. This is the only ventilator of the small district hospital wherein you are working. Suddenly the emergency department informs you that they have intubated a 15-year old boy with severe asthma. They are referring the boy to you for emergency ventilator support. What is your response to this situation?
- a) Discuss the dilemma with the family of Mr. RR to obtain their consent to give the ventilator to the boy.
 - b) Allocate the ventilator to the boy and allow Mr. RR to expire, as he is already 75years old.
 - c) Allocate the ventilator to the boy and manually ventilate Mr. RR in the ward.
 - d) Instruct the nurses to manually ventilate the boy in the ward till he recovers.
 - e) Instruct the casualty doctor to transfer the patient to another hospital.*
- B). The boy’s father arrives and pleads with you to save his son. He informs you that the boy is a top student in his school and represents the state in many games. How do you respond now?
- C). The mother arrives and quickly goes into a hysterical state. She screams about losing her only son due to your incompetence. What would you do now?

SCENARIO 6

- A). Mr. FF a 45-year- old male, fell from a tree 5 years ago and broke his neck. He is a tetraplegic and depends on a ventilator to breathe. He has become very distressed recently and pleads with you to disconnect the ventilator so that he can die with dignity. He informs you that he is causing a severe drain on his children’s financial situation. What would you do?
- a) Have sympathy for him and disconnect the ventilator
 - b) Set up a system so that he can disconnect the ventilator himself.
 - c) Do not disconnect the ventilator but allow him to starve to death.
 - d) Explain to him that as a doctor you cannot in any circumstances do harm.*
 - e) Provide an opportunity for his relatives to “accidentally” disconnect the ventilator.
- B). You later discover that Mr. FF’s family has recently abandoned him. His young wife is now living with his best friend. He claims that there is no point in living. What would you do now?
- C. Mr. FF now refuses to eat and take his medication. He insists that he has a right to refuse treatment. What would you do now?

ORIGINAL ARTICLE

COMPLEMENTARY MEDICINE PRACTICES FOR PREGNANCY AND POSTPARTUM HEALTH: A STUDY AMONG MALAYSIAN WOMEN WHO GAVE BIRTH IN A TERTIARY CENTRE.

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Abstract

Background: A systematic review reported a high prevalence of complementary and alternative medicine (CAM) practice during pregnancy. Earlier Malaysian studies related to it were based on Malay predominant populations. Objectives: The study objectives were to determine prevalence, types, aims, and associated factors of CAM use during pregnancy and the postnatal period among women who gave birth in a Malaysian tertiary hospital. Methods: A cross sectional study was conducted among women who were admitted to the postnatal wards of “Hospital Raja Permaisuri Bainun, Ipoh, Perak state, Malaysia” using a structured questionnaire, designed to collect data on the participants’ demography, details of CAM practice and their attitude towards its use. Results: The prevalence of CAM use among 134 respondents was 87.3%. The most commonly used method was naturopathy using abdominal hot stone application or massage as reported by 72% respondents. It was rated highly effective in improving circulation or recuperation by 90% of users. Herbal usage was reported by 36% and the commonest type was Indonesian traditional herbal medicine “Jamu”. The use of CAM was significantly low among Chinese respondents ($P < 0.001$), respondents with no/primary level education background ($P < 0.05$), unskilled workers ($P < 0.05$) and low earners ($P < 0.005$). Regression analysis indicated the chance of CAM usage was significantly less among Chinese women compared to Malays. (OR = 0.077 95% CI= 0.013-0.458) Conclusion: The prevalence of obstetric CAM use among the study population was high. Further studies are required to critically assess the commonest practice, naturopathy.

Keywords: *Complementary therapies, associated factors, pregnancy and postnatal, obstetrics, Malaysia*

Introduction

The definition of “Complementary and alternative medicine” (CAM) adopted by Cochrane collaboration is “a broad domain of healing resources that encompasses all health systems, modalities, and practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health system of a particular society or culture in a given historical period. CAM includes all such practices and ideas self-defined by their users as preventing or treating illness or promoting health and well-being.”¹ Subsequently, an operational definition was developed with 70 different terms or combination of terms to identify therapies used in treating or preventing disease².

High prevalence of systemic CAM use in pregnancy was highlighted in a review³ and also in a recent Malaysian study⁴. In Malaysia prevalence of herbal use in pregnancy was reported variably 52.4% with high rate of coconut oil ingestion in third trimester⁵ and 34.3% with the most frequent intrapartum utilization⁶.

A wide variety of CAM are used during antenatal and postnatal periods. Herbal or other CAM was recommended by 46.1% of physicians as reported in an Iranian study⁷, by 60% of midwives in a Turkish study⁸ and by 32.5% of health care professionals in a Scotland survey⁹.

The usage is racially and culturally different. In the United States, non-Hispanic whites are most likely to use a broader variety of CAM while racial/ethnic minorities are the highest users of specific and culturally relevant CAM methods¹⁰.

A report from a multi-national study (excluding Asians) suggested that herbal use in pregnancy was higher in Russia (69%), Eastern Europe (51.8%) and Australia (43.8%) than other regions and was associated with being non-smokers, folic acid or alcohol consumption in pregnancy, being students and having education other than a high school degree¹¹.

Therefore health care providers in Malaysia, a multiracial nation, have to recognize the diversity of CAM practice among their population because

some specific methods are used by individual races.

This study was conducted to explore obstetric CAM practice among mothers who gave birth in a tertiary hospital of Perak state, Malaysia. Study objectives were to investigate prevalence, types and purpose of CAM use during pregnancy and postnatal periods, to explore women’s attitude towards the use and to determine demographic factors associated with the usage.

Materials and Methods

This cross-sectional descriptive study was conducted as a ‘student special study module research project’ with an approval from the institutional medical ethics committee of the Faculty of medicine, Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP /MREC/2016/047).

Study population

All eligible women admitted to the postnatal wards of ‘Hospital Raja Permaisuri Bainun, Ipoh, Perak state, Malaysia’ within a period between 22nd August and 7th October 2016 were included. Eligibility criteria included mothers who were postpartum and available in the postnatal wards during the study period, who were willing to participate, who were mentally and physically fit to answer the questions and who were able to communicate in Malay (official language of Malaysia) or English Language. Sample size was calculated as 194 based of the Obstetric CAM prevalence of 85.2% from a previous Malaysian study⁴ using Open source calculator of open epi version 3. All women who satisfied the eligibility criteria were selected. Out of 177 eligible persons, 134 agreed to participate and all of them completed the questionnaire during the interview. Therefore, the response rate was 75.7%.

The purpose and nature of the study were verbally explained to eligible women by the interviewers. The participant information leaflet which was prepared in question and answer format was also distributed to the selected women. A written informed consent was taken after assuring confidentiality of their personal information. The participants were informed that the participation is voluntary and they can withdraw from the study at any time.

Data collection

Two trained medical students collected data via face to face interview using the questionnaire written in English. Malay or English language was primarily used during the interview. To collect the data on types of CAM, common categories as stated in working definition² were listed in the questionnaire. The users had to answer further on details of their use. The respondents could volunteer information of “other method” they used to prevent any illness or to promote their wellbeing even if it is not in the list. Content validity of the questionnaire was assessed by the subject experts and face validity was observed in a pilot study.

Statistical analysis

Analysis was performed to determine association between user’s demographics and use of alternative medication by using Chi Square test and logistic regression analysis.

Results

The responses of 134 women were computed into our statistical analysis.

Socio-demographic and health characteristics

The Majority (69%) of respondents were Malays and 73% were Muslims. The mean age was 28.99 years (+/-5.39 2SD) with the youngest being 15 and the oldest 43 years. The mean parity was 2.41

(+/-1.595 2SD) with the highest parity ten. More than half of participants had secondary or lower level education and were housewives. The largest group had a monthly income between 1000 and 3000 Malaysian Ringgit. (Table 1)

Descriptive analysis of the use of alternative medications

Among our study population, the prevalence of CAM use during pregnancy and postnatal period was 87.3%. Highest proportion (59%) used CAM during the postpartum period, 31% used during pregnancy and 10% used in both periods.

Massage or abdominal hot stone application (naturopathy) was reported by 72% of the respondents and herbal medicine was used by 36%. The commonest reason given by both groups was to improve circulation and to enhance their recuperation after delivery. “Jamu” and ginger were commonly used as reported by 41% and 11% of respondents respectively. Other products reported were black pepper, herbal tea, Bilimbi (*Averrhoa bilimbi*), Pandan leaves (*Pandanus amaryllifolius*), Guava (*Psidium guajava*) leaves, Senna (*Senna alexandrina*) leaves, ginseng, Kacip Fatimah (*Labisia pumila*), lemon grass, rice water turmeric, lime and Galangal (*Alpinia galena*).

Dietary supplements were used by 32% of the study population and 39.5% used it for improvement of health and energy. Commonly used supplements reported by the users were vitamin, virgin coconut oil and milk, and rarely used products are dates, black seed oil, fish essence, sea cucumber and pomegranate essence. Ayurveda was used by 6% mainly for relieving pain and warming of the blood. No other mind and body practices were reported except Yoga (1%). The majority for users rated their methods highly effective. (Table 2)

More than half of users spent between Malaysian Ringgit (RM) 100 and 300 for CAM in their current pregnancy, 25% used more than RM 300 and 22% used less than 100.

The major source of information related to CAM was their parents. They also received advice from friends, relatives and parents in law. Traditional midwives and other health care professionals

rarely recommended those medications or methods. (Figure 1)

Analysis on association between demographic and health variables, and the use of CAM

As shown in Table 3, age and parity were not significantly associated with the use ($p > 0.05$). The prevalence among Chinese respondents and respondents from other ethnic groups was significantly lower than that of Malay and Indian respondents ($p < 0.001$). Among our participants, women with no education and primary level education were less likely to use it. ($p < 0.05$).

All participants from the group of “intellectuals, professionals, executives, managers and entrepreneurs” used CAM. The user proportion was significantly higher among housewives and skilled staff compared to un-skilled workers ($p < 0.05$). The participants from the low-income group (income < 1000 /month) were less likely to use CAM compared to the higher income group ($P < 0.005$).

Binomial regression analysis demonstrated that Chinese women had lower odds for CAM use (Chinese: OR = 0.077, 95% CI = 0.013-0.458) but all other independent variables showed insignificant odds. (Table 4)

Participants’ attitude towards CAM use

The majority of the users responded positively towards all attitude related questions. Most of the participants responded that they have plan to use CAM in future pregnancies and would recommend CAM to others. (Table 5)

Discussion

Prevalence of CAM use among our respondents was much higher than previous findings ranging from 5.8% to 74.2%³ but comparable to that reported by a Malaysian study⁴ and an Iranian study¹².

Our finding of high prevalence of naturopathy might be due to inclusion of postnatal use of CAM. With regards to pre-natal usage, herbal use was always the highest (although the rate widely

varied between 22.3 to 82.3%), increasing in trend¹³ and was associated with increasing age¹⁴.

Naturopathy (post-natal hot stone massage), is not an uncommon practice in southeast Asian countries e.g. Cambodia, Malaysia and Myanmar¹⁵⁻¹⁷. Some Cambodian communities believe that sitting on a heated rock during the postpartum period prevents uterine prolapse and applying fire-warmed rock abdominally improves uterine involution and abdominal muscle tone¹⁵. In spite of its great use, no research output literature was available on technique, benefits or side effects related to these methods. In western medicine, uterine massage is recommended after placental delivery just by hand rubbing to improve uterine involution in order to reduce the postpartum hemorrhage. However the results of two randomized controlled trial did not show any significant benefit of uterine massage¹⁸. A small study found that abdominal heat application during labor increased uterine activity significantly¹⁹. This effect may be replicated postnatally but no data is available to support its use either in labor or after delivery.

In the middle-east, herbal products are more diverse¹³ than in USA¹⁴, however, use of some products like ginger, green tea, peppermint, chamomile are common internationally. Interestingly Indonesian herbal beverage “Jamu” was the most popular product among our respondents. There are ten types of Jamu prepared by mixing of various herbs and spices, for specific health benefits. However, almost all preparations were stated to be beneficial for pregnancy and lactation²⁰.

The rate of supplement use among our respondents was similar to that of an Iranian study¹² but much lesser than previous findings reported (47% to 91%)³. The reason of this discrepancy might be due to the variation in definition of “supplements”.

In our study, Ayurveda was used by Indians and other racial groups. A review reported that homeopathy prevalence varied from less than 5% to more than 50%³ but none of our respondents use it. Similarly, the use of acupuncture or acupressure, aromatherapy, mind body practices and manipulation and body based practices were

not reported by our participants despite the prevalence of 24.7% body based practices and 22.9% spiritual methods in other Muslim population¹². An American survey also showed that mind body practices were the most popular methods²¹.

In our study, the majority of users were satisfied with their methods for improving their health although the effectiveness can only be measured subjectively. An Australian study reported that herbal medicine was used in pregnancy as a holistic approach and a preventative measure with some concerns about evidence of clinical efficacy of these products²². Clinical trials have demonstrated the promising effect of ginger in improving pregnancy related nausea and vomiting but very few studies were undertaken for other herbal remedies²³ and no reliable data accessible to support use of other methods.

The spending on CAM use among our population cannot be considered high although comparison is not possible due to lack of data. Hot stone massage can be performed by family members therefore cost would not be a factor.

The majority of our participants followed their family advice with regards to CAM use which differs from the findings of an international study⁷. This can be explained by the fact that Malaysians live in close community where people still rely on the family members for their consultation rather than online sources. Only 2% of our respondents received information from health care providers whose view on CAM use may be skeptical as reported by a qualitative study².

A US nationwide survey reported that increased maternal age, primigravida, being US born and having college education were associated with CAM use in pregnancy²⁵.

Our multivariate analysis indicated that being a Chinese, the chance of CAM use is significantly less compared to Malays. Although nonspecific CAM use was high among Chinese women (86%)²⁶. Prevalence of traditional Chinese medicine (TCM) use in pregnancy was relatively low^{27, 28}. Therefore it will be of interest to look at whether pregnancy is an exception for TCM use among Chinese population. Likewise, very little is presented in the scientific literature related to

obstetric CAM use in India or among Indian women living abroad.

Our results also indicated that high earners, professionals or entrepreneurs have 100% user rate. Likewise, women with no employment is associated with high CAM usage. Similar to our findings, it was positively associated with no occupation and high income, rural residence, perceived healthy status and ever use of contraception among Iraqi women²⁹. However, a study based on Malay predominant population did not prove any association between CAM usage and sociodemographic features⁵.

Our respondents expressed their positive attitude on safety antenatal and postnatal use of CAM while it was reported that herbal medicines users had concern about evidence of clinical efficacy and women who practiced aromatherapy and homoeopathy were concerned more about their own personal experience of the efficacy²².

Our study participants also demonstrated optimistic view as higher majority answered positively to attitude questions statements on plan for future CAM use and recommending CAM to others.

Lapi F et al reported that habitual user of CAM were at higher risk of taking CAM during pregnancy (adjusted odds ratio = 10.8; 95% confidence interval: 4.7–25.0).³⁰ It is understandable that women recommend their method that they think beneficial and safe to their relatives and friends as indicated by previous study that revealed most pregnant women used herbs based on advice from family and friends^{31, 32}.

Limitation: The main limitation of this study which carried out as a medical student research project, was time constraint that resulted small sample size. However, the ethnic distribution corresponded well to the ethnic proportion of Malaysian population.

Conclusion

Our findings suggested that the prevalence of CAM use in pregnancy and postnatal period is considerably high. Naturopathy using massage or hot stone application is the most popular method

followed by herbal medicine. Most users rated their methods as 'quite effective'. Factors that are negatively associated with the use are Chinese ethnicity, no education or primary level education, low skill occupation and low income. Logistic regression analysis indicated that being a Chinese woman, the chance of CAM usage was significantly less compared to Malays. Therefore future research should focus on use of abdominal hot stone application, traditional herbal medicine "Jamu" and Chinese and Indian women's perception towards use of their customary methods like acupuncture, acupressure TCM or homeopathy.

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Declaration of conflicting interests

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RESULTS

Table 1. Socio demographic distributions of the study population

VARIABLES	GROUPS	FREQUENCY (%)
ETHNICITY	Malay	93 (69.4)
	Chinese	16 (11.9)
	Indian	12 (9.0)
	Others	13 (9.7)
RELIGION	Muslim	98 (73.1)
	Hindu	10 (7.5)
	Buddhist	14 (10.4)
	Christian	3 (2.2)
	Others	9 (6.7)
EDUCATIONAL LEVEL	No school education	4 (3.0)
	Primary level	11 (8.2)
	Secondary level	76 (56.7)
	Diploma	23 (17.2)
	Professional Degree	20 (14.9)
OCCUPATION	Housewife/unemployed	78 (58.2)
	Staff with no special qualifications	11 (8.2)
	Staff with special skills/technical skills	27 (20.1)
	Intellectual professionals, executives, manager, entrepreneur, business woman	18 (13.4)
	MONTHLY INCOME	< RM1000
	RM1000-<RM3000	86 (64.2)
	RM3000-<RM5000	17 (12.7)
	>RM5000	8 (6.0)

Table 2. Prevalence, purpose and user effective rating of CAM modalities used by respondents

Modalities	Prev	Commonly used methods	The common reasons reported for the use	Effectiveness rating*		
				3	4	5
Naturopathy	72%	Massage, Hot stone	Improve circulation, recuperate after delivery	5 (5.2)	57 (58.8)	35 (36.1)
Herbal medicine	36%	“Jamu” Traditional herbal medicine	Improve circulation, recuperate after delivery	4 (6.5)	43 (69.4)	14 (22.6)
Dietary supplement †	32%	Vitamin Virgin coconut oil	Improve health and energy	7 (16.3)	27 (62.8)	8 (18.6)
Ayurveda	6%		Relieving pain, Warming the blood	0	5 (62.5)	3 (37.5)
Yoga	0.75%		Relax the body	0	1 (100)	0

*Effectiveness Rating was given by the users in the Likert scale of 0 to 5 where 0 is not effective and 5 is very effective

† Only 1 pregnant mother who used dietary supplement rated 2.

Table 3. Association between socio-demographic factors and obstetric CAM use

Variables	Groups	User Frequency (%)	Non-user Frequency (%)	P- value
Age group (years)	<25	20(80)	5(20)	0.151
	25-<35	83(91.2)	8(8.8)	
	35 and above	14 (77.8)	4 (22.2)	
Parity	Primipara (P1)	34 (79.1)	9(20.9)	0.080
	Multipara(P2-4)	74(92.5)	6 (7.5)	
	Grand multipara (P5 and above)	9(81.8)	2 (18.2)	
Ethnicity	Malay	89 (95.7)	4 (4.3)	0.000
	Chinese	10 (62.5)	6 (37.5)	
	Indian	10 (83.3)	2 (16.7)	
	Others	8 (61.5)	5 (38.5)	
Educational level	No school education	2 (50)	2 (50)	0.034
	Primary level	8 (72.7)	3 (27.3)	
	Secondary level	66 (86.8)	10 (13.2)	
	Diploma	21 (91.3)	2 (8.7)	
	Professional degree	20 (100)	0	
Occupation	Housewife/unemployed	67 (85.9)	11 (14.1)	0.027
	Staff with no special skill	7 (63.6)	4 (36.4)	
	Staff with special skill/technical skill	25 (92.6)	2 (7.4)	
	Intellectual/professional/Executives/manager/ entrepreneurs	18(100)	0	
Monthly income	<RM1000	15 (65.2)	8 (34.8)	0.004
	RM1000-<RM3000	80 (93)	6 (7)	
	RM3000-<RM5000	14 (82.4)	3 (17.6)	
	=/>RM5000	8 (100)	0	

P-values were calculated using Chi square test. P-value < 0.05 were presented in bold text.

Table 4. Regression analysis for association between obstetric CAM use and independent variables

Variables	Groups	Odds Ratio	95% confidence interval	
			Lower	upper
Ethnicity	Malay (reference group)			
	Chinese	.077	.013	.458
	Indian	.184	.024	1.384
	Others	.217	.027	1.725
Educational level	No school education (reference group)			
	Primary level	2.472	.199	30.747
	Secondary level	.949	.076	11.845
	Diploma	1.154	.045	29.894
	<i>Professional degree</i>	<i>1.697E7</i>	<i>.000</i>	<i>.</i>
Occupation	Housewife (reference group)			
	Staff with no special skill	.974	.157	6.058
	Staff with special skill /technical skill	1.633	.260	10.269
	<i>Intellectual/professional executives/manager/entrepreneurs</i>	<i>3.714E7</i>	<i>.000</i>	<i>.</i>
Monthly income	<RM 1000 (reference group)			
	RM 1000-<3000	6.380	.998	40.805
	RM 3000-<5000	2.423	.225	26.059
	<i>=/>5000</i>	<i>6.566E8</i>	<i>.000</i>	<i>.</i>

Binomial regression analysis was used to predict the odds of CAM use. Significant odds ratio was presented in bold text. The user rate was 100% in the groups presented in *italic*.

Table 5. Response to individual attitude question

Attitude question	Yes Number (%)	No Number (%)
Do you think that CAM that you used is safe for you and your baby? (<i>Among users</i>)	116(99.14)	1(0.86)
Do you have any concern regarding unwanted effects of CAM on you baby? If yes please specify (<i>Among users</i>)	12(10.26) jaundice specified by 10	105 (89.74)
Do you plan to use CAM in future pregnancy? (<i>All participants</i>)	115 (85.8)	19(14.1)
Would you recommend alternative medication or complementary method you use during pregnancy and postpartum period to others? (<i>All participants</i>)	115 (85.8)	19(14.1)



Figure 1. Source of information for CAM

References

1. Zollman C, Vickers A. What is complementary medicine? *BMJ*. 1999 Sep 11;319(7211):693-6.
2. Wieland LS, Manheimer E, Berman BM. Development and classification of an operational definition of complementary and alternative medicine for the Cochrane Collaboration. *Alternative therapies in health and medicine*. 2011; 17(2):50-59.
3. Pallivalappila AR, Stewart D, Shetty A, Pande B, McLay JS. Complementary and Alternative Medicines Use during Pregnancy: A Systematic Review of Pregnant Women and Healthcare Professional Views and Experiences. *Evid Based Complement AlternatMed*. 2013; 2013:205639.
4. Yusof J, Mahdy ZA, Noor RM. Use of complementary and alternative medicine in pregnancy and its impact on obstetric outcome. *Complement Ther Clin Pract*. 2016; 25:155-163.
5. Rahman AA, Sulaiman SA, Ahmad Z, Salleh H, Wan Daud WN, Hamid AM. Women's attitude and sociodemographic characteristics influencing usage of herbal medicines during pregnancy in Tumpat district, Kelantan. *Southeast Asian J Trop Med Public Health*. 2009; 40 (2) 330-337.
6. Kim Sooi L, Lean Keng S. Herbal Medicines: Malaysian Women's Knowledge and Practice. *Evidence-based Complementary and Alternative Medicine: eCAM*. 2013;2013:438139.
7. Sattari MR, Dilmaghanizadeh M, Hamishehkar H, Mashayekhi SO. Self-reported Use and Attitudes Regarding Herbal Medicine Safety During Pregnancy in Iran. *Jundishapur J Nat Pharm Prod*. 2012;7(2);45-9.
8. Koc Z, Topatan S, Saglam Z. Use of and attitudes toward complementary and alternative medicine among midwives in Turkey. *Eur J Obstet Gynecol Reprod Biol*. 2012; 160(2):131-6.
9. Stewart D, Pallivalappila AR, Shetty A, Pande B, McLay JS. Healthcare professional views and experiences of complementary and alternative therapies in obstetric practice in North East Scotland: a prospective questionnaire survey. *BJOG*. 2014;121(8):1015-9.
10. Kronenberg F, Cushman LF, Wade CM, Kalmuss D, Chao MT. Race/Ethnicity and Women's Use of Complementary and Alternative Medicine in the United States: Results of a National Survey. *American Journal of Public Health*. 2006; 96(7):1236-1242.
11. Kennedy DA, Lupattelli A, Koren G, Nordeng H. Herbal medicine use in pregnancy: results of a multinational study. *BMC Complement Altern Med*. 2013; 12;13:355. .
12. Khadivzadeh T, Ghabel M. Complementary and alternative medicine use in pregnancy in Mashhad, Iran, 2007-8. *Iranian Journal of Nursing and Midwifery Research*. 2012;17(4):263-269.
13. John LJ, Shantakumari N. Herbal Medicines Use During Pregnancy: A Review from the Middle East. *Oman Med J*. 2015;30(4):229-36.
14. Louik C, Gardiner P, Kelley K, Mitchell AA. Use of Herbal Treatments in Pregnancy. *American journal of obstetrics and gynecology*. 2010; 202(5): 439.
15. Cambodian postpartum practices [Internet]. *Ethnomed* [Cited 16th August 2017]. Available from: <https://ethnomed.org> > Clinical Topics > Pediatrics

16. Traditional postnatal care in restoring women's physical and mental health [Internet]. INAHTA brief Issue 2016-18 [cited Sept 25 2017]. Available from: www.moh.gov.my/index.php/database_stores/attach_download/348/267
17. Cultural dimensions of pregnancy, birth and post-natal care - Burmese cultural profile [Internet]. Multicultural Health - A Guide for Health Professionals [cited August 14 2017]. Available from: https://www.health.qld.gov.au/__data/assets/pdf_file/0032/.../burmese-preg-prof.pdf
18. Hofmeyr GJ, Abdel-Aleem H, Abdel-Aleem MA. Uterine massage for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art. No.: CD006431.
19. Khamis Y, Shaala S, Damarawy H, Romia A, Topozada M. Effect of heat on uterine contractions during normal labor. *Int J Gynaecol Obstet.* 1983; 21(6):491-3.
20. 10 types of traditional Indonesian herbal medicine and its benefits [Internet]. Sttemit [cited August 14 2017]. Available from: <https://steemit.com/health/@fajrilgooner/10-types-of-traditional-indonesian-herbal-medicine-and-its-benefits>.
21. Birdee GS, Kemper KJ, Rothman R, Gardiner P. Use of Complementary and Alternative Medicine During Pregnancy and the Postpartum Period: An Analysis of the National Health Interview Survey. *Journal of Women's Health.* 2014;23(10):824-829.
22. Frawley J, Sibbritt D, Broom A, Gallois C, Steel A, Adams J. Women's attitudes towards the use of complementary and alternative medicine products during pregnancy. *J Obstet Gynaecol.* 2016; 36(4):462-7.
23. Dante G, Pedrielli G, Annessi E, Facchinetti F. Herb remedies during pregnancy: a systematic review of controlled clinical trials. *J Matern Fetal Neonatal Med.* 2013 Feb;26(3):306-12.
24. Farooqui M, Othman CN, Hassali AA, Saleem F, Ul Haq N, Sadeeqa S. A Qualitative Exploration Of Malaysian Doctors' Perceptions Towards Complementary And Alternative Medicines (Cam). *Value Health.* 2014 Nov;17(7):A789.
25. Strouss L, Mackley A, Guillen U, Paul DA, Locke R. Complementary and Alternative Medicine use in women during pregnancy: do their healthcare providers know? *BMC Complementary and Alternative Medicine.* 2014;14:85.
26. Hsiao AF, Wong MD, Goldstein MS, Becerra LS, Cheng EM, Wenger NS. Complementary and alternative medicine use among Asian-American subgroups: prevalence, predictors, and lack of relationship to acculturation and access to conventional health care. *J Altern Complement Med.* 2006 Dec;12(10):1003-10.
27. Chen HQ, Zou SH, Yang JB, Cai J, Zhang Y, Wang ZL. A survey and analysis of using traditional Chinese medicine during pregnancy. *Int J Clin Exp Med.* 2015; 15;8(10):19496-500.
28. Yeh HY, Chen YC, Chen FP, Chou LF, Chen TJ, Hwang SJ. Use of traditional Chinese medicine among pregnant women in Taiwan. *Int J Gynaecol Obstet.* 2009; 107(2):147-50.
29. Hwang JH, Kim Y-R, Ahmed M, et al. Use of complementary and alternative medicine in pregnancy: a cross-sectional survey on Iraqi women. *BMC Complementary and Alternative Medicine.* 2016;16:191.

30. Lapi F, Vannacci A, Moschini M, et al. Use, Attitudes and Knowledge of Complementary and Alternative Drugs (CADs) Among Pregnant Women: a Preliminary Survey in Tuscany. *Evid Based Complement Alternat Med.* 2008;7(4):477–486.
31. Al Essa M, Alissa A, Alanizi A, et al. Pregnant women's use and attitude toward herbal, vitamin, and mineral supplements in an academic tertiary care center, Riyadh, Saudi Arabia. *Saudi Pharm J.* 2018;27(1):138–144.
32. Al-Ghamdi S, Aldossari K, Al-Zahrani J, et al. Prevalence, knowledge and attitudes toward herbal medication use by Saudi women in the central region during pregnancy, during labor and after delivery. *BMC Complement Altern Med.* 2017;17(1):196. Published 2017 Apr 4. doi:10.1186/s12906-017-1714-3

ORIGINAL ARTICLE

A STUDY ON THE KNOWLEDGE AND ATTITUDE ON SEXUAL HEALTH AMONG UNDERGRADUATES IN IPOH, PERAK.

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ABSTRACT

Background: Young adults in Malaysia are vulnerable to sexual health problems and unwanted pregnancies as sexual health issues are still a taboo subject in Malaysia. This study examines the knowledge and attitudes regarding sexual health among the undergraduates.

Methods: Data were obtained from a cross-sectional survey of 300 undergraduates in Ipoh, Perak. Their demographic data, sexual knowledge and attitudes were evaluated.

Results: The mean sexual knowledge mark was 29.68 ± 5.6 out of total mark of 38 based on 15 questions, with HIV/AIDS being the most well-known STDs. Eighty two percent of the undergraduates obtained information of sexual health through the internet. Higher level economic status of the undergraduates had greater sexual knowledge.

Conclusion: There was adequate grasp of knowledge on sexual health among undergraduate especially health sciences students and students with higher income parents and the youths were very much aware of the importance of education on sexual health.

INTRODUCTION

Between the year 2005-2010, 472 new born babies were abandoned or dumped across Malaysia, of which 258 were found dead¹. The prevalence of abortion among adolescents is one for every five pregnancies² and the rise of sexually transmitted diseases (STDs) among young adults, especially HIV/AIDS was alarming³. Youths are much more vulnerable to these sexually related health problems because they are prone to sexual experimentation⁴.

World Health Organization (WHO) stated that everyone should achieve their optimal sexual health through a proper education on the subject⁵. However, sexual health has always been a taboo in the society and it is deemed as a sensitive issue to be discussed openly; be it among family members, friends, within the school compounds or university campuses^{6,7}. The role of parents, family and friends as source of information were found to be negligible among university students in non-medical courses⁸.

Hence this study aimed to determine the source of knowledge, level of knowledge, association between knowledge and socioeconomic background and attitude on sexual health among undergraduates in medical and non-medical courses in Ipoh, Perak.

MATERIALS AND METHODS

This is a cross-sectional study using self-administered questionnaire and answered anonymously among undergraduates aged between 18 to 24 years old from tertiary education institutions that offer health sciences and non-health sciences courses.

We used a standard sample size calculation formula with a constant of 1.96 at 95% confidence level and 5% alpha error assuming 50% of participants with good knowledge on sexual health and level of significance at 0.05 to determine the sample size. A total of 421 was

calculated as minimum sample size required to participate in this study including the 20% non-respondents. However we had to limit the sample size to 300 (150 from institution that offer health sciences courses & 150 from institution that offer non-health sciences courses) because of our limitation in time and resources for data collection.

The questionnaire was compartmentalized into 3 parts; socio-demographic, knowledge (20 items) and attitude (13 items) on sexual health. Only similar items from both WHO and National Sexuality Education Standards^[9] were included in the questionnaire. Items were closed ended, multiple response questions. It was validated to establish face validity and was piloted on 10 subjects. Errors were then corrected. Questionnaires were given to the respondents by hand on site and were collected back after about an hour later.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 22. The descriptive statistics for the demographic characteristics were calculated, with frequency distribution for demographic variables. Two sample t-tests and analysis of variance (ANOVA) were used to test the association between the age groups, gender, education courses, parents' income and responses of the undergraduates. The significance level was set to be $P < 0.05$.

Ethical approval was obtained from the Institutional Ethical Committee of UniKL Royal College of medicine Perak before conducting this study. All the information gathered was kept confidential. Written informed consent was taken from all respondents before their participation in the study.

RESULTS

The result showed 81.3% of the respondents had good knowledge (more than 50% correct answers) on sexual health. The least correct answer was about the legal age for a man/woman to get contraception with only 42% undergraduates responded correctly. Concerning morning after pills, only 61.3% claimed know that there are contraceptive pills that can be taken soon after a sexual intercourse. It also showed that 89.3% of the young adults know that absence of menstruation is one of the signs of pregnancy. Only 48.3% and 59% were aware that the proper use of condom could prevent pregnancy and transmission of STD respectively. From the list of contraceptive methods given, oral contraceptive pills were the most commonly known among the respondents (84.7%), followed by IUD (70%), diaphragm (67%), implants (56.7%), cervical cap (55.7%), and the least known method was contraceptive patch (44.3%). Regarding sexually transmitted diseases, 96% answered correctly about the transmission of HIV/AIDS and STD and 84.3% knew about the aetiology of STDs. Out of the list of STDs given, almost all (92.3%) of the respondents have heard of HIV/AIDS, syphilis (67%), genital herpes (61%), hepatitis B (57.7%), gonorrhoea (54.3%), and chlamydia (48.7%). 94.7% were aware that risky sexual behaviour such as having multiple sex partners could increase the risk of getting STD and 90% knew that untreated STD could lead to a series of complications in the future.

On to their attitude about sexual health, 93.3% undergraduates disagreed to have sex before marriage and 83% of them agreed that contraception is both partners' responsibility. On usage of condoms, 49.7% agree that it is an embarrassing situation to purchase or obtain condoms and 83.3% claimed that they would continue with the pregnancy and raise the baby if they or their partner gets pregnant. However 6.7% of them chose to do abortion if such circumstance occurred. About 59.7% of undergraduates preferred friends to talk about sex followed by no one with 22.3%, siblings or cousins (8.7%), parents or guardians (7.0%) and school

counsellor with only 2.3%, making them the least popular choice. As much as 77.7% undergraduates agreed to report to the authorities and parents if they were sexually abused by their partner. However regarding health check-up, only 36.7% of them agreed to visit the hospital or sexual health clinic to do a sexual health check-up if they were sexually active, while 13.3% of them have never heard of a sexual health clinic before. A total of 90.3% of them believed that sexual health education can teach about sexual rights and sexual abuse or assaults. A majority of undergraduates chose secondary school as the most appropriate stage to introduce sexual health education in Malaysia with 55.7% while only 3.7% of them think that sexual health education should not be taught in Malaysia.

Comparing the knowledge as shown in Table 2, age group 22-24 years old had higher mean score of 30.94(\pm 5.63) than the age group 18-21 years old with mean score of 27.90 (\pm 5.14) and there was significant difference of means between the age group ($P < 0.05$). Undergraduates with different courses background also showed significant differences in the means. Health science background with higher mean of 33.29(\pm 3.89) and non-health science background with mean of 26.07(\pm 4.71). There was significant difference of means between the undergraduates' parents' incomes ($P < 0.05$). Undergraduate with parents' income of >RM5000 had the highest mean score 31.61(\pm 5.08), followed by parents' income of RM 3001-5000, RM 1001-3000 and <RM1000 with the mean scores of 29.65(\pm 5.40), 29.24(\pm 5.46) and 26.43(\pm 5.88) respectively. As for means for gender, there is no significant difference of means between males and females in knowledge marks ($P > 0.05$) with mean score of 30.09(\pm 5.64) for females and slightly lower mean score of 29.21(\pm 5.59) for males. Comparing the means of attitudes marks, all of the variables showed no significant differences of means ($P > 0.05$) except for their backgrounds i.e., undergraduates from science and non-health science background that showed significant difference of mean ($P < 0.05$).

DISCUSSION

Sources of Information on Sexual Health:

From this study, it is found that the internet plays a major role in providing information about sexual health (82%) whereas parents stand as one of the least popular sources among other sources of information (21%). This is consistent with nationwide study as well as study done in the east coast of Malaysia^{10, 11}. This is in contrast with another study among secondary school children where peers were the most common source of information^{12,13}. Though parents are not identified as the main source of information among youths, evidently positive parent-teen communication has been linked to less risky sexual behaviour among adolescents¹. Hence, there's a need to educate the parents as well for the establishment of a more effective, trusted and reliable source of information on sexual health for our youths.

Socio-demographics Characteristics:

Age does play a role in determining the level of knowledge whereby in this study, there is significant difference between age groups (P value <0.05). Knowledge seems to increase with age and this finding is consistent with most of the current studies^{11, 12}. It is in contrast with a study from Bangladesh where the younger generation was more knowledgeable as they may have received better education than the generations above them¹⁴. However, attitude level between the two age groups is not significantly different (P value > 0.05) though more from the older age group showed positive attitude. The discrepancy on the level of knowledge and attitude between females and males in this study is not significantly different (P value < 0.05) even though, female undergraduates were found to be more knowledgeable which is consistent with the results in other studies^{15, 16}. We also found that non health science students scored lower in knowledge and attitude. This may make them less likely to practice safe sex compared to students who take up science related courses¹⁷.

Knowledge on Sexual Health:

In general, the undergraduates in this study acquire good knowledge on sexual health in comparison to one study that showed a huge gap between the level of knowledge between university students and secondary school students¹³. For example, in this study 71.3% of the undergraduates responded correctly when asked whether a girl could get pregnant after one act of sexual intercourse whereas only 30% school students responded correctly for the same question. Across the board, there is lack of adequate basic knowledge on different types of contraceptive methods among the undergraduates as a majority of them have only heard of contraceptive pills compared to other methods. Only half of them (51.7%) in our study were aware that proper use of condom could prevent pregnancy while 84% of young adults in another study agreed that condoms are efficient in preventing pregnancy¹⁵. Statistics showed that by 2011, on the average, many Malaysian adolescents have become sexually active by the age of 14, so this warrants a need to educate Malaysians since their poor knowledge schooling years may carry risks of unwanted pregnancies or STDs at a much earlier age^{18,19}. For questions on sexually transmitted diseases, as predicted most (92%) of the respondents knew HIV/AIDS very well compared to other STDs. But in another similar study, the level knowledge on other STDs fell to unsatisfactory levels due to so much emphasis being given to HIV/AIDS in terms of creating public awareness, allowing such huge discrepancy between HIV/AIDS and other STDs¹²

Attitude on Sexual Health:

The overall attitude score was good among the respondents where many of them agreed with statements that reflect positive attitude regarding sexual health. All most all of them (95%) agreed that it was wrong to have premarital sex which was contradictory to another study done in Croatia where only 5% of young adults agreed that premarital sex is unacceptable while the other

88% disagreed to it¹⁵. This huge difference may be mainly attributable to the differences in culture. However, in regards of safe sex practice, majority of the young adults in Croatia with the percentage of 84.8% believe that condoms are efficient in preventing pregnancy while only 48.3% of the young adults in this study agreed to the statement. Nearly half of them agreed that purchasing or obtaining condoms is embarrassing, which is consistent with the finding by previous study¹⁹. Social taboos are accountable for this as an Asian country like Malaysia with diverse religious beliefs generally disapprove premarital sex which eventually causes unmarried couples to feel embarrassed to procure condoms and seek information or services on sexual health¹⁹. Majority i.e. 83.3% of the respondents agreed to continue with the pregnancy and raise the baby together following an unplanned premarital pregnancy, a small number of them (6.7%) chose to do abortion. This is a matter of concern as that small portion may portray a significant number of young adults in reality who are not taking responsibility over their risky sexual behaviour. The fact that not even half of the young adults (36.7%) in this study agree to do a holistic health check-up if they were sexually active is significantly worrisome and a minority of them (13.3%) haven't even heard of a sexual health clinic that are mainly present in major cities. Regarding the implementation of sexual health education, most of the respondents agree that a comprehensive sexual education could reduce the number of unwanted pregnancy and STDs and educate the youths on their sexual health as proven in other developed country²⁰. Hence, about 55.7% of them chose secondary school as the appropriate stage to implement sexual health education in this country.

LIMITATIONS

Nevertheless, the study has some major limitations; most of our respondents were Malays and Muslims so it was impossible to make reasonable comparison between different ethnic groups. There was also the tendency for bias due to sensitivity of this issue, so the actual finding may be masked. The interpretations made were based on a limited sample size, only from tertiary education institutions which may not be the representative of the whole population of young adults in Ipoh. Further studies with a larger sample size from the community, using more generalized variables are recommended to improve and confirm the findings of this study.

CONCLUSION

There was adequate grasp of knowledge on sexual health among undergraduate especially health sciences student and parents with higher income. Our youths were very much aware of the importance of sexual health education.

ACKNOWLEDGEMENT

We would like to thank the Dean of Faculty of Medicine for giving us the opportunity to conduct this research. We would also like to thank our Special Research Project coordinator Dr Sandheep Sugathan for helping us in solving matters regarding our approval and his untiring guidance in statistical analysis.

Table 1. Demographic of the respondents.

<i>Characteristic</i>	<i>n (%)</i>
Age	
18 – 21	124 (41.3%)
22 – 24	176 (58.7%)
Gender	
Male	140 (46.7%)
Female	160 (53.3%)
Race	
Malay	277 (92.3%)
Chinese	6 (2%)
Indians	14 (4.7%)
Bhumiputra	3 (1%)
Religion	
Islam	281 (93.7%)
Buddha	5 (1.7%)
Hindu	11 (3.7%)
Christian	2 (0.7%)
Sikh	1 (0.3%)
Course	
Health science	150 (50%)
Non health science	150 (50%)
Parents' income	
<RM 1000	46 (15.3%)
RM 1001-3000	78 (26%)
RM 3001-5000	79 (26.3%)
>RM 5000	97 (32.3%)

Table 2. Mean of the knowledge and attitude marks of the respondents.

Variables	Knowledge Marks		Attitude Marks	
	Mean (\pm SD)	P Value	Mean (\pm SD)	P Value
Age Group				
18 - 21	27.90(\pm 5.14)	0.000	15.65(\pm 1.74)	0.594
22 - 24	30.94(\pm 5.63)		15.75(\pm 1.63)	
Gender				
Male	29.21(\pm 5.59)	0.177	15.51(\pm 1.81)	0.063
Female	30.09(\pm 5.64)		15.88(\pm 1.53)	
Course				
Health Science	33.29(\pm 3.89)	0.000	16.09(\pm 1.36)	0.000
Non Health Science	26.07(\pm 4.71)		15.32(\pm 1.86)	
Parents' income				
<RM 1000	26.43(\pm 5.88)	0.000	15.80(\pm 1.75)	0.594
RM 1001-3000	29.24(\pm 5.46)		15.64(\pm 1.69)	
RM 3001-5000	29.65(\pm 5.40)		15.53(\pm 1.91)	
>RM 5000	31.61(\pm 5.08)		15.86(\pm 1.41)	

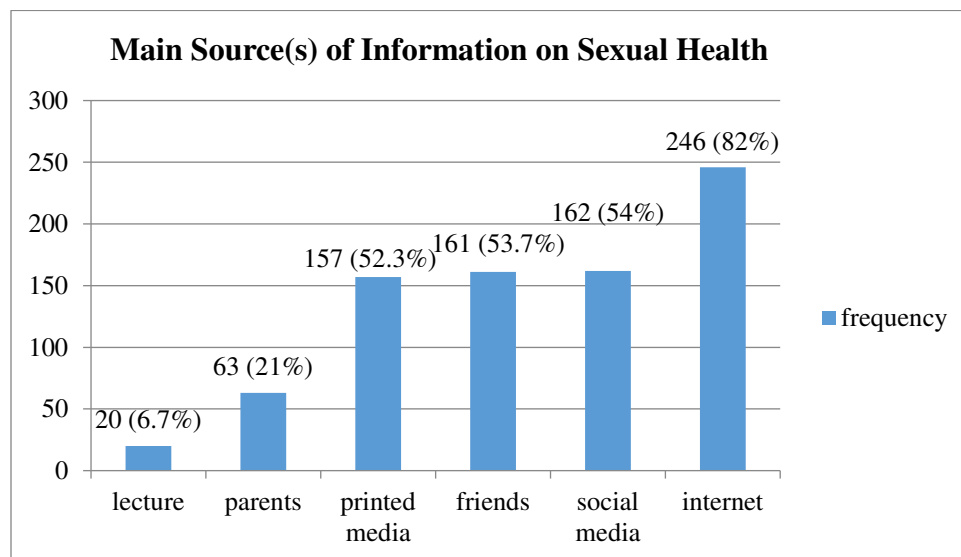


Figure 1. Main Source(s) of Information on Sexual Health

References

1. Wong L. An exploration of knowledge, attitudes and behaviours of young multiethnic Muslim-majority society in Malaysia in relation to reproductive and premarital sexual practices. *BMC Public Health*. 2012; 12:865.
2. Ng CY, Abd Rahman Z and Raman A. One abortion for every five pregnancies, says survey. *Malaysia: The Star* [online]. [Updated 26 May 2009, cited 20 December 2010.] Available from: <http://thestar.com.my/news/story.asp?file=/2009/5/26/nation/3977852&sec=nation>
3. UNICEF. UNICEF Malaysia - Challenging HIV and AIDS - AIDS in Malaysia [Internet]. [Unicef.org](http://www.unicef.org/malaysia/aids.html). 2010 [cited 10 October 2015]. Available from: <http://www.unicef.org/malaysia/aids.html>
4. McLeod S. Psychosexual Stages | Simply Psychology [Internet]. [Simplypsychology.org](http://www.simplypsychology.org/psychosexual.html) 2008 [cited 10 October 2015]. Available from: <http://www.simplypsychology.org/psychosexual.html>
5. World Health Organization (WHO). *Defining sexual health: report of a technical consultation on sexual health*. Geneva: WHO Press; 2006.
6. Athar S. *Sex Education, Teenage Pregnancy, Sex in Islam and Marriage*. Chicago: Kazi Publications; 1996.
7. Makol-Abdul P, Nurullah A, Imam S, Abd Rahman S. Parents' Attitudes towards Inclusions of Sexuality Education in Malaysian Schools. *International Journal about Parents in Education*. 2009;3(1):42-56.
8. Jahanfar S, Sann Lye M, Rampal L. Sexual Behaviour, Knowledge and Attitude of Non-Medical University Students Towards HIV/AIDS in Malaysia. *Shiraz E-Medical Journal*. 2010;11(3):126-129. Available from <http://semj.sums.ac.ir/vol11/jul2010/88034.htm>
9. Cleland J, Ingham R, Stone N. *Asking Young People about Sexual and Reproductive Behaviours*. 1st ed. Special Programme of Research, Development and Research Training in Human Reproduction; 2001.
10. Ab Rahman A, Ab Rahman R, Ibrahim M, Salleh H, Ismail S, Ali S et al. Knowledge of Sexual and Reproductive Health Among Adolescents Attending School in Kelantan, Malaysia. *Southeast Asian J Trop Med Public Health*. 2011;42(3):717-725.
11. Wong L, Leng Chin C, Low W, Jaafar N. HIV/AIDS-Related Knowledge among Malaysian Young Adults: Findings from a Nationwide Survey. *Journal of The International AIDS Society*. 2008; 10:148.
12. Anwar et al. Awareness of school students on sexually transmitted infections (STIs) and their sexual behavior: a cross-sectional study conducted in Pulau Pinang, Malaysia. *BMC Public Health*. 2010; 10:47.
13. Kamarudin K: A study of premarital sexual activity among secondary school students in Kota Bharu, Kelantan. Dissertation for Master of Medicine (Family Medicine) Universiti Sains Malaysia 2003.
14. Hossain M, Mani K, Mohd Sidik S, Kadir Shahar H, Islam R. Knowledge and awareness about STDs among women in Bangladesh. *BMC Public Health*. 2014; 14:775.
15. Stulhofer A, Graham C, Bozicevic I, Kufrin K, Ajdukovic D. HIV/AIDS-Related Knowledge, Attitudes and Sexual Behaviours as Predictors of Condom Use Among Young Adults in Croatia. *International Family Planning Perspectives*. 2007;33(2):58-65.

16. Mohammadi M, Rampal L, Abdullah M, Ab Rahman H. Knowledge, Attitude and Sexual Behaviours Related to HIV/AIDS Prevention Amongst Malaysian Adolescents 2009. Presentation presented at; 2011; Universiti Putra Malaysia (UPM).
17. Liew H, Noor Illiati I, Siti Nadzrah Y, Raymond Yii S, Moy F. Health Risk Behaviours among Undergraduates in a Malaysian Public University: A Cross Sectional Study. JUMMEC. 2011;14(2):1-8.
18. Ahmadian M, Hamsan H, Abdullah H, Abu Samah A, Md Noor A. Risky Sexual Behavior among Rural Female Adolescents in Malaysia: A Limited Role of Protective Factors. Global Journal of Health Science. 2014;6(3):165-174.
19. Wong L, Atefi N, Abd Majid H, Su T. Prevalence of Pregnancy Experiences and Contraceptive Knowledge among Single Young Adults in a Low Socio-economic suburban community in Kuala Lumpur, Malaysia. BMC Public Health. 2014; 14(Suppl 3):S1.
20. Knowles J. Sex Education in the United States. 1st ed. New York: Katharine Dexter McCormick Library; 2012.

BRIEF REPORT

ADDITIVE MANUFACTURING IN MEDICINE.

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Introduction

In Additive Manufacturing 3-D model data is used to make objects, by layer upon layer, using a machine. This is opposite of subtractive manufacturing methodology. It is also known as “rapid prototyping” and “3D printing”. This is akin to printing on a paper the same material over and over again several times till that printed matter builds up into a 3-D image. Actually in 3-D printing process a whole object is converted into thousands of tiny little slices by a computer and then it is built from the bottom-up, slice by slice.

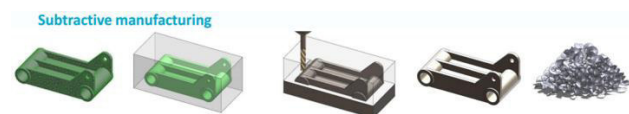
History of Additive Manufacturing^{1,2}

The first Stereo lithography was first invented by Charles Hull in 1984. The first commercial 3D printing system was launched by 3D Systems in 1987.

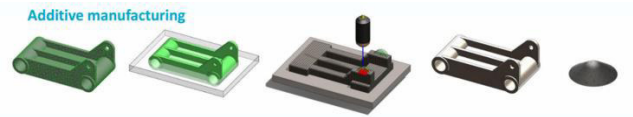


Starting from the 21st century different human body parts have been fabricated by different institutions worldwide, viz. miniature kidney, blood vessel, skin and heart. Non-living objects like prosthetic leg and artificial joint parts have also been manufactured.

Additive Vs Subtractive manufacturing



In subtractive manufacturing, the part is machined out from a block of raw material. The excess material is removed, until the desired shape is formed. The subtractive process creates waste material. The complexity of the part is limited.



In additive manufacturing, the part is created by depositing the material in the desired locations in a layer-by-layer manner. Able to create complex geometries. Minimized wastage of materials.

Categories of AM systems

There are 7 categories of AM systems:

- Vat Polymerization
- Powder Bed Fusion
- Material Extrusion
- Material jetting
- Binder Jetting
- Sheet Lamination
- Direct Energy Deposition

Vat polymerization^{3,4}

Method:

UV source scans and traces out the cross-section of the object on the liquid resin.

The resin cures and solidifies on UV exposure.

The build platform moves down by one-layer thickness.

Re-coater spreads an even layer of resin over the object.

The tracing and curing process is repeated.

Powder-Bed Fusion^{5,6}

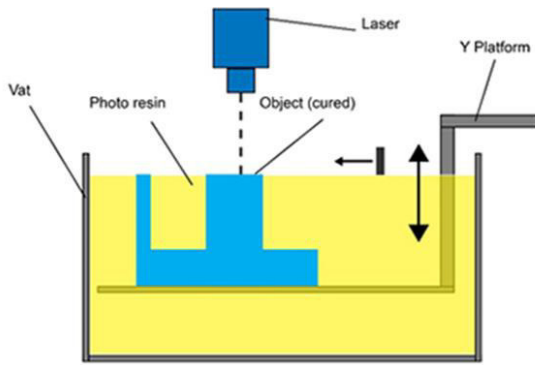
Principle: Energy source such as a CO2 laser or electron beam is used to fuse powder particles together.

Building Material used:

Polymer

Ceramic

Metal powders



Powder-Bed Fusion^{5, 6}

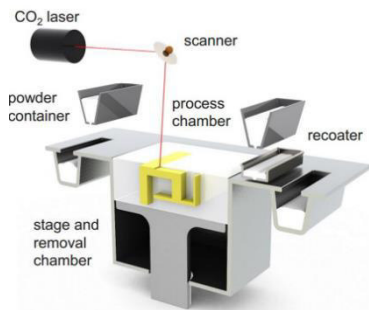
Principle: Energy source such as a CO₂ laser or electron beam is used to fuse powder particles together.

Building Material used:

Polymer

Ceramic

Metal powders



Method:

Laser beam scans and traces out the cross-section of the object on the pre-heated powder bed. Energy of the laser bonds (sinters) or melts the powder particles causing them to fuse together.

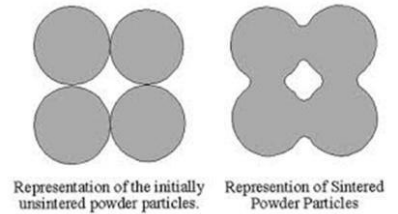
The build platform moves down by one-layer thickness.

A thin layer of powder gets spread over and the process repeats.

Happens in an inert environment such as nitrogen.

Fusing occurs below melting temperature.

Printed parts are porous in nature due to gaps in-between particles.



Applications

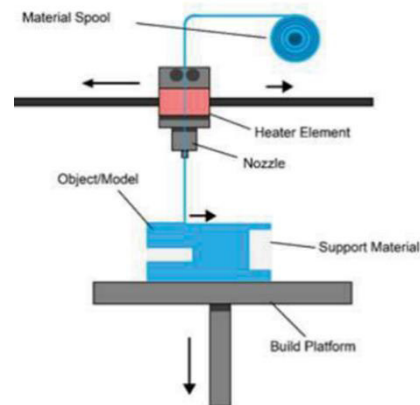
Used in the medical field such as orthopaedic implants & scaffolds

Functional prototypes

Material Extrusion^{7, 8}

Principle:

In this the required material is expressed from a nozzle and is subjected to heat. This will make the material pliable and it is deposited layer upon layer on a platform. As each layer is deposited the machine moves in a horizontal direction, whereas the platform moves in a vertical direction.



Method:

First layer is built as nozzle deposits material where required.

The following layers are added on top of previous layers.

Layers are fused together upon deposition as the material is in a melted state.

Materials:

The Material Extrusion process uses polymers and plastics.

E.g.: ABS (Acrylonitrile butadiene styrene), Nylon, PEI (Polyetherimide), and PEEK (Polyether ether ketone)

PEEK is finding increased use in spinal fusion devices and reinforcing rods. It is also used with a high-resolution MRI for creating a partial skull replacement in neurosurgical applications.

Material Jetting⁹

Principle:

In this method droplets of material used is sent as a jet form using heat or piezo-electric energy, on a platform. This is then solidified using UV light. The first layer thus built is followed by several other layers deposited over and over again in a horizontal manner on the platform.

Method:

The print head is positioned above build platform. Droplets of material are deposited from the print head onto surface where required, using either thermal or piezoelectric method. Droplets of material solidify and make up the first layer. Further layers are built up as before on top of the previous. Post processing includes removal of support material.

Medical Applications of Additive Manufacturing^{10, 11, 12, 13}

- Planning and simulation of complex surgery
- Customized Implants and Prosthesis
- Tissue & Organ Engineering

Planning and simulation of Complex surgery

The process involves converting CT, MRI or Ultrasound scan data into a 3D model

The 3D model is then printed into a physical model which can be studied

AM enables surgeons to practice surgery on a precise model and master the essential details before the actual operation

Hands on experience help improve success rates of surgery

Surgeons able to visually inspect the exact location and/or profile of the defect, which might not be clear on traditional scanning methods.

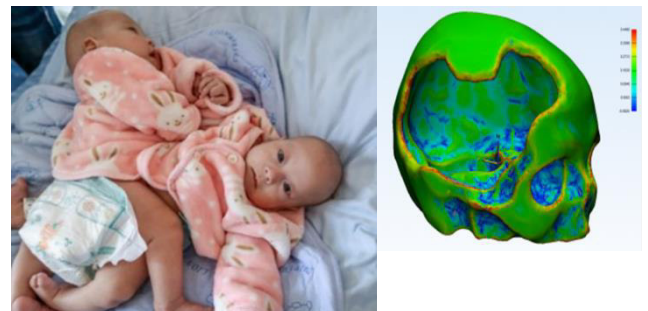
Case Study 1:

Surgeons at the Fudan University in Shanghai used CT and MRI data to reconstruct a 3D model of conjoined twins who were born fused at the abdomen & pelvis.

The surgeons determined that they would start with separating the liver and the pelvic bone, followed by a new team of surgeons to work on the babies' intestines and bladder.

The surgery lasted 12 hours. The twins were successfully separated

Fudan University has used 3D printing in the separation of 9 pairs of conjoined twins.



Case study 2:

Two teenagers in Kochi India, suffered from congenital heart disease. Due to the teens' unique

structural defects a surgery posed a risk on the lives of the patients.

A paediatric cardiologist and a radiologist gave full heart evaluations and built physical 3D printed models using the scanned data. Surgical procedures were planned based on the models and surgery was carried out successfully.

Case study 3:

A patient had extensive defect in the skull due to a traumatic injury.

A CT scan of the patient's head was taken and a digital 3D model built from it. The shape and size of the required implant was digitally created using this scanned 3D model which allowed for a good fit.

The mould was 3D printed and used to cast the final implant out of a biocompatible polymer, which was then successfully implanted in the patient.



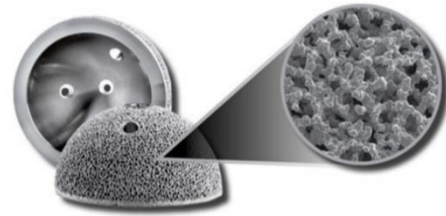
Case study 4:

A 15 year old girl was suffering from severe skeletal deformity of the left hip. Skane University Hospital in Lund, Sweden teamed up with Materialise to design a custom acetabular implant.

CT scans were used to reconstruct a digital 3D model which was used as a template to design the implant.

The designed implant was 3D printed in titanium.

A porous surface was designed to maximize bone regrowth.



Implants and prosthesis:

Traditional implants and prosthesis were based on available anthropometric data and standard sizing.

Standard sizing doesn't provide a good fit to many patients due to the uniqueness of the defects.

Creating customized implants were expensive and time consuming.

With AM, customized implants and prosthesis were able to be manufactured and at a much lower cost and time.

Scan data is used to create a digital 3D model which can be printed in 3D.

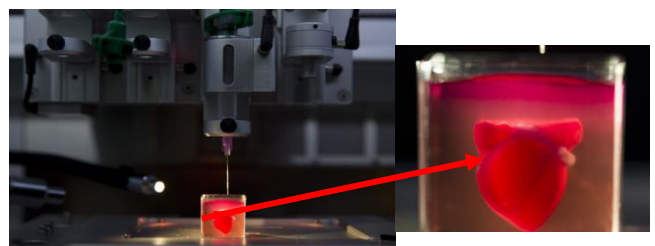
No extra cost of customization and complexity. Better bio-compatibility.

3D printed heart¹⁴:

On 15th April, 2019, Israeli scientists demonstrated a 3D printed heart from human cells.

The heart was the size of a rabbit's heart.

They further stated that may be in 10 years organ printing may become a reality across the world.



3-D printed skin:

In May, 2019, IIT Delhi bio-printed human skin. This has great potential in treating burns & other major wounds.

3-D printed lung:

In May, 2019, scientists in George R. Brown School of Engineering bio-printed lung with blood vessels. This has opened a tremendous pathway for organ bio-printing and can reduce the need for organ donors.

Limitations for Bioprinting

Vascularisation of organs:

The limitation for AM, viz. vasculature of printed organs, can be overcome by including

pre-fabricated printed vessels into the 3D printed organ.

This permits faster integration of the transplant into the host circulatory system.

Cell sources:

Adult stem cells or induced pluripotent stem cells may be required. Has its own health risks.

Conclusion

Additive manufacturing has tremendous potential in the future in the field of medicine, especially in organ transplants.

References

1. Prince JD. 3D printing: an industrial revolution. *Journal of electronic resources in medical libraries*. 2014 Jan 1;11(1):39-45.
2. Goldberg D. History of 3D Printing: It's Older Than You Are (That Is, If You're Under 30). Autodesk, [Online]. Available: <https://redshift.autodesk.com/history-of-3d-printing/>. [Accessed 30 10 2019]. 2014.
3. Adam GA, Zimmer D. Design for Additive Manufacturing—Element transitions and aggregated structures. *CIRP Journal of Manufacturing Science and Technology*. 2014 Jan 1;7(1):20-8.
4. Thompson MK, Moroni G, Vaneker T, Fadel G, Campbell RI, Gibson I, Bernard A, Schulz J, Graf P, Ahuja B, Martina F. Design for Additive Manufacturing: Trends, opportunities, considerations, and constraints. *CIRP annals*. 2016 Jan 1;65(2):737-60.
5. Gusarov AV, Laoui T, Froyen L, Titov VI, Tolochko NK. Numerical simulation of laser solid state sintering of loose titanium powder. In *Proc. EURO RP 2001, 10th European Conference on Rapid Prototyping and Manufacturing 2001* (pp. 1-5).
6. Kruth JP, Peeters P, Smolderen T, Bonse J, Laoui T, Froyen L. Comparison between CO2 and Nd:YAG lasers for use with Selective Laser Sintering of steel-copper powders, *Revue Internationale de CFAO et d'informatique graphique*, 1999;13(4):95-112.
7. Evans MA, Ian Campbell R. A comparative evaluation of industrial design models produced using rapid prototyping and workshop-based fabrication techniques. *Rapid Prototyping Journal*. 2003 Dec 1;9(5):344-51.
8. Sambu S, Chen Y, Rosen DW. Geometric tailoring: a design for manufacturing method for rapid prototyping and rapid tooling. In *ASME 2002 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference 2002* Jan 1 (pp. 149-161). American Society of Mechanical Engineers.
9. Sachs E, Cima M, Cornie J. Three-dimensional printing: rapid tooling and prototypes directly from a CAD model. *CIRP annals*. 1990 Jan 1;39(1):201-4.
10. Bibb R, Eggbeer D, Evans P, Bocca A, Sugar A. Rapid manufacture of custom-fitting surgical guides. *Rapid Prototyping Journal*. 2009 Sep 25;15(5):346-54.
11. Kontio R, Björkstrand R, Salmi M, Paloheimo M, Paloheimo KS, Tuomi J, Mäkitie A. Designing and additive manufacturing a prototype for a novel instrument for mandible fracture reduction. *Surgery S*. 2012 Jan;1:2161-1076.
12. Poukens J, Laeven P, Beerens M, Nijenhuis G, Sloten JV, Stoelinga P, Kessler P. A classification of cranial implants based on the degree of difficulty in computer design and manufacture. *The International Journal of Medical Robotics and Computer Assisted Surgery*. 2008 Mar;4(1):46-50.
13. Salmi M, Tuomi J, Paloheimo KS, Björkstrand R, Paloheimo M, Salo J, Kontio R, Mesimäki K, Mäkitie AA. Patient-specific reconstruction with 3D modeling and DMLS additive manufacturing. *Rapid Prototyping Journal*. 2012 Apr 20;18(3):209-14.
14. College of Engineering, Carnegie Mellon University. "3D printing the human heart." *Science Daily*. Science Daily, 1 August 2019.

SHORT COMMUNICATION

COMMON MANIFESTATIONS OF SYSTEMIC LUPUS ERYTHEMATOSUS IN TERTIARY RHEUMATOLOGY CENTRE, PERAK.

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Abstract

Objective. A hospital-based cross-sectional descriptive study documenting the common clinical manifestations of systemic lupus erythematosus (SLE) in a tertiary rheumatology center in the state of Perak in Malaysia. **Method.** The 1997 American College of Rheumatology classification revised criteria and the 2012 Systemic Lupus International Collaborating Clinic criteria were used and all patients attending the rheumatology clinic at a tertiary referral centre were included. The demographics and other clinical information were retrieved from patients' outpatient clinical records. **Results.** One-hundred SLE patients were included in this cross-sectional study, the majority of whom were of the Malay ethnic group (47%) followed by Chinese (41%) and Indians (12%). Almost 91% of the patients in our study were females. Mean age was 34.94 years (SD = 12.7; 95% confidence interval, 32.42 – 37.46), almost 79% were in the 20-50 years age group. Anti-nuclear antibody (ANA) was positive in 70% of patients while only 28% were positive for anti-double-stranded deoxyribonucleic antibody (dsDNA). Major clinical manifestations were hematological disorders (53%) followed by a malar rash (41%), photosensitivity (30%) and oral ulcers (27%). **Conclusion.** Clinical phenotypes, demographics of SLE patients in this study shows no significant difference across age, gender, and ethnic groups. The current data, though limited, shows a high frequency of hematological and mucocutaneous manifestation in these patients.

Keywords: Systemic Lupus Erythematosus, signs symptoms, immunologic biomarkers.

Introduction

Systemic lupus erythematosus (SLE) is a complex multisystem autoimmune disease with a spectrum of clinical manifestations ranging from mild to life-threatening conditions with a higher prevalence in females. The incidence and prevalence of SLE vary in different countries based on various epidemiological studies.^{1,2,3} The complex immune-pathogenesis of SLE is yet to be fully elucidated, genetic and epigenetic factors, environmental such as ultraviolet light, and microbes, immunoregulatory and hormonal factors have been found to play an important role.^{4,5,6} The diagnostic conundrum of SLE varies widely due to heterogeneity in the standard of care by health care professionals, influenced by socio-economic factors, ethnicity, and beliefs as well as individual variations.

The prognosis for patients with lupus today is much better with the advancement of new medical modalities and diagnostic tools strengthened by the increased awareness of health care professionals and the public of this incurable condition. The diverse ethnicity and beliefs in Malaysia make it very unique and may provide an excellent resource in studying SLE.

Materials and Methods

This was a cross-sectional descriptive study of the presentation of patients with SLE in the rheumatology outpatient clinic of Hospital Raja Permaisuri Bainun, Ipoh conducted in 2016. The details of demographic, clinical and laboratory data were retrieved from the patient's clinical notes.

All patients diagnosed with SLE attending rheumatology clinic who fulfilled The American College Rheumatology (ACR) classification criteria for SLE and the 2012 Systemic Lupus International Collaborating Clinic (SLICC) criteria were included.^{7,8} Patients who had been diagnosed and treated as SLE in nephrology, hematology or dermatology clinics and never been referred to rheumatologist were not selected.

Suspected secondary SLE such as overlap syndrome or drug-induced lupus were also excluded.

Statistical Analysis

Descriptive analysis using SPSS version 23 was performed followed by cross-tabulation using Chi-square test. Level of significance was fixed at 0.05.

Ethical Consideration

The approval for this study was obtained from the institutional research ethics committee and central medical research ethics committee. All data and personal information about the patients to be kept private and confidential.

Results

A total of one hundred patients were identified in the study of whom 47% were Malay, 41% Chinese and 12% Indian. Female to male ratio was 9:1, a clear female predominance. Mean age was 34.94 years (SD = 12.7; 95% CI, 32.42 – 37.46). The majority of the patients were in the 20 to 50 years old age group (79%). Immunological markers, ANA and anti-dsDNA were positive in 70% and 28% of patients respectively (Table 1).

The common clinical manifestation were hematological abnormalities of which anemia (24%) was the commonest feature while 7% presented with pancytopenia. Cutaneous manifestations were the next common presentation of SLE namely malar rash (41%) followed by a photosensitive rash (30%), mucosal ulcer (27%) and discoid rash (7%) (Table 2). Other manifestations encountered were arthritis, serositis (pleurisy and pericarditis), a neurological disorder (psychosis and seizure) and nephritis.

There were no significant differences in the clinical manifestations across all 3 ethnic groups although Malay and Chinese showed a propensity towards ANA and anti-dsDNA positivity as well as hematological presentation. This was seen in both males and females. However, discoid rash and hematological manifestations showed a significant association across both genders ($p < 0.05$).

There was a significant association between age group with photosensitivity rash, and neurological manifestation ($P < 0.05$). Hematological disorders were common in the 20 to 50 year age group and malar rash among patient below 30 years. ANA was positive in 70% of patients in almost all range of ages ($P < 0.05$) and 28% of them had a positive anti-dsDNA.

Discussion

SLE is an autoimmune disease present globally affecting both genders, all ethnic groups and age groups. There is a female preponderance. Whether the diverse socio-demographic and geographical distribution in Malaysia has any impact on the incidence and prevalence of SLE has yet to be studied.

SLE is more frequent in females with a female: male ratio varying from 8-15:1 which is comparable to our study population.^{9,10} The clinical phenotype does differ between both genders, with arthritis or arthralgia is less frequent in males as depicted in the literature.^{11,12}

Hematological manifestations are common in our female SLE patients consistent with a previous study, the majority of whom presented with anemia and very much less with multiple cell line involvement.¹³

In this study, Malays had a higher prevalence of SLE compared to Chinese, contrary to another study done in a different region of Malaysia.¹⁴ Heterogeneity in clinical phenotypes in SLE has been shown to be influenced by genetic predisposition spread over the different geographical region.¹⁵ Asian patients present with a less frequent general manifestation of SLE compared to African descendants.¹⁶ There was no significant difference in clinical manifestations across all 3 ethnic groups in our study.

SLE can develop at any age. The mean age in this study is comparable with a large cohort in a well-established epidemiological study which showed a high incidence of adult SLE in the age group 24 to 32 years.¹⁷ Late-onset SLE (age 50 years and above) and non-specific manifestations were less frequent in our study.

Conclusion

The prevalence and broad spectrum of clinical manifestations of SLE in our study population are greatly influenced by various factors. More rigorous multicenter epidemiologic studies conducted in future may minimize the disparities in the prevalence and incidence of SLE in Malaysia.

Table 1. Sociodemographic baseline characteristics

	n (%)
Ethnic	
Malay	47 (47)
Chinese	41 (41)
Indian	12 (12)
Others	0 (0)
Gender	9 (9)
Male	91 (91)
Female	
Mean age \pm SD	34.9 \pm 12.7
Immunological markers:	
*ANA positive	70 (70)
^{β} Anti-dsDNA positive	28 (28)

*ANA= anti-nuclear antibody; ^{β} dsDNA = double stranded deoxyribonucleic antibody.

Table 2. Clinical manifestations, immunological and serological positivity according gender, ethnicity and age groups.

Clinical, Immunological and serological	Gender, n (% of positivity in the category)		p	Ethnicity, n (% of positivity in the category)			p	Age Groups (Years), n (% of positivity in the category)						p
	Male	Female		Malay	Chinese	Indian		<20	20–29	30–39	40–49	50–59	≥ 60	
	Malar rash	1 (11.1)	40 (44.0)	ns	17 (36.2)	19 (46.3)	5 (41.7)	ns	6 (66.7)	13 (40.6)	11(45.8)	8 (34.8)	3 (30.0)	0 (0)
Discoid rash	3 (33.3)	4 (4.4)	0.015	4 (8.5)	3 (7.3)	0	ns	0	1 (3.1)	2 (8.3)	2 (8.7)	1 (10)	1 (50)	ns
Photosensitive	3 (33.3)	27 (29.7)	ns	13 (27.7)	12 (29.3)	5 (41.7)	ns	6 (66.7)	9 (28.1)	5 (20.8)	9 (39.1)	0	1 (50)	0.025
Oral ulcer	1 (11.1)	26 (28.6)	ns	14 (29.8)	10 (24.4)	3 (25.0)	ns	2 (22.2)	9 (28.1)	7 (29.2)	7 (30.4)	1 (10)	1 (50)	ns
Serositis	2 (22.2)	7 (7.7)	ns	7 (14.9)	2 (4.9)	0	ns	1 (11.1)	3(9.4)	3 (12.5)	0 (0)	2 (20.0)	0 (0)	ns
Arthritis	0	9 (9.9)	ns	4 (8.5)	3 (7.3)	2 (16.7)	ns	2 (22.2)	0 (0)	1 (4.2)	4 (17.4)	2 (20.0)	0 (0)	ns
Renal	0	11 (12.1)	ns	7 (14.9)	3 (7.3)	1 (8.3)	ns	2 (22.2)	5 (15.6)	2 (8.3)	1 (4.3)	1 (10.0)	0 (0)	ns
Neurological	0	9 (9.9)	ns	7 (14.9)	2 (4.9)	0	ns	0 (0)	3(9.4)	1 (4.2)	2 (8.7)	3 (30.0)	0 (0)	0.046
Hematological	1 (11.1)	52 (57.1)	0.012	23 (48.9)	25 (61.0)	5 (41.7)	ns	5 (55.6)	15 (46.9)	14 (58.3)	10 (43.5)	8 (80.0)	1 (50.0)	ns
ANA*	5 (55.6)	65 (71.4)	ns	31 (66%)	30 (73.2)	9 (75)	ns	8 (88.9)	23 (71.9)	21 (87.5)	11 (47.8)	5 (50.0)	2 (100)	0.017
Anti dsDNA**	2 (22.2)	26 (28.6)	ns	12 (25.5%)	15 (36.6%)	1 (8.3%)	ns	4 (44.4)	7 (21.9)	6 (25.0)	8 (34.8)	2 (20.0)	1 (50.0)	ns

Table 3. Clinical manifestations based on ACR* Classification criteria 1982. N=100.

Criteria	n (%)
Malar rash	41 (41)
Discoid rash	7 (7)
Photosensitivity	30 (30)
Oral ulcer	27 (27)
Arthritis	9 (9)
Serositis	
a) Pleuritis	9 (9)
b) Pericarditis	0 (0)
Renal disorder	
a) Proteinuria	3 (3)
b) Cellular casts	0 (0)
c) Proteinuria and cellular casts	8 (8)
Neurologic disorder	
a) Seizure	5 (5)
b) Psychosis	4 (4)
Hematologic disorder	
a) Anemia	24 (24)
b) Leukopenia	9 (9)
c) Thrombocytopenia	0 (0)
d) Bicytopenia	7 (7)
e) Pancytopenia	7 (7)

*ACR= American College of Rheumatology

References

1. Pons-Estel GJ, Ugarte-Gil MF, Alarcón GS. Epidemiology of systemic lupus erythematosus. Expert review of clinical immunology. 2017 Aug 3;13(8):799-814.
2. Feldman CH, Hiraki LT, Liu J, Fischer MA, Solomon DH, Alarcón GS, Winkelmayr WC, Costenbader KH. Epidemiology and sociodemographics of systemic lupus erythematosus and lupus nephritis among US adults with Medicaid coverage, 2000–2004. Arthritis & Rheumatism. 2013 Mar;65(3):753-63.
3. Rees F, Doherty M, Grainge M, Lanyon P, Zhang W. The worldwide incidence and prevalence of systemic lupus erythematosus: a systematic review of epidemiological studies. Rheumatology. 2017;56(11):1945-1961.
4. Rahman A, Isenberg DA. Systemic lupus erythematosus. N Engl J Med. 2008 Feb 28. 358(9):929-39.
5. D'Cruz DP, Khamashta MA, Hughes GR. Systemic lupus erythematosus. Lancet. 2007 Feb 17. 369(9561):587-96.
6. What causes lupus? [Internet]. Lupus Foundation of America. 2019 [cited 6 May 2019]. Available from: <https://www.lupus.org/resources/what-causes-lupus>
7. Hochberg M. Updating the American college of rheumatology revised criteria for the classification of systemic lupus erythematosus. Arthritis & Rheumatism. 1997;40(9):1725-1725.
8. Petri M, Orbai AM, Alarcón GS, et al. Derivation and validation of the Systemic Lupus International Collaborating Clinics classification criteria for systemic lupus erythematosus. Arthritis Rheum 2012;64:2677–86.
9. Murphy G, Isenberg D. Effect of gender on clinical presentation in systemic lupus erythematosus. Rheumatology. 2013 May 2;52(12):2108-15.
10. Paul BJ, Fassaludeen M, Nandakumar RM. Clinical profile of systemic lupus erythematosus in Northern Kerala. J Indian Rheumatol Assoc. 2003;11:94-7.
11. Tan T, Fang H, Magder L, Petri M. Differences between Male and Female Systemic Lupus Erythematosus in a Multiethnic Population. The Journal of Rheumatology. 2012;39(4):759-769.
12. Garcia M, Marcos J, Marcos A, Pons-Estel B, Wojdyla D, Arturi A et al. Male systemic lupus erythematosus in a Latin-American inception cohort of 1214 patients. Lupus. 2005;14(12):938-946.
13. Zhao XY, Zhang P, Huang LS, Zhang XH. The clinical significance of hematological damage in systemic lupus erythematosus and related antibodies. Zhonghua nei ke za zhi. 2006 May;45(5):369-71.
14. Frank A. Apparent predisposition to systemic lupus erythematosus in Chinese patients in West Malaysia. Annals of the Rheumatic Diseases. 1980;39(3):266-269.
15. Alarcon G. Systemic lupus erythematosus in a multiethnic cohort: LUMINA XXXV. Predictive factors of high disease activity over time. Annals of the Rheumatic Diseases. 2006;65(9):1168-1174.
16. Peschken C, Katz S, Silverman E, Pope J, Fortin P, Pineau C et al. The 1000 Canadian Faces of Lupus: Determinants of Disease Outcome in a Large Multiethnic Cohort. The Journal of Rheumatology. 2009;36(6):1200-1208.
17. Borchers A, Naguwa S, Shoenfeld Y, Gershwin M. The geoepidemiology of systemic lupus erythematosus. Autoimmunity Reviews. 2010;9(5):A277-A287.

SHORT COMMUNICATION

CAN RAPID TROPONIN T BE USED AS A SINGLE RELIABLE TEST IN THE DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION?

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Abstract

Introduction: Myocardial infarction (MI), a common cause of mortality and morbidity, needs early and reliable diagnosis. We determined the validity of rapid troponin T (rTropT) in the diagnosis of MI in our local population to know if it can be used as a single diagnostic test.

Method: This was a case control study conducted in patients admitted to ICU/CCU/medical ward in a teaching hospital towards north of Pakistan over a period of six months. Fifty patients were included in study group and 50 in control group, depending on the presence or absence of MI respectively. Patients in control group were age and sex matched. WHO criteria was used for the diagnosis of acute MI. Rapid TropT was performed in study group after establishing the diagnosis of MI and in control group after excluding the diagnosis of acute MI. CK, SGOT, LDH and rTropT were done by Humazyn M test kit Germany, Granutest Merck Germany, monokinetic method and Boehringer Mannheim Germany respectively.

Results: In the study group, 34 (68%) patients were male. Age range was 55-65 years. Overall sensitivity, specificity, positive predictive value and negative predictive value of Rapid troponin T were 92% (CI 80.8-97.8), 100% (CI 92.89-100.0), 100% and 92.6% (CI 83.0-96.9) respectively.

Conclusion. Rapid trop T was a reliable marker for the diagnosis of MI in our patients over a prolonged window period of 7 days after MI. So it can be used as a single diagnostic test in our local population avoiding the need to do many other tests.

Key words: Myocardial infarction, Sensitivity and specificity, Troponin T

Introduction

Early diagnosis of MI may reduce the subsequent complications like cardiac remodeling and failure.¹ In spite of World Health Organization (WHO) criteria for early diagnosis of MI, its diagnosis may be difficult.² It may be painless especially in diabetics.³ Release of cardiac enzymes may be delayed, and they may be raised in patients without MI. This led to the search for new biochemical markers for the Diagnosis of MI. Cardiac troponin T (c trop-T) and troponin I were two such markers, which are components of troponin-tropomyosin complex.⁴

After MI, troponin T is released in two peaks. Early peak on day one is due to release of cytosolic form and a second peak after 3-4 days is due to breakdown of structural part of trop T. The later persists in the blood for longer duration prolonging the window period for detection of MI.^{5,6} In April 2000, the Joint European Society of Cardiology/ American College of Cardiology Committee (ESC/ACC) proposed that cardiac troponins may be used as the most sensitive and specific markers of acute MI and they redefined the criteria for its diagnosis.^{2,7}

Troponins are most sensitive and specific markers of myocardial injury and provide important information about prognosis, risk stratification and therapeutic planning of patients with acute coronary syndromes.^{8,9} In 1990, katus HA et al developed a quantitative enzyme immunoassay for cardiac troponin T, now available as a commercial kit by the name of 'enzymun test system' Boehringer-Mannheim.¹⁰

According to Mair J et al, sensitivity of cTrop-T for acute MI was 100% at 10 to 120 hours after onset of symptoms and 86% on seventh day while specificity was 96%.¹¹ In normal people there was a rise in creatine kinase and myoglobin after exercise but cTrop-T remained normal.¹² In a study by Uji Y et al, a rise of 7 to 10 fold in cTrop-T was observed with acute MI within 6 hours after chest pain. Levels remained elevated for 14 to 20 days. Sensitivity and specificity in acute MI was 100% and 92% respectively.¹³

Most of the people in our local population are poor and cannot do multiple tests because of their high cost. If there is a test with high sensitivity and specificity in the diagnosis of acute MI, it can be used as a single, sole investigation for this purpose decreasing the cost and financial burden on the patient. Hence, we tried to get the answer by determining the validity of rTrop t in the diagnosis of MI in our local patients within 8 hours to 7 days after onset of chest pain.

Materials and Methods

This was a case control study conducted at District Headquarter Teaching Hospital Abbottabad, Pakistan. Both male and female patients were selected from coronary care unit/intensive care unit (CCU/ICU) and medical ward. Informed consent was taken from the participants. We made two groups of participants, study group and control group. Study group contained fifty patients with confirmed diagnosis of MI. Control group also contained 50 age and sex matched patients from medical ward. They were not suffering from ischaemic heart disease (IHD).

In study group, diagnosis of MI was established according to WHO criteria (history, ECG changes and cardiac enzymes CK, SGOT and LDH).² After the diagnosis of acute MI, rapid Trop-T was done. Time after MI to perform rapid Top-T was noted and it ranged between 8 hours to 7 days. In control group rapid Trop-t was done after excluding MI as per WHO criteria.

Rapid Troponin-T was done using a kit from Boehringer Mannheim Germany based on the principle of Troponin T rapid immunoassay. Humazyn M test kit, Germany and Granutest, Merck, Germany were used for the estimation of creatine kinase and SGOT respectively. Monokinetic method was used for the estimation of LDH. The collected data was analyzed by calculating various proportions using simple mathematics. Sensitivity, specificity, positive predictive value and negative predictive value

were calculated using free statistical calculator, Medcalc easy, taking into account standard formulae.¹⁴

Results

In the study group, there were 50 patients with MI. Majority of them were males (n=34) and age range was 55-65 years. Among these, 40 had Q wave MI, six had non-Q wave MI while the four patients had left bundle branch block on ECG. Details of Trop-T results in them are shown in table 1.

Group B i.e. control group also contained 50 patients who were age and sex matched with study group. In study group, Trop-T was positive in 46 (92%) and negative in 4 (8%) patients. In control group, Trop-T was negative in all the 50 subjects. (Table 1)

Overall sensitivity, specificity, positive predictive value and negative predictive value for rapid trop T are shown in Table 2.

Sensitivity, specificity and other indices of rTrop-T, determined at different time intervals after the onset of ischaemic symptoms, are shown in Table 3. In 13 patients with acute MI, rapid Trop-T was done during 8-48 hours after chest pain and it was positive in 12 of them and negative in only one. In corresponding control group all thirteen were negative for trop-T. Therefore, the sensitivity in this group was 92.3% and specificity 100%. Similar parameters were calculated for time intervals 49-96 hours and 97-168 hours after chest pain and results are shown in Table 3.

Discussion

Early and accurate diagnosis of MI is important. High sensitivity and specificity of rTrop T in our study indicated that it could be used as reliable marker for the diagnosis of acute MI in our patients. Moreover, it remained sensitive and

specific over a prolonged period after MI, which is useful in those who present late after the event. High sensitivity of rTropT in our study, over an extended period of time (8 hours to one week) was also observed in other studies worldwide. Ebell MH et al, in a systematic review, concluded that sensitivity of Trop T increased from 10 to 45% within first hour to more than 95% at 8 or >8 hours after the onset of chest pain.¹⁵ These results showed that sensitivity of Trop T might be low in first few hours (less than 8 hours) after acute MI. Hence, we may need more sensitive biomarkers during this time interval so that the critical diagnosis of MI is not missed. In a study by Haltern G et al, sensitivity of Troponin-T was 42% in first four hours. Measurement of human heart-type fatty acid binding protein (H-FABP) with TropT in first 4 hours, improved the sensitivity and negative predictive value for acute MI.¹⁶ In another study, sensitivity of cardiac Trop T was lower (38%) than H-FABP (95%) within first 6 hours. However, it was higher than H-FABP between 6-24 hours (100% versus 91%) and at 24 hours (91% versus 27.3%).¹⁷ A study by Nagahara D et al showed higher specificity but lesser sensitivity of cTrop T compared to H-FABP and myoglobin (new cardiac markers) in the early detection of acute coronary syndromes.¹⁸ A study by Figiel Ł et al showed sensitivity of 64.9% and specificity of 100% for cardiac Trop T after non-ST elevation acute coronary syndrome, when done early at admission.¹⁹

The greater sensitivity of the marker at the onset of chest pain for detection of acute MI is highly desired. Newly developed high sensitivity cardiac Trop T assay was found to be highly sensitive in first 2 hours after MI and it was recommended that it should be repeated 4-6 hours after the onset of the symptoms.²⁰

Our results showed that early sensitivity of rTropT (8-48 hours) was high (92%). Its positive predictive value was 100% and negative predictive value was also high. So it can be used reliably for early diagnosis of MI which is useful in the management and prevention of

complications. The long diagnostic window of Trop-T is helpful in detecting acute MI when patients present late. In this situation CK, CK-MB and other cardiac enzymes may return to baseline and ECG changes may not be helpful.

In our study, rTropT was positive in all the cases who suffered from MI except four. In one case, it was done between 8 to 48 hours after chest pain. In the remaining three cases, it was performed after 48 hours. No good reason can be given to explain the false negative results.

Conclusion

Rapid TropT was a sensitive and specific marker for the diagnosis of acute MI in our local patients over a prolonged window period of 7 days after MI. Hence, it can be used as a single reliable test in acute MI in our local population obviating the need to do other tests like cardiac enzymes. It is useful in our set up where people are poor and cannot afford multiple tests. Its prolonged diagnostic window provides advantage in our population where people may not seek early medical advice after an attack of MI.

Table 1. Number of patients in different groups and subgroups, showing results of rapid cTrop T

Study group	Number	Trop-T	
		Positive	Negative
A: Acute MI			
1. Q wave Myocardial infarction	40	38	2
2. Non Q wave Myocardial infarction	6	4	2
3. Patients with left bundle branch block	4	4	0
Total	50	46	4
B: Control			
Total	50	0	50

Table 2. Various parameters of validity for rapid Trop T

Parameter	rTrop T %(Confidence Interval)
Sensitivity	92 (80.8-97.8)
Specificity	100 (92.89-100.0)
Positive predictive value	100 .0
Negative predictive value	92.6 (83.0-96.9)

Table 3: Sensitivity, specificity and other indices for rapid Trop T at various time intervals after onset of ischaemic symptoms.

Rapid Trop-T	Time from onset of chest pain to test performance					
	8-48 hours		49-96 hours		97-168 hours	
	<i>MI</i>	<i>Control</i>	<i>MI</i>	<i>Control</i>	<i>MI</i>	<i>Control</i>
Positive (n)	12	0	14	0	20	0
Negative (n)	1	13	2	16	1	21
Sensitivity %(CI)	92.3 (63.9-99.8)		87.5 (61.6-98.4)		95.2 (76.2-99.9)	
Specificity %(CI)	100.0 (75.3-100.0)		100.0 (79.4-100.0)		100.0 (83.8-100.0)	
Positive predictive value %(CI)	100.0		100.0		100.0	
Negative predictive value %(CI)	92.9 (66.4-99.9)		88.9 (68.6-96.6)		95.4 (75.6-99.3)	

CI: Confidence interval; MI: Acute myocardial infarction; n: Number of patients

References

1. Salic K, De Windt LJ. MicroRNAs as biomarkers for myocardial infarction. *Curr Atheroscler Rep.* 2012 Jun;14(3):193-200.
2. Hisamuddin Nar N, Suhailan M A. Evaluation of the diagnostic indices and clinical utility of qualitative cardiodetect® test kit in diagnosis of ami within 12 hours of onset of chest pain in the emergency department. *Int J Emerg Med.* 2011 Oct 27; 4:67.
3. Achar SA, Kundu S, Norcross WA. Diagnosis of Acute Coronary Syndrome. *Am Fam Physician.* 2005 Jul 1;72(1):119-126.
4. Goldmann BU, Christenson RH, Hamm CW, Meinertz T, Ohman EM. Implications of troponin testing in clinical medicine. *Curr Control Trials Cardiovasc Med.* 2001, 2(2):75–84
5. Licka M, Zimmermann R, Zehelein J, Dengler TJ, Katus HA, Kübler W. Troponin T concentrations 72 hours after myocardial infarction as a serological estimate of infarct size. *Heart.* 2002 June; 87(6): 520–524.
6. Babuin L, Jaffe AS. Troponin: the biomarker of choice for the detection of cardiac injury. *CMAJ.* 2005 November 8; 173(10); 1191-1202
7. Alpert JS, Thygesen K, Antman E, Bassand JP. Myocardial infarction redefined--a consensus document of The Joint European Society of Cardiology/American College of Cardiology Committee for the redefinition of myocardial infarction. *J Am Coll Cardiol.* 2000 Sep; 36(3):959-69.
8. Katus HA, Giannitsis E, Jaffe AS. Interpreting Changes in Troponin—Clinical Judgment Is Essential. *Clinical Chemistry.* 2012; 58:1;39–44.
9. Tsai SH, Chu SJ, Hsu CW, Cheng SM, Yang SP. Use and interpretation of cardiac troponins in the ED. *Am J Emerg Med.* 2008 Mar;26(3):331-41
10. Katus HA, Looser S, Hallermayer K, Remppis A, Scheffold T, Borgya A, Essig U, Geuss U. Development and In Vitro Characterization of a New Immunoassay of Cardiac troponin T. *Clin Chem.* 1992 Mar;38(3):386-93.
11. Mair J, Artner-Dworzak E, Lechleitner P, Smidt J, Wagner I, Dienstl F, Puschendorf B. Cardiac troponin T in diagnosis of acute myocardial infarction. *Clin Chem.* 1991 Jun;37(6):845-52.
12. Takagi Y, Gomi K. [Evaluation of [troponin-T] as a new biochemical marker for acute myocardial infarction]. *Rinsho Byori.* 1991 Nov;39(11):1166-71. [Article in Japanese]
13. Uji Y, Sugiuchi H, Okabe H. [Evaluation of serum troponin T measurement in acute myocardial infarction]. *Rinsho Byori.* 1992 Jul;40(7):775-82. [Article in Japanese]
14. Medcalc easy-to-use statistical software. Free statistical calculators; Diagnostic test evaluation calculator; https://www.medcalc.org/calc/diagnostic_test.php. Accessed September 30, 2018
15. Ebell MH, Flewelling D, Flynn CA. A systematic review of troponin T and I for diagnosing acute myocardial infarction. *J Fam Pract.* 2000 Jun;49(6):550-6.
16. Haltern G, Peiniger S, Bufe A, Reiss G, Gülker H, Scheffold T. Comparison of usefulness of heart-type fatty acid binding protein versus cardiac troponin T for diagnosis of acute myocardial infarction. *Am J Cardiol.* 2010 Jan 1;105(1):1-9.

17. Ruzgar O, Bilge AK, Bugra Z, Umman S, Yilmaz E, Ozben B, Umman B et al. The use of human heart-type fatty acid-binding protein as an early diagnostic biochemical marker of myocardial necrosis in patients with acute coronary syndrome, and its comparison with troponin-T and creatine kinase-myocardial band. *Heart Vessels*. 2006 Sep;21(5):309-14
18. Nagahara D, Nakata T, Hashimoto A, Takahashi T, Kyuma M, Hase M, Tsuchihashi K et al. Early positive biomarker in relation to myocardial necrosis and impaired fatty acid metabolism in patients presenting with acute chest pain at an emergency room. *Circ J*. 2006 Apr; 70(4):419-25.
19. Figiel Ł, Kasprzak JD, Peruga J, Lipiec P, Drozd J, Krzemińska-Pakuła M, Smigielski J. Heart-type fatty acid binding protein--a reliable marker of myocardial necrosis in a heterogeneous group of patients with acute coronary syndrome without persistent ST elevation. *Kardiol Pol*. 2008 Mar; 66(3):253-9, discussion 260-1.
20. Aldous SJ, Richards M, Cullen L, Troughton R, Than M. Diagnostic and prognostic utility of early measurement with high-sensitivity troponin T assay in patients presenting with chest pain. *CMAJ*. March 20, 2012, 184(5); 260-8.

SHORT COMMUNICATION

KNOWLEDGE AND AWARENESS ON FAMILY PLANNING PRACTICE (CODE 1) AMONG THE HIGH RISK MOTHERS IN ONE LOCAL HEALTH CLINIC, IPOH, MALAYSIA.

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Introduction

The proper use of contraceptive has significantly improved health-related outcomes among the mothers and infants.^{1,2} Each pregnancy and childbirth places a health risk for the mother and the risk is magnified if she is at high risk or with pre-existing chronic medical conditions.³ Family planning programme has been implemented free or at affordable charges in Malaysia Healthcare System; however, it was underutilized or not being fully utilized.⁴ Based on the health records and returns from January till December 2016 in one local maternal-child health clinic, as high as 62.5% of registered high risk mothers were reluctant to practice family planning Code 1 (hormonal methods of contraceptive). High risk pregnancy cause complications for both mother and infant; also affecting the whole family system. Literatures suggest that health education has positive impacts in changing individual's health behavior; also empowering the clients to take charge of their own health decisions and behavior.

Objectives

To increase awareness and knowledge on family planning Code 1 (Hormonal methods) among the high risk mothers aged 15 – 45 years in one-month time after implementation of interventions.

Materials and methods

Pre-Intervention Phase: Data was collected to identify the factors influencing clients' health behavior through review of health records, observation of clients' behavior and a small scale survey using self-administered questionnaire (pre-test). Permission was granted by the Director of Kinta District Health Office and the Family Medicine Specialist of the health clinic. The results of the survey were analyzed using IBM SPSS version 22.0.

Intervention Phase: Health promotion approaches were designed with various interventions implemented, including health talk, health forum, small group discussion, counseling & health education, home visit and sharing of information/updates using social media and advanced technology, such as WhatsApp messenger group chat, digital print, augmented reality and web-tools.

Post-Intervention Phase: The same methodology of data collection as in the Pre-Intervention Phase, includes review of health records and self-administered questionnaire (post-test) to ensure consistency and increase accuracy in data analysis.

Results

Pre-Intervention Phase: Generally, participants have adequate knowledge on family planning (80%); while the factors influencing their health behavior were lack of knowledge, lack support from husband and cultural beliefs.

Post-Intervention Phase: Marked increase in the level of knowledge (> 85% respondents have good knowledge) and 11.1% increase in the practice of Code 1 contraception among high risk mothers.

Conclusion & Recommendation

Knowledge alone will not influence attitude; however, it is importance to have good knowledge, as knowledge will influence individual's thinking and mind set.⁵ Knowledge can be improved much easier as compared to change of individual's health behavior. This findings of this project suggested that health education must be emphasized extensively by healthcare personnel to increase the percentage of high risk mothers practicing Code 1 contraception⁶. In addition, one of the new approaches introduced and imparted was adopting the advancement in technology in giving health education. The application of information

and communication technology (ICT) has certainly increased the effectiveness in health promotion. The findings are congruent with the desired outcomes of implementing a variety of health promotion strategies. Healthcare personnel should continue to empower women to practice of family planning.



Figure1. Health promotion approaches

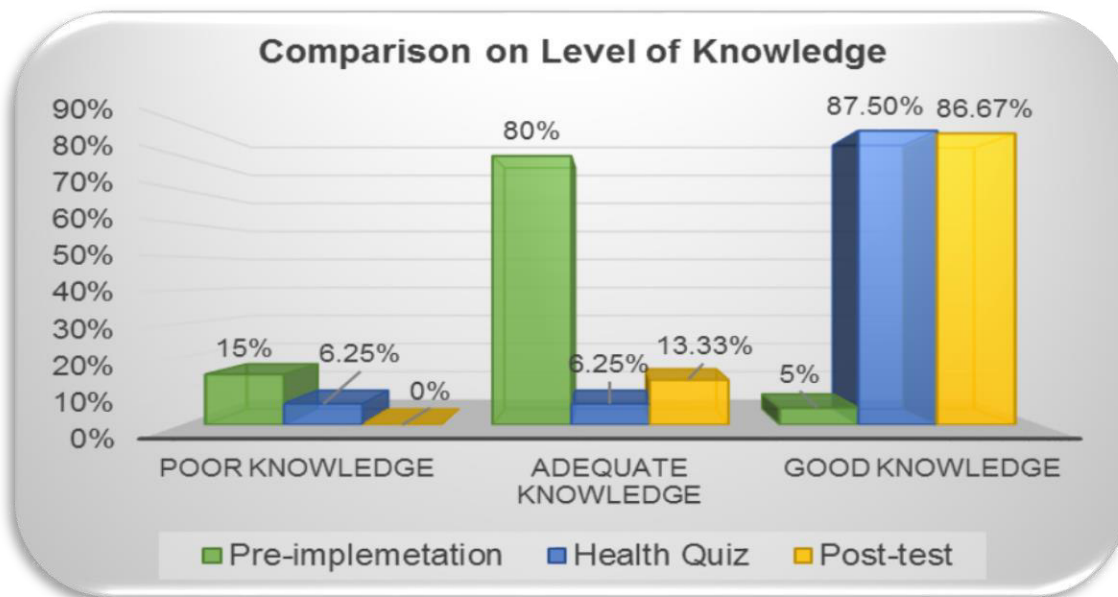


Figure 2. Comparison on level of knowledge pre and post implementation of health promotion

References

1. Selected Practice Recommendations for Contraceptive Use [Internet]. 3rd ed. Geneva: World Health Organization; 2016. (WHO Guidelines Approved by the Guidelines Review Committee). Available from: <http://www.ncbi.nlm.nih.gov/books/NBK409187/>
2. Family Planning - United Nations Population Division | Department of Economic and Social Affairs [Internet]. [cited 2019 Oct 30]. Available from: <https://www.un.org/en/development/desa/population/theme/family-planning/index.asp>
3. Manaf RA, Ismail IZ, Latiff LA. Contraceptive use among women with chronic medical conditions and factors associated with its non-use in Malaysia. *Global journal of health science*. 2012 Sep;4(5):91.
4. Mansor MB, Abdullah KL, Akhtar K, Jusoh AS, Ghazali SB, Haque M, Choon LC. The prevalence of family planning practice and associated factors among women in Serdang, Selangor. *Malaysian Journal of Public Health Medicine*. 2015 Jan 1;15(3):147-56.
5. Shafei MN, Shah MS, Tengku Ismail TA. Knowledge and attitude towards family planning practice and prevalence of short birth spacing among residents of suburban area in Terengganu, Malaysia. *J Community Med Health Educ*. 2012;2(180):2161-0711.
6. Najafi-Sharjabad F, Hejar Abdul Rahman MH, Yahya SZ. Spousal communication on family planning and perceived social support for contraceptive practices in a sample of Malaysian women. *Iranian journal of nursing and midwifery research*. 2014 Feb;19(7 Suppl1):S19.

CASE REPORT

INTRIGUING MANIFESTATION OF MILIARY TUBERCULOSIS - A CASE REPORT.

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Abstract

This report is a case of a 24-year-old immunocompetent lady treated with anti-tuberculous drug for disseminated tuberculosis diagnosed by bone marrow finding. She presented with concurrent intracranial and intramedullary tuberculoma associated with tuberculous spondylodiscitis evidenced by serial magnetic resonance imaging (MRI) screening after a month of anti-tuberculous therapy. These complications are thought to be paradoxical effects of anti-tuberculous therapy. Symptoms resolved with continuation of anti-tuberculous treatment and a course of corticosteroid.

Keywords: *Disseminated tuberculosis, bone marrow, intracranial, intramedullary, anti-tuberculous, paradoxical effect*

Introduction

Tuberculosis (TB) is a centuries old disease; yet it is still a leading cause of illness and death globally, with more cases being reported today than at any previous period of time in history. Extra-pulmonary TB occurs in 10 to 15% of all TB cases¹. In about 10% of all TB patients, the central nervous system (CNS) is involved² and 1 to 3% of skeletal TB frequently affects the spine^{1,3}. But a combination of intramedullary and intracranial tuberculoma is extremely rare^{4,5}. Combination of spondylodiscitis and CNS TB has never been described in previous English literature.

We report a case of a patient who developed concurrent intracranial and intramedullary tuberculoma after a month of anti-TB therapy for disseminated TB. Combination of anti-TB treatment with the addition of steroid helped to improve the symptoms.

Case Report

A 24-year-old lady was admitted for pyrexia of unknown origin. She was treated in another hospital earlier for persistent high grade fever for two weeks associated with constitutional symptoms with non-productive cough. She had no history of night sweat, headache, joint or bone pain, oral ulcer, photosensitivity rashes or alopecia. She had neither a history of traveling nor contact with any tuberculosis patient and denied high risk behavior or history of illicit abuse drugs.

On examination, she was febrile with temperature fluctuating from 37.0°C to 39.5°C. There was neither bony tenderness nor peripheral lymphadenopathy. Splenomegaly was present. Other systems were unremarkable. Laboratory investigation showed low haemoglobin level ranging from 8.6 g/dl to 9.4 g/dl and leucopenia which fell from $4.8 \times 10^3/\text{ul}$ to $2.4 \times 10^3/\text{ul}$. However, her platelet count remained within normal range. Her erythrocyte sedimentation rate

(ESR) was 73mm/1st hr. Liver, renal function tests and electrolytes were normal. Human immunodeficiency virus (HIV), Hepatitis B and C screening, blood film for malaria parasite (BFMP) and screening for connective tissue (Antinuclear antibody (ANA), anti-double stranded DNA and rheumatoid factor) were negative. Screening for tuberculosis (tuberculin skin test and sputum for acid fast bacilli (AFB) was also negative. Septic surveillance was repeatedly negative. Initial chest radiograph was unremarkable and 2D echocardiography revealed no vegetation.

Ultrasound abdomen only showed splenomegaly and computed tomography (CT) of abdomen showed presence of small bowel related mass at the pelvic region. Combinations of broad spectrum antibiotics were given without any improvement and she remained febrile. Based on earlier CT scan report, an exploratory laparotomy was performed but without significant finding. Post-operatively, she required six days intensive care management and had a stormy recovery. Findings of repeat CT abdomen, pelvis and CT thorax were unremarkable.

A month later, in view of the patient's failure to respond to multiple antibiotics, repeated negative septic surveillance, and normal echocardiographic findings, we proceeded with bone marrow aspiration and trephine biopsy. It was done over her right iliac crest. The biopsy showed caseating granulomatous lesion and Ziehl-Neelsen (ZN) staining confirmed presence of acid fast bacilli in the histiocytes (**Fig. 1**). Culture from bone marrow aspiration was negative for *M. tuberculosis*. Other body fluids including sputum culture for AFB was not done. Treatment with anti-tuberculous drugs (ethambutol, isoniazid, rifampicin, and pyrazinamide) commenced promptly with improvement of her clinical status.

However, she developed progressive lower limbs weakness after a month of anti-TB treatment. She was wheel chair bound. She experienced back pain, worse at night and aggravated by sitting up associated with urinary retention and urge incontinence. Examination revealed tenderness over the area of T10 to L1 vertebral bodies and generalized muscle atrophy and weakness of both lower extremities with muscle power of grade 3 to 4 on the Medical Research Council Scale (MRCs). Her sensation however, was intact. Her higher mental function was still intact. No other remarkable neurological finding was observed.

Repeated chest radiograph showed features consistent with millitary tuberculosis. Magnetic resonance imaging (MRI) of the spines (cervical, lumbosacral, and thoracic) and brain were consistent with intracranial tuberculoma associated with intramedullary tuberculoma and tuberculous spondylodiscitis. (**Fig. 2, 3 and 4**)

She received a course of prednisolone in reducing dose over a period of a month and combination of anti-TB therapy extended for a year for which she was referred to chest physician in a tertiary center. Her symptoms improved gradually with the treatment and she was able to ambulate without residual neurological deficit. She had no symptoms suggestive of reactivation of TB.

Discussion

Diagnosis of disseminated or millitary TB is often difficult. It may mimic many diseases and in some case series, up to 50% of cases are undiagnosed ante-mortem. It is easily missed and fatal if untreated. Therefore, a high index of clinical suspicion is important. The most common presentations are fever and weight loss. Pulmonary symptoms may be absent and the duration of illness ranges from acute illness to as long as 6 months before the diagnosis is made. As the pathogenesis of the disease is by haematogenous spread, multi-organ involvement may occur. Patients are not always acutely ill. Clinical examination of the chest is usually normal and up to 30% of patients have normal chest radiograph².

Since extra pulmonary TB may mimic other diseases, confirmation of diagnosis is usually late. Tuberculin skin test is of limited value: a positive result supports the diagnosis, but a negative result does not exclude TB. Radiographic findings may be suggestive of TB, but they are not mandatory. Microbiological and / or histological findings are required for final diagnosis of TB. Unfortunately, Ziehl-Neelsen (ZN) staining is positive in a minority of extra pulmonary TB cases, and excess time is required before culture results come back. Alsoub et al found that acid-fast bacilli (AFB) were rarely positive in sputum cerebrospinal fluid, bronchial washings and urine but yet the cultures for Mycobacterium tuberculosis were positive in 25% to 55% in these body fluids. Lymph node biopsy yields the highest positivity for AFB as compared to transbronchial, bone marrow and liver in patients without radiographic evidence of millitary pattern⁶. In our case, diagnosis was made by identification of AFB and caseating granulomas seen in bone marrow biopsy. In previous studies the yield of tuberculous granuloma from bone marrow biopsy was highly positive in millitary tuberculosis^{7,8}. However, culture for AFB from marrow aspirate has been reported as less sensitive.

The incidence of concurrent CNS TB with skeletal TB is rare in immunocompetent patient but it can be postulated since the spread is via blood. The vertebral column are affected in about 50% of all cases of skeletal TB, especially involving the thoracic and lumbar regions^{2,9}. The different pattern of vertebral TB identified: firstly the spondylodiscitis which characterized by destruction of two or more contiguous vertebrae and opposed end plates disc infection and secondly an atypical form of spondylitis without disc involvement¹⁰. The common symptoms are pain, limitation of motion and eventually develop spinal deformities in later stages.

Intracranial tuberculoma is commonly found among CNS tuberculoma. The incidence of intramedullary tuberculoma is extremely rare and only few cases were reported in the literatures^{4,5,11,12}. HIV-related multiple CNS tuberculoma has

been well recognized but it is not uncommon among non HIV patients. Bernardino Roca, reviewed 25 cases of intradural extramedullary tuberculoma and found 25% of them were HIV-infected patients. This finding showed that disseminated TB occurs regardless of the HIV status.

Radiological evaluation has gained importance in diagnosis of extra pulmonary TB. Conventional radiograph is important in the initial imaging study, however generally the finding occurs late. The sensitivity and specificity of the plain spine radiographs are very low^{1,13}. Conventional CT scan has played a minor role for the diagnosis of early spondylitis and disc infection. MRI is superior to both plain radiograph and CT scan in detection of early spondylitis and disc infections¹³. The intracranial tuberculoma MRI image of this patient is typical of central liquid caseating type. This is characterized by centrally hypo-intense on T1W1 and hyper-intense on T2-weighted images with peripheral hypo-intense ring which represent the capsule of tuberculoma. Images after contrast administration show ring enhancement. This finding is consistent with what has been described in previous literatures^{1,7,11,13}. With the emergence of newer and sophisticated imaging techniques, there will be more reporting of cases, previously thought to be rare. It has been observed and documented frequently in several literatures that intracranial tuberculoma appears or paradoxically increase in size while patients are being treated with anti-TB therapy. These lesions are usually discovered accidentally when follow up imaging is performed routinely or when new neurological signs develop during the course of anti-TB therapy probably related to an immune response to antigen released as bacilli are destroyed by

chemotherapy^{2,12,14,15,16,17}. However, such paradoxical effect on neurological system may also be due to haematogenous dissemination even before the commencement of anti-TB medication. Unfortunately, MRI or CT scan of the brain and spinal cord was not performed prior to anti-TB treatment and while she was being investigated for fever of unknown origin.

Development of intracranial tuberculoma during anti-TB therapy does not represent treatment failure and continuation of anti-TB drugs, with or without the addition of steroids will usually resolve the lesion^{2,12,14,15,18}. Steroids may be used to reduce the oedema and subsequent mass effect associated with tuberculoma. In this case prednisolone was given at a dose of 1.5mg/kg/day and gradually tapered down over a period of a month and continuation of anti-TB therapy for a period of 12 months.

Various manifestations of disseminated TB, previously was considered rare, has now become more common as the whole spectrum of these disorders being reported worldwide. Early recognition of tubercle bacilli or caseating granulomatous lesion in the bone marrow is essential for prompt treatment. Delay or dismissal of the diagnosis may end up with catastrophe as illustrated in the early part of this patient's management. Hence, the morbidity and mortality can be prevented by early intervention.

Conflict of interest: None

Acknowledgement

We wish to thank Mr. J.S. Solomon for his kind secretarial assistance.

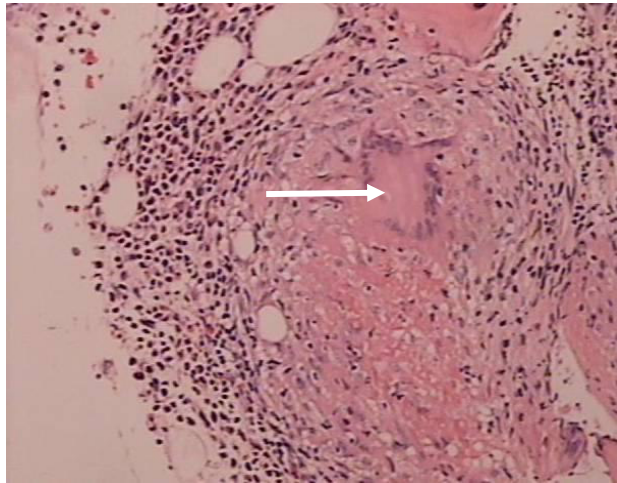


Figure 1: Trephine biopsy of bone marrow: Aggregates of epithelioid histiocytes with central necrosis suggestive of Langhan's giant cells (*arrow*) within islands of hypercellular haematopoietic cells.

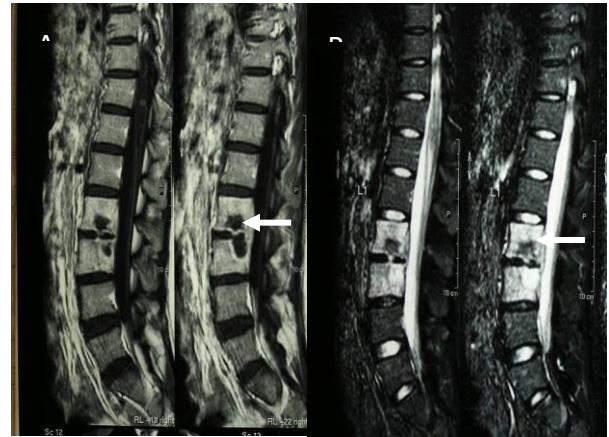


Figure 2: MR Imaging of lumbar spine. Post-contrast, sagittal view, T1W1 (Panel B) shows rim enhancement within vertebral body of L3. The lesion appears hyperintense in T2W1 image. Arrow indicates subligamentous or epidural phlegma situated posterior to the vertebral body of L2 and L3 that enhanced in post-contrast film.

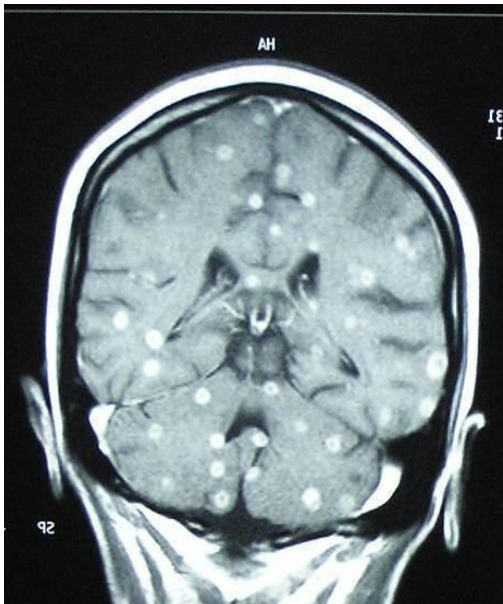


Figure 3: MR imaging of the brain, T1W1, post contrast (coronal view) shows multiple small ring enhancing lesions involving the cerebrum, brain stem, pons and cerebellum.

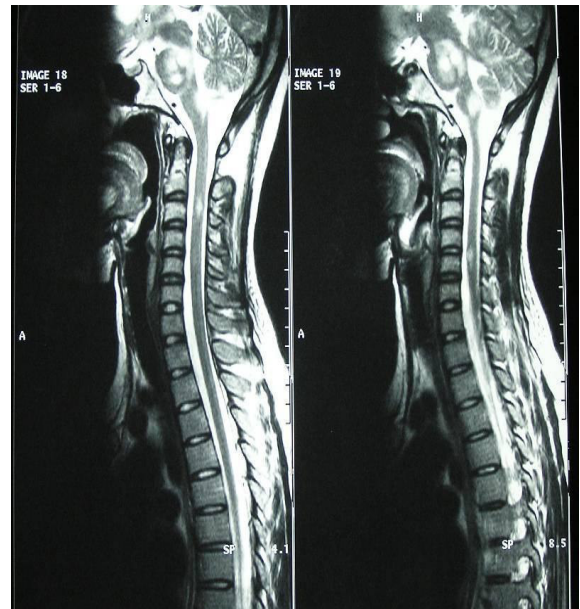


Figure 4: MRI of the cervical and thoracic spine, T1W1 sagittal view show lesion in the spinal cord that enhanced post-contrast noted at C2 and C4/C5 levels.

References

1. Ravindra KG. Classic disease revisited: Tuberculosis of the central nervous system. *Postgrad Med J* 1999; 75:133-140.
2. Teo ELHJ, Peh WCG. Imaging of tuberculosis of the spine. *Singapore Med J* 2004; 45 (9): 439-44.
3. Moore SL, Rafii M. Imaging of musculoskeletal and spinal tuberculosis. *Radiol Clin North Am* 2001; 39: 329-42.
4. Sharma MC, Arova R, Deol PS, Mahapatra AK, Sinha AK, Sarkar C. Intramedullary tuberculoma of the spinal cord: a series of 10 cases. *Clin Neurol Neurosurg* 2002; 104: 279-284.
5. Thacker MM, Puri AI. Concurrent intramedullary and intra-cranial tuberculoma. *J Postgrad Med* 2004; 50:107-9.
6. Alsoub A, Al Alousi FS. Miliary tuberculosis in Qatar: A review of 32 Adult Cases. *Ann Saudi Med* 2001; 21:16-20.
7. Kinoshita M, Ichikawa Y, Koga H, Sumita S, Oizumi K. Re-evaluation of Bone Marrow Aspiration in the Diagnosis of Miliary Tuberculosis. *Chest* 1994; 106:690-692.
8. Maartens G, Willcox PA, Benatar SR. Miliary tuberculosis: rapid diagnosis, hematologic abnormality and outcome with 109 treated adults. *Am J Med* 1990; 89:291-296.
9. Franco P, Giampaolo C. Skeletal tuberculosis and other granulomatous infections. *Bailliere's Clinical Rheumatology* 1999; 13:163-177.
10. De Backer AI, Mortelet KJ, Vanghonbroeck IJ, Deeren D, Vanhoenacker FM, De Keulenaer BL, et al. Tuberculosis of the spine: CT and MR imaging features. *JBTBTR* 2005; 88: 92-97.
11. Huang CR, Lui CC, Chang WN, Wu HS, Chen HJ. Neuroimages of disseminated neurotuberculosis: Report of one case. *Clin Imaging* 1999; 23: 218-222.
12. Shenoy SN, Raja A. Concurrent intramedullary and intracerebral tuberculomas. *Neurol India* 2004; 52: 512-516.
13. Tali ET. Spinal infections. *Eur J Radiol* 2004; 50:120-33.
14. Tsai MH, Huang YC, Lin TY. Development of tuberculoma during therapy presenting as hemianopia. *Pediatr Neurol* 2004; 31: 360-63.
15. Afghani B, Lieberman JM. Paradoxical enlargement or development of intracranial tuberculomas during therapy. Case report and review. *Clin Infect Dis* 1994; 19: 1092-9.
16. Teoh R, Humhrie MJ, O'Mahoney G. Symptomatic intracranial tuberculomas developing during treatment of tuberculosis: a report of 10 patients and review of literature. *Q J Med* 1982; 63: 449-53.
17. Pauranik A, Behari M, Maheshwari MC. Appearance of tuberculoma during treatment of tuberculous meningitis. *Jpn J Med* 1987; 26: 332.
18. Schoeman JF, Vanzyl LF, Laubscher JA, Donald PR. Effect of corticosteroids on intracranial pressure, computed tomographic findings and clinical outcome in young children with tuberculous meningitis. *Pediatrics* 1997; 99: 226-31.

CASE REPORT

REACTIVE ARTHRITIS ACCOMPANYING SPOROTRICHOSIS POST CAT SCRATCH: A MALAYSIAN CASE REPORT.

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Abstract

Sporotrichosis is a fungal infection caused by *Sporothrix schenckii*, a dimorphic fungus. Transmission of this infection is usually through contact with infected soil, decaying vegetation and plants as well as zoonotic inoculation such as cat scratches. We present an uncommon case of lymphocutaneous sporotrichosis accompanied by reactive arthritis in a 51-year-old woman due to a cat scratch in Malaysia.

Introduction

Sporothrix schenckii is a dimorphic fungus ubiquitous worldwide and is responsible for sporotrichosis.¹ Pathogenic acquisition of sporotrichosis in immunocompetent patients occurs mainly via cutaneous inoculation with subsequent development of a fixed cutaneous and/or lymphocutaneous infection. Osteo-articular involvement rarely occurs in sporotrichosis with only a handful of cases reported in the literature.² Almost all reported cases in the literature originated from Brazil or the United States of America. We report a case of reactive arthritis with sporotrichosis following a cat scratch in Malaysia.

Case report

A 51-year-old Malay lady from Ipoh, Malaysia presented with atraumatic progressive bilateral painful ankle swelling for over two weeks. Other joints were not affected and she denied respiratory, urinary or gastrointestinal disturbances. She has a past history of type 2 diabetes (well controlled on oral hypoglycaemic agents only).

Three weeks prior to this presentation, she suffered an abrasion over the anterior aspect of her right forearm following a cat scratch. She was then treated as bartonellosis with a course of oral ciprofloxacin without improvement. The inoculated site ulcerated and papulo-nodular lesions developed along the lymphatic track. Subsequently, these lesions were surgically resected and itraconazole 100 mg twice daily was commenced (empirically treating for lymphocutaneous sporotrichosis) with minimal skin improvement and subsequent development of articular symptoms.

On examination, there was evidence of bilateral ankle swelling most evident anterior to the medial and lateral malleoli as depicted. There were no overlying skin changes. There was evidence of diffuse ankle synovial thickening but no focal tenderness identified upon palpation. The ankle range of movement was mildly restricted

particularly upon dorsiflexion. [Figure 1b]. Peripheral and axial joint examination were normal. There was no evidence of dactylitis. There were surgical scars over the right anterior forearm (inoculation site) and above the cubital fossa with interconnecting cutaneous tracking [Figure 1a]. A small subcutaneous nodule was palpable proximal to the track. These cutaneous lesions conform to a linear 'nodular lymphangiitic' pattern which is classically described with sporotrichosis. Otherwise, there were no other skin changes, nail abnormalities or palpable peripheral lymphadenopathies.

Laboratory evaluation demonstrated a leukocyte count of $7.4 \times 10^9/L$, haemoglobin of 10.3 g/dL, platelet count of $438 \times 10^9/L$, erythrocyte sedimentation rate of 40 mm in the first hour and C-reactive protein of 9.98 mg/L. Rheumatoid factor measurement was low positive at 33.2 IU/mL (normal range: < 15) and the anti-citrullinated cyclic peptide antibody was negative. Renal profile, liver function tests, serum calcium, phosphate and creatine kinase were normal. Blood cultures were negative for fungal and bacterial growth. Unfortunately, her previous tissue samples post skin debridement were not cultured. She declined further excision of the remaining nodule for aetiological confirmation. *Sporothrix* serology and molecular diagnostics were unavailable in our laboratory facility.

Acknowledging these limitations, in view of her cutaneous nodular lesions conforming to a classical 'sporotrichoid' configuration, she was commenced on itraconazole 200 mg twice daily, empirically treating her for reactive arthritis accompanying sporotrichosis. We re-assessed her at the end of a four week course of intensified itraconazole therapy.

Upon follow-up, the surgical scars had healed with hyper-pigmented scarring. The subcutaneous nodule and cutaneous tracking had completely resolved [Figure 2]. There was complete clinical resolution of synovitis in both ankle joints [Figure 2].

Given the good response to intensified itraconazole therapy, we have continued her therapy to complete a 12 months course, as per Infectious Diseases Society of America (IDSA) guidelines.³

Discussion

Osteo-articular involvement is the commonest manifestation of extra-cutaneous sporotrichosis.⁴ Despite this, a systematic review of the English literature undertaken by Lederer *et al* discovered only 20 cases published between the years 1980 and 2015.² Although sporotrichosis has been reported in Malaysia,⁵ to our knowledge, this is the first case report of reactive arthritis accompanying sporotrichosis from this country. The diagnostic probability for sporotrichosis in this lady is high as she suffered a cat scratch with resultant 'nodular lymphagitic' cutaneous lesions. Cat scratch is the commonest mode of inoculation of *S. schenckii* in Malaysia.⁵ Subsequent extra-cutaneous symptoms may indicate infective dissemination. Empirical antifungal therapy should be commenced in these situations if fungal cultures could not be obtained to halt further disease progression and prevent chronicity.

Here, the diagnosis of reactive arthritis accompanying sporotrichosis was retrospectively supported by clinical improvement upon intervention with appropriate therapy. Differential diagnoses for 'nodular lymphangitis' include Nocardiosis, Leishmaniasis and *Mycobacterium marinum*. Tissue cultures would distinguish these infections. Where cultures are unavailable, these conditions may be distinguished by virtue of deduction as illustrated below [Table 1].

Despite fungal culture being the diagnostic gold standard, the rate of positive culture for *S. schenckii* displays a significant inter-study

variability (32 to 81.2%).⁶⁻⁷ Pre-treatment with antimicrobials, such as in our case may reduce the yield of fungal retrieval.

Other investigative surrogates such as the sporotrichin skin test and serological methods are sensitive but is non-specific for active disease.⁸ Molecular methods for detection of pathogenic *Sporothrix* species is well developed.⁹ but is not widely available in Malaysia.

Osteoarticular sporotrichosis is recognized in immunocompetent patients as elucidated in Lederer's systematic review.² However, the pathogenesis remains obscure. A typical tissue histology of sporotrichosis display mixed tissue granulomatous and pyogenic reactions which suggest impairment of phagocytic function in clearing fungal antigen. We postulate the pathogenesis of osteoarticular sporotrichosis in immunocompetent patients to be specific impairment in phagocytic function (may be hereditary as in chronic granulomatous disease) or immunological cross reactivity akin to the id reaction in dermatophytosis. Identifying the specific pathogenesis requires expensive laboratory investigations which makes it less practical in a third world country.

Conclusion

Osteoarticular sporotrichosis is a relatively uncommon manifestation of *S. schenckii* tissue infection. We report a case of a 51-year-old lady with reactive arthritis accompanying sporotrichosis diagnosed based on clinical grounds. She had complete clinical resolution of cutaneous and articular disease within 4 weeks of twice daily itraconazole 200 mg therapy. The pathogenesis of dissemination of sporotrichosis among immunocompetent individuals is currently obscure, subject to further research and elucidation.

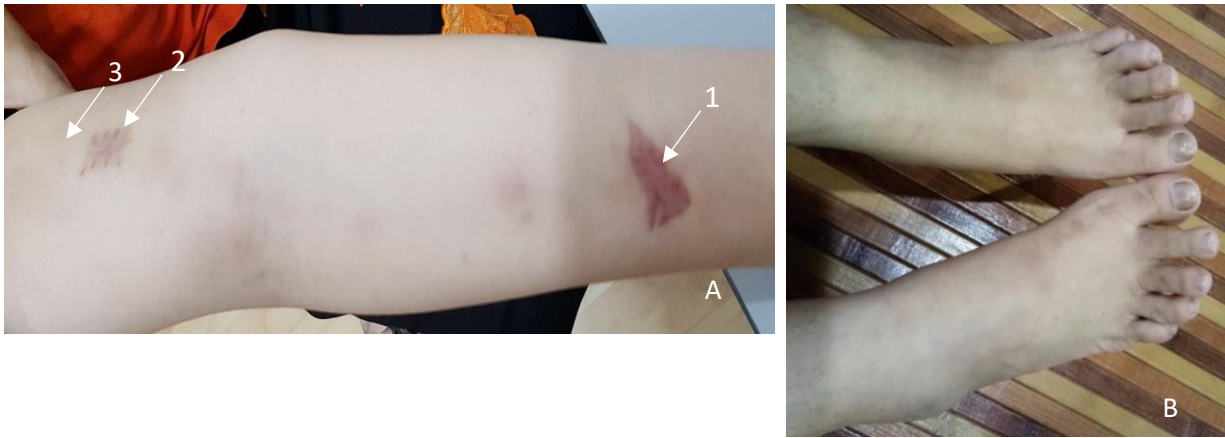


Figure 1. (A) 2 surgical scars post debridement at the inoculation site (arrow 1) and site of papulonodular lesions (arrow 2) with interconnecting tracking. A nodule is palpable proximal to the cubital fossa (arrow 3). (B) Bilateral ankle synovitis.



Figure 2. (a) Surgical scars in the maturation phase of secondary healing. There was resolution of tracking and all palpable nodules. Resolution of bilateral ankle swelling (b) Right ankle/foot (c) Left ankle/foot.

Table 1: Differential diagnosis for ‘nodular lymphangitis’ and their clinical features.

Condition	Clinical features	DGD	Transmission	Antibiotic response	Antifungal response
Sporotrichosis	Cutaneous or lymphocutaneous disease	No	Inoculation (soil, zoonotic, phyto-transmission)	No	Yes
Nocardiosis	Pulmonary or severe disseminated systemic disease	No	Inhalation or traumatic inoculation with nocardia containing soil	Yes	No
Leishmaniasis (cutaneous)	Mucocutaneous or lymphocutaneous disease	Yes	Zoonotic (bite of the female phlebotomine sandfly)	No	No
<i>Mycobacterium marinum</i>	Cutaneous or lymphocutaneous disease	No	Contact with infected water	Partial	No

DGD: *distinct geographical distribution*

References

1. Marimon R, Gené J, Cano J, Trilles L, Lazéra MD, Guarro J. Molecular phylogeny of *Sporothrix schenckii*. *Journal of Clinical Microbiology*. 2006 Sep 1;44(9):3251-6.
2. Lederer HT, Sullivan E, Crum-Cianflone NF. Sporotrichosis as an unusual case of osteomyelitis: A case report and review of the literature. *Medical mycology case reports*. 2016 Mar 1;11:31-5.
3. Kauffman CA, Bustamante B, Chapman SW, Pappas PG. Clinical practice guidelines for the management of sporotrichosis: 2007 update by the Infectious Diseases Society of America. *Clinical Infectious Diseases*. 2007 Nov 15;45(10):1255-65.
4. Mahajan VK. Sporotrichosis: an overview and therapeutic options. *Dermatology Research Practice*. 2014;2014:272376.
5. Tang MM, Tang JJ, Gill P, Chang CC, Baba R. Cutaneous sporotrichosis: a six - year review of 19 cases in a tertiary referral center in Malaysia. *International journal of dermatology*. 2012 Jun;51(6):702-8.
6. Mahajan VK, Sharma NL, Sharma RC, Gupta ML, Garg G, Kanga AK. Cutaneous sporotrichosis in Himachal Pradesh, India. *Mycoses*. 2005; 48(1):25-31.
7. Conias S, Wilson P. Epidemic cutaneous sporotrichosis: report of 16 cases in Queensland due to mouldy hay. *Australasian journal of dermatology*. 1998 Feb;39(1):34-7.
8. Barros MB, de Almeida Paes R, Schubach AO. *Sporothrix schenckii* and sporotrichosis. *Clinical Microbiology Reviews*. 2011 Oct; 24(4): 633–654.
9. Rodrigues AM, de Hoog GS, de Camargo ZP. Molecular diagnosis of pathogenic *Sporothrix* species. *PLoS neglected tropical diseases*. 2015 Dec 1;9(12):e0004190.

LETTER TO THE EDITOR

HOLISTIC EDUCATION THROUGH CO-CURRICULAR ACTIVITIES.

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Dear Sir,

Holistic development is a process of self-realization and learning which combines an individual's mental, physical, social, emotional and spiritual growth.¹ However, information management, digital skills and continuous learning are essential skills which a regular medical curriculum does not offer much focus on.²

A medical graduate of today or rather a leader or healer of tomorrow, should be trained and empowered not only with knowledge and clinical skills but also social skills, humanistic values including empathy, an excellent attitude, professionalism, communication skills, leadership skills and team skills.

The involvement of medical students in co-curricular activities allows one to learn to recognise his/her own emotions and values as well as one's strength and limitations.³ This plays a huge role as hidden or not so obvious curriculum in a medical student's life.⁴

The students experience in medical school influences the way they will treat their patients, colleagues, and future medical students.⁵

A student needs the patience, the ability to reflect, the continuous self-motivation and confidence to go through every apparent obstacle and the stress faced. Co-curricular activities help in providing a holistic approach to learning. Time management, responsibility, attendance, punctuality, dress code, communication skills, team work, leadership, management of information, digital skills and etiquette are learnt experientially and collaboratively with extra and co-curricular activities.⁶

Embedding corporate social responsibility, ethics, professional and personal development into the curriculum and hands on experience of these during curricular and co-curricular activities will definitely mould holistic graduates, who are ready to adapt to their working environment and the community.

RED (reach out, embrace and deliver) is a student lead charity association of the Faculty of Medicine, AIMST University. Students raise funds by means of car wash, cultural shows and food carnival. Since 2011, RED has aided more than 300 patients with cataract surgeries and other health related aids.

References

1. Holistic Learning in Medical Education; Progress in Medicine, Association of Physician of India, 76: 419-22.
2. Guidelines for the accreditation of Malaysian undergraduate medical education programmes, 2016.
3. Supe A. Co-curricular activities in medical education. The National medical journal of India. 2012;25(3):186-.
4. D'eon M, Lear N, Turner M, Jones C. Perils of the hidden curriculum revisited. Medical Teacher. 2007 Jan 1;29(4):295-6.
5. Kassebaum DG, Cutler ER. On the culture of student abuse in medical school. Academic medicine: journal of the Association of American Medical Colleges. 1998 Nov;73(11):1149-58.
6. Judge LW, Pierce D, Petersen J, Bellar D, Wanless E, Gilreath E, Simon L. Engaging Experiential Service Learning through a Co-Curricular Club: The Chase Charlie Races. ICHPER-SD Journal of Research. 2011;6(2):30-8.

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