DYSPEPSIA AND PERSONALITY TRAIT AMONG ADULT PATIENTS WITH HEADACHE – A SINGLE CENTRE STUDY

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ABSTRACT

Introduction

Headache and dyspepsia are commonly present among Malaysians. They may have different personality traits. We conducted a study to evaluate the frequency of dyspepsia in the patients with primary headache in University Malaya Medical Centre (UMMC). The secondary objective was to assess the various types of personality traits in the patients with headache and dyspepsia.

Methodology

A cross sectional study was conducted in the neuromedical clinic. Demographic and headache characteristics were collected from the patients with migraine and tension-type headache (TTH).

Visual Analogue Scale (VAS) was used to determine the severity of the headache. Presence of dyspepsia was evaluated with Leeds questionnaire (LDQ). Minnesota Multiphasic Personality Inventory-2 restructured form (MMPI-2RF) questionnaire was used to assess the personality trait.

Results

60 patients with mean age 47.58±16.63 years were recruited. The patients were predominantly females (80%). The ethnic distribution was: Malays (31.7%), Chinese (28.3%) and Indians (40.0%). The headache subtypes were: migraine without aura (n=17, 28.3%), migraine with aura (n=14, 23.3%), frequent TTH (n=14, 23.3%), chronic TTH (n=12, 20.0%) and infrequent TTH (n=3, 5.0%).

55% of the headache patients had dyspepsia. On univariate analysis, migraine was more likely to be associated with dyspepsia compared to TTH (71% migraine vs 37.9% TTH, p=0.019). Only 20 completed MMPI results were available for analysis. There was no statistical significance between headache with dyspepsia group/headache alone group with the five personality traits on MMPI.

Conclusion

Migraine was more likely to be associated with dyspepsia compared to TTH. Personality trait associations among adults with headache and dyspepsia could not be demonstrated in this study.

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LIST OF ABBREVIATIONS

AGGR-r	Aggressiveness Revised
AMPP	American Migraine Prevalence and Prevention
ANS	Autonomic Nervous System
CGRP	Calcitonin Gene-Related Peptide
CM	Chronic Migraine
DISC-r	Disconstraint Revised
DSM	Diagnostic and Statistical Manual of Mental Disorders
EM	Episodic Migraine
FD	Functional Dyspepsia
FFM	Five Factor Model
ICHD	International Classification of Headache Disorders
IHD	Ischaemic Heart Disease
IHS	International Headache Society
INTR-r	Introversion/Low Positive Emotionality Revised
LDQ	Leeds Questionnaire
LMS	Methyl Salicylate Menthol Ointment
MMPI	Minnesota Multiphasic Personality Inventory
MMPI-2RF	Minnesota Multiphasic Personality Inventory-2 Restructured Form
NEGE-r	Negative Emotionality/Neuroticism Revised
NSAIDs	Non-Steroidal Anti-inflammatory Drugs
PSYC- r	Psychoticism Revised
RM	Ringgit Malaysia
SPSS	Statistical Package for Social Sciences
TAHBSO	Transabdominal Hysterectomy and Bilateral Salpingo-oophorectomy
TTH	Tension-type Headache
UMMC	University Malaya Medical Centre
VAS	Visual Analogue Scale
WHO	World Health Organization
w/o	without

APPENDICES

CHAPTER 1: INTRODUCTION

Headache

Headache is a symptom of pain anywhere in the region of head and neck. The types of headaches are migraines, tension-type Headache (TTH) and cluster headaches. (1) Migraine is a common disabling primary headache disorder. (2) In the *Global Burden of Disease Survey 2010* it was ranked as the third most prevalent disorder and seventh highest specific cause of disability worldwide. (3, 4)

Migraine has two major subtypes: migraine with aura and migraine without aura. (5, 6)

Migraine with aura is primarily characterized by the transient focal neurological symptoms that usually precedes or accompanies the headache. (7) Migraine without aura is a clinical syndrome characterized by headache with specific features and associated symptoms. (6)

Tension-Type Headache (TTH) is very common, with a life time prevalence in general population ranging between 30% and 78%. (8) Tension-type headache can be generally classified into episodic and chronic subtypes. (9) In International Classification of Headache Disorders (ICHD-III) the episodic form was further subdivided into infrequent TTH and frequent TTH. (9) Chronic tension-type headache causes greatly decreased quality of life and disability. (10)

Dyspepsia

Functional dyspepsia (FD) is a clinical disorder presenting with persistent or recurrent abdominal discomfort or pain located in the upper abdomen with unknown responsible structural lesions. (11) Studies have shown a heterogeneity of this disorder in which specific clinical symptom patterns can be related to various gastric pathophysiological mechanisms. (12)

A previous study has shown that the prevalence of headache in the community is about 21%. (13) Dyspepsia has been reported to be present in about 24.1% -38.1% of the population (14). There have been reports that there is association between headache and gastrointestinal disorders such as, functional dyspepsia. (15, 16) Moreover a high number of patients with headache have other gastrointestinal symptoms such as diarrhoea, constipation and nausea. (17) A higher prevalence of migraine patients have also been reported to have dysmotility like dyspepsia. (18)

Personality Traits

Minnesota Multiphasic Personality Inventory (MMPI) is the most popular assessment instrument used to investigate personality traits. (20, 21) It is a validated tool. (20, 21) The MMPI-2-RF PSY-5 Scales embodying Harkness and McNulty's (1994) dimensional model of personality pathology was used to determine the clinical symptoms, behavioural tendencies and personality characteristics of the patients. We mainly focused on 5 major personality traits also known as Five Factor Model (FFM). These are Aggressiveness, Psychoticism, Neuroticism, Disconstraint and Introversion.

(22) According to *McCrae et al*, the personality traits are remarkably universal in a study was conducted on people from 36 different cultures around the world. (23)

Personality disorders are class of mental disorders characterized by enduring maladaptive pattern of behaviour and cognition, exhibited across many contexts and markedly deviated from those accepted by the individual's culture. (24) According to Diagnostic and Statistical Manual of Mental Disorders, the 5th chapter (DSM-5), personality disorders can be grouped into 3 main clusters which consist of Cluster A, Cluster B and Cluster C Personality Disorders. (25, 26)

MMPI-2RF scales components

Aggressiveness-Revised (AGGR-r) consists of 18 items describing the aggressively assertive behaviour. Elevated scores are associated with instrumental aggressiveness (behaviour designed to accomplish a desired goal as opposed to being reactive).

Psychoticism- Revised (PSYC-r) consists of 26 items describing a variety of experiences associated with thought disturbance. Elevated scores are associated with unusual perceptual experiences and thoughts and with being alienated from others.

Disconstraint- Revised (DISC-r) consists of 20 items describing a variety of manifestations of disconstrained behaviour. Low DISC-r scores indicated a relatively high overall level of behavioural constraint.

Negative Emotionality/ Neuroticism-Revised (NEGE-r) consists of 20 items describing a wide range of negative emotional experiences. Elevated scores are associated with such negative emotions such as anxiety, insecurity and worry as well as general tendency to catastrophize and expect the worst to happen.

Introversion/ Low Positive Emotionality- Revised (INTR-r) consists of 20 items describing the lack of positive emotional experiences and avoidance of social situations and interactions. Elevated scores are associated with social introversion, anhedonia, restricted interests and pessimistic outlook.

Personality traits in headache patients

Numerous studies have examined the personality structure of patients with primary headache disorders, and it has been found that such patients were mildly anxious and depressed relative to their headache free counterparts. (27, 28) These patients have generally experienced more adverse events and rated them as more stressful than ~~did~~ headache free counterparts (29) with higher degree of anxiety, neuroticism, or depression (27). These patients present a significant impairment of anger control, a higher level of anxiety, depression, phobias, emotional lability and psychophysiological disorders. (30)

Migraine is a common neurological disorder with prevalence of approximately 12%, and a cause of significant disability for many patients. (31-34) As a result, the World Health Organization (WHO) had listed migraine as a significant public health concern

and a major cause of years of life lived with disability. (35) Claims have been made that migraineurs display increased neuroticism and anxiety and they are also anti-aggressive, but complex interactions regarding personality traits also need to be considered. (36-37)

Personality traits in patients with functional dyspepsia

Psychological factors have also been associated with functional dyspepsia (FD). Clinical observation suggested a higher anxiety level and stress experienced in FD patients with positive correlation to the disease severity. (38) Clinical data even pointed out a disordered sleep pattern reported from patients with FD. (39) Some researchers tried to use the "Brain-Gut Axis" to explain the link between psychological state and FD. (40) This idea is a neurobiological framework for reciprocal connections between the brain and gastrointestinal tract. (40)

CHAPTER 2: OBJECTIVES

2.1 Hypothesis

The hypothesis is there is an association between headache and dyspepsia, more in migraine compared to tension-type headache (TTH). The patients with headache and/or dyspepsia have various personality traits.

2.2 Objectives

The primary objective of this study was to evaluate the frequency of dyspepsia in the patients with primary headache in University Malaya Medical Centre (UMMC).

The secondary objective was to assess the various types of personality traits in the patients with headache and dyspepsia.

CHAPTER 3: METHODOLOGY

3.1. Sample size calculation (41)

$n= [Z^2 \times P (1-P)]/d^2$

The expected prevalence (for dyspepsia in community) is 25%; $P = 0.25$. For the level of confidence of 95%, Z value is 1.96. In proportion of one; if 10%, precision (d) = 0.10. Width of CI = 2d=0.1. Sample size calculation is as follows:

$n= [(1.96)^2 \times 0.25(1-0.25)]/0.1^2=72.$

3.2. Patient Selection

This was a cross sectional study conducted in University Malaya Medical Centre from February 2017 until August 2017. This study was approved by the Institutional Ethics Committee of University Malaya Medical Centre. The patients with headache were recruited from the neuromedical clinic in University Malaya Medical Centre. The patients recruited were aged 12 years and above with headache. Consecutive sampling was used. Patients' information sheet (Appendix A) was given to the eligible patients.

Written informed consent was obtained from all the study participants or their legally acceptable participants.

Inclusion Criteria for study patients

- The patients with history of history of headache at least once per month for more than three months.
- The patients who fulfil the headache criteria of migraine and tension-type headache according to IHS classification

Exclusion Criteria for study patients

- The patients on non-steroidal anti-inflammatory drugs (NSAIDS) including aspirin
- The patients with peptic ulcer, gastritis and gastroesophageal reflux
- Headache with presence of warning signs such as suggestive focal neurological deficit, papilloedema and neck stiffness
- Trigeminal neuralgia, cluster headache and other subtypes of headache
- Presence of brain malignancy on CT scan or MRI of brain

3.2 Methods

All the participants who consented, were interviewed with a structured headache questionnaire. The data on demographic characteristics and clinical data was recorded. The details of headache characteristics which was collected included site, laterality of headache (unilateral, bilateral), character of headache (throbbing, tightness, pressing), time of onset and frequency of headache in one month. The other data collected was on triggering factors.

Visual Analogue Scale (VAS) was used to determine the severity or intensity of the headache. VAS (Appendix B) is validated based on previous studies. The list of medications, particularly non-steroidal anti-inflammatory drugs (NSAIDS) was recorded. Non-pharmacological management for headache was also documented.

Headache

The diagnosis of the headache was based on the International Headache Society (IHS) Criteria (ICHD III). (9) The International Headache Society (IHS) classification (ICHD-III) was used to classify the headache subtypes. According to IHS criteria (ICHD-III), headache is divided into primary and secondary headache. Primary headache consists of migraine (with and without aura) and tension-type headache (TTH). Chronic headache was defined as headache $\geq$ 15 days/month. (9)

Case Definitions

Migraine with aura

Is a recurrent attack of headache developing gradually over 5-20 minutes and last less than 60 minutes.

Diagnostic criteria:

A. At least 2 attacks fulfilling criteria B

B. Aura consisting of at least one of the following, but no motor weakness:

   1. Fully reversible visual symptoms including positive features (e.g. Flickering of lights, spots or lines) and /or negative features(e.g. Loss of vision)

   2. Fully reversible sensory symptoms including positive features(i.e. pins and needles) and/ or negative features (i.e. numbness)

   3. Fully reversible dysphasic speech disturbance

C. At least 2 of the following:

   1. Homonymous visual symptoms and/ or unilateral sensory symptom

   2. At least one aura symptom develop gradually over ≥ 5 minutes and/or different aura symptoms occur in succession over ≥5 minutes

   3. Each symptom last ≥5minutes and ≤ 60 minutes

D. Headache fulfilling criteria B-D for 1.1 Migraine without Aura begins during the aura or follows aura within 60 minutes

E. Not attributed to another disorder

Migraine without Aura

Recurrent headache lasting 4-72 hours.

Diagnostic Criteria:

A. At least 5 attacks fulfilling criteria B-D

B. Headache attacks lasting 4-72hours (untreated or unsuccessfully treated)

C. Headache has at least 2 of the following characteristics:

1. Unilateral location
2. Pulsating quality
3. Moderate or severe pain intensity
4. Aggravated by routine physical activity

D. During headache at least one of the following:

1. Nausea and/or vomiting
2. Photophobia and phonophobia

E. Not attributed to another disorder

Tension-type headache

Diagnostic criteria:

A. At least 10 episodes occurring on ≥1 but<15 days per month for at least 3 months(≥12 and <180 days per year) and fulfilling criteria B-D

B. Headache lasting 30 minutes to 7 days.

C. Headache has at least 2 of the following characteristics:

1. Bilateral location
2. Pressing/tightening (non-pulsating quality)
3. Mild or moderate intensity
4. Not aggravated by routine physical activity such as walking or climbing stairs

D. Both of the following:

1. No nausea or vomiting
2. No more than one of photophobia or phonophobia

E. Not attributed to another disorder

Infrequent episodic tension-type headache

Diagnostic criteria:

A. At least 10 episodes of headache occurring on <1 day per month on average (<12 days per year) and fulfilling criteria B-D

B. Lasting from 30 min to 7 days.

C. At least two of the following four characteristics:

1. bilateral location
2. pressing or tightening (non-pulsating) quality
3. mild or moderate intensity
4. not aggravated by routine physical activity such as walking or climbing stairs

D. Both of the following:

1. no nausea or vomiting
2. no more than one of photophobia or phonophobia

Frequent episodic tension-type headache

Diagnostic criteria:

A. At least 10 episodes of headache occurring on 1-14 days per month on average for >3 months (≥12 and <180 days per year) and fulfilling criteria B-D

B. Lasting from 30 min to 7 days

C. At least two of the following four characteristics:

1. bilateral location
2. pressing or tightening (non-pulsating) quality
3. mild or moderate intensity
4. not aggravated by routine physical activity such as walking or climbing stairs

D. Both of the following:

1. no nausea or vomiting
2. no more than one of photophobia or phonophobia

Chronic tension-type headache

Diagnostic criteria:

A. Headache occurring on ≥15 days per month on average for >3 months (≥180 days per year), fulfilling criteria B-D

B. Lasting hours to days, or unremitting

C. At least two of the following four characteristics:

1. bilateral location
2. pressing or tightening (non-pulsating) quality
3. mild or moderate intensity
4. not aggravated by routine physical activity such as walking or climbing stairs

D. Both of the following:

1. no more than one of photophobia, phonophobia or mild nausea
2. neither moderate or severe nausea nor vomiting

The patients were assessed for presence of dyspepsia by Leeds questionnaire. (Appendix D) The Leeds questionnaires in English (Appendix E) and Malay

(Appendix F) were validated. The Minnesota Multiphasic Personality Inventory-2 restructured form (MMPI-2RF) questionnaire was used to assess the personality trait of the patients.

Specific Instruments

1. Visual Analogue Scale (VAS)

VAS is an instrument which measures a characteristic that range across a continuum of values and cannot easily be directly measured. The amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. VAS is usually a horizontal line, which is 100 mm in length. VAS is anchored by word descriptors at each end. The patient places a mark on the line, the point that he/she feels that it represents his/her perception of current state.

2. Leeds Dyspepsia Questionnaire (LDQ)

The presence of dyspepsia was diagnosed using the original (Appendix C) and locally translated (Malay, Appendix D) validated version of Leeds Dyspepsia Questionnaire. The questionnaire is based on eight items of symptom-based questions. It encompasses the frequency and severity of various upper gastrointestinal symptoms, consisting of upper abdominal pain, belching, nausea, dysphagia, heartburn,

regurgitation, vomiting and early satiety. A score ranging from 0 to 40 can be calculated in the Leeds Dyspepsia Questionnaire based on the item frequency. A score of ≥ 11/40 has been shown to be diagnostic of dyspepsia.

3. Minnesota Multiphasic Personality Inventory-2 restructured form (MMPI-2 RF)

Minnesota Multiphasic Personality Inventory (MMPI-2 RF) is a standardized psychometric test of adult personality and psychopathology. MMPI-2 RF is composed of 338 questions and consists of Personality Psychopathology Five (PSY-5) scales. The PSY-5 consists of 5 scales as follows: Aggressiveness, Psychoticism, Disconstraint, Negative Emotionality/ Neuroticism, Introversion (Low Positive Emotionality). The manual scoring of the MMPI was performed by a clinical psychologist, who was blinded to the identity of the patients.

Statistical Analysis

All descriptive statistics were done using Statistical Package for Social Sciences SPSS (Version 21.0, SPSS Inc, Chicago USA). Chi square test (or Fischer Exact test) was used to analyse categorical data. A p-value of <0.05 (two tailed p-value) was taken as statistically significance.

CHAPTER 4: RESULTS

72.1

72 patients were approached for the study. Four patients refused to participate in the study. Eight patients were excluded because they were on NSAIDS. 60 patients were eligible and were recruited for the study. Only 21 patients returned the completed MMPI questionnaire. One MMPI questionnaire was incomplete, leaving 20 patients with complete MMPI questionnaire.

4.2 Basic demography of study patients

Age, gender and ethnicity

Table 1 shows the basic demography and characteristics of the study patients. The mean age was 47.58±16.63. The age range was from 17 to 80. 48 (80%) patients were females, whereas 12 (20%) patients were males. 19 (31.7%) patients were Malays, 17 (28.3%) patients were Chinese and 24 (40.0%) patients were Indians.

Dyspepsia

33 (55%) of the headache patients were found to have dyspepsia.

Table 1: Basic demography of study patients

	Patients (n=60)
Age (mean±SD), range (year)	47.58±16.63 (17-80)
Gender (n, %)	
Male	12 (20%)
Female	48 (80%)
Ethnic groups (n, %)	
Malay	19 (31.7%)
Chinese	17 (28.3%)
Indian	24 (40.0%)
Body mass index (BMI) (kg/m2) (mean±SD)	26.21± 5.20
Body mass index (BMI) (kg/m2) (n, %)	
<18.5	2 (3.3%)
18.5-25	27 (45.0%)
25.1-30	19 (31.7%)
>30	12 (20.0%)
Education level (n, %)	
Primary school	10 (16.7%)
Secondary school	27 (45.0%)
Pre-university	8 (13.3%)
Diploma	4 (6.7%)
Degree	11 (18.3%)
Salary (n, %)	2 (3.3%)
	9 (15.0%)
RM500-RM1000	15 (25.0%)
RM1001-RM2000	7 (11.7%)

RM2001-RM5000 >RM5000 Dependent on family	27(45.0%)
Marital status (n, %) Single Married Widow/widower	 17 (28.3%) 41 (68.3%) 2 (3.3%)
Smoking (n, %) Yes No	 0 60 (100%)
Alcohol (n, %) Yes No	 5(8.3%) 55 (91.7%)
Comcomitant medical illnesses (n, %) Hypertension Diabetes mellitus Hypercholesterolaemia Ischaemic heart disease (IHD) Bronchial asthma Osteoarthritis Epilepsy Hyperthyroidism Degenerative disc disease	 17 (28.3%) 10 (16.7%) 6 (10%) 4 (6.7%) 3 (5%) 2 (3.3%) 1 (1.7%) 1 (1.7%) 1 (1.7%)
Past gynaecological history (n, %) Transabdominal hysterectomy (TAHBSO)	 5 (5.0%)
Psychiatric illnesses (n, %) Anxiety Depression Obsessive compulsive disorder (OCD) Psychosis Schizophrenia	21 (35%) 12 (20%) 4 (6.7%) 1(1.7%) 3 (5%) 1 (1.7%)

Dyspepsia (n, %)	
Yes	33 (55%)
No	27 (45%)

4.3. Characteristics of headache

The headache characteristics are described in **Table 2**

Frequency of headache in 15 days/month

30 (50%) patients had headache more than fifteen days per month (chronic headache), whereas 30 (50%) patients had headache less than fifteen days a month.

Table 2: The headache characteristics

	Patients (n=60)
Time of onset (n, %)	
On rising	18 (30%)
Afternoon/evening	17 (28.3%)
Night	8 (13.3%)
Anytime	17 (28.3%)
Frequency (n, %)	
Everyday	19 (31.7%)
Every other day	11 (18.3%)
>1-3x/week	10 (16.7%)
1x/week-1x/2week	10 (16.7%)
<1x/2week-1x/month	5 (8.3%)
<1x/month-1x/6months	5 (8.3%)
Frequency of headache in 15 days/month (n, %)	

Headache < 15days/month Headache ≥15days/month	30 (50%) 30 (50%)
Site of pain (n, %)	
Frontal Temporal Parietal Occipital Back of neck Orbital/supraorbital Whole Head	12 (20%) 36 (60%) 17 (28.3%) 22 (36.7%) 6 (10%) 1 (1.7%) 6 (10%)
Laterality of pain (n, %)	
Unilateral Bilateral Unilateral alternating	33 (55%) 20 (33.3%) 7 (11.7%)
Character of headache (n, %)	
Throbbing/pulsating Sharp/stabbing Tightness/pressing Not specific	34 (56.7%) 9 (15%) 15 (25%) 2 (3.3%)
Intensity of headache (n, %)	
Mild Moderate Severe	6 (10%) 30 (50%) 24 (40%)
Visual analogue scale, mm (mean±SD)	67.17 ±17.37
Triggering factor (n, %)	
Stress Sun exposure Feeling Tired Sleep deprivation Oversleep Fever	47 (78.3%) 36 (60.0%) 35 (58.3%) 33 (55.0%) 3 (5.0%) 17 (28.3%)

Missing meal	9 (15.0%)
Weather	10 (16.7%)
Menstruation	10 (16.7%)
Excitement	4 (6.7%)
Medications (n, %)	
Symptomatic	
Paracetamol	41 (68.3%)
Tramadol	13 (21.7%)
Ergotamine	3 (5.0%)
Sumatriptan	6 (10.0%)
Prophylactic	
Amitriptyline	8 (13.3%)
Propranolol	3 (5.0%)
Gabapentin	4 (6.7 %)
Pregabalin	1 (1.7%)
Sibelium	3 (5.0%)
Topiramate	1 (1.7%)
Alternative medication use (n, %)	
Tiger Balm	13 (21.7%)
"Minyak Cap Kapak" Oil	22 (36.7%)

4.4. Headache subtypes

Table 3 shows the different headache subtypes. 17 (28.3%) patients had migraine without aura and 14 (23.3%) patients had migraine with aura. 16 (51.6%) patients had chronic migraine.

There were 14 (23.3%) patients with frequent tension-type headache (TTH), 12 (20.0%) patients with chronic TTH, and three (5.0%) patients with infrequent TTH.

Table 3: Headache diagnosis

Headache subtype	Patients (n=60)
Migraine without aura (n, %)	17 (28.3%)
Migraine with aura (n, %)	14 (23.3%)
Infrequent tension-type headache (n, %)	3 (5.0%)
Frequent tension-type headache (n, %)	14 (23.3%)
Chronic tension-type headache (n, %)	12 (20.0%)

4.5. Association between the headache subtypes and dyspepsia

The univariate analysis of the headache subtypes and dyspepsia is shown in Table **4**. On univariate analysis, migraine was more likely to be associated with dyspepsia compared to TTH with statistical significance (p=0.019). 22 (71%) migraine patients had dyspepsia, while nine (29%) migraine patients did not have dyspepsia. Only 11 (37.9%) patients with tension-type headache (TTH) had dyspepsia, whereas 20 (62.5%) patients with TTH did not have dyspepsia (p=0.014).

14 (82.4%) migraine without aura patients had dyspepsia whereas three (17.6%) migraine with aura patients did not have dyspepsia. Eight (57.1%) migraine with aura

patients had dyspepsia, and six (42.9%) migraine without aura patients did not have dyspepsia (p=0.23).

Table 4: Univariate analysis of the headache subtypes and dyspepsia

	Dyspepsia		p-value
	Yes	No	
Migraine (n, %)	22 (71%)	9 (29%)	***0.019***
TTH (n, %)	11 (37.9%)	18 (62.1%)	
Migraine without Aura (n, %)	14 (82.4%)	3 (17.6%)	0.23
Migraine with Aura (n, %)	8 (57.1%)	6 (42.9%)	
Infrequent TTH (n, %)	0 (0%)	3 (100%)	0.15
Frequent TTH (n, %)	4 (28.6%)	10 (71.4%)	
Chronic TTH (n, %)	7 (58.3%)	5 (41.7%)	

4.6. Types of personality traits in the headache patients with and without dyspepsia

There was no statistical significance between headache with dyspepsia group/headache alone group with the five features of MMPI (neuroticism, psychoticism, introversion, aggression, overly constrained). (**Table 5**)

Neuroticism

Five (25%) of the headache patients had neuroticism. Three (15%) patients with both headache and dyspepsia had neuroticism.

Psychoticism

Fourteen (70%) of the headache patients had psychoticism. Seven (35%) patients with both headache and dyspepsia had psychoticism.

Introversion

Four (20%) of the headache patients had introversion. Three (15%) patients with both headache and dyspepsia had introversion.

Aggression

Two (10%) of the headache patients had aggression. Only one (5%) patient with both headache and dyspepsia had aggression.

Overly constrained

Five (25%) of the headache patients were overly constrained. Four (20%) patients with both headache and dyspepsia were overly constrained.

Table 5: Types of personality traits in headache patients with and without dyspepsia

	Headache with dyspepsia (n=11)	Headache without dyspepsia(n=9)	p-value
Neuroticism (high scores)			
Yes	3 (27.3%)	2 (22.2%)	1.00
No	8 (72.7%)	7 (77.8%)	
Psychoticism (high scores)			
Yes	7 (63.6%)	7 (77.8%)	0.64
No	4 (36.4%)	2 (22.2%)	
Introversion (high scores)			
Yes	3 (27.3%)	1 (11.1%)	0.59
No	8 (72.7%)	8 (88.9%)	
Aggression (high scores)			
Yes	1 (9.1%)	1 (11.1%)	1.00
No	10 (90.9%)	8 (88.9%)	
Overly constrained (low scores for disconstraint)			
Yes	4 (36.4%)	1 (11.1%)	0.32
No	7 (63.6%)	8 (88.9%)	

4.7. The MMPI results of 20 headache patients

The complete MMPI results of the 20 headache patients are listed in **Table 6**.

Table 6: List of 20 patients who had complete MMPI results (headache, dyspepsia and personality traits)

Patients	Headache subtype	dyspepsia		Neuroticism	Psychoticism	Aggression	Introversion	Overly constrained
		Yes	No					
	Migraine w/o aura	Yes		no	no	no	no	yes
	Migraine w/o aura	Yes		no	yes	no	yes	no
	Frequent TTH		No	no	yes	no	no	no
	Migraine with aura	Yes		no	no	no	no	yes
	Migraine with aura	Yes		no	yes	no	no	no
	Frequent TTH		No	no	yes	yes	no	no
	Chronic TTH		No	no	yes	no	no	no
	Chronic TTH		No	yes	yes	no	yes	no
	Migraine with aura	Yes		no	yes	no	no	no
	Migraine w/o aura	Yes		no	yes	no	no	no
	Migraine with aura		No	yes	no	no	no	no
	Chronic TTH	Yes		yes	yes	no	yes	yes
	Infrequent TTH		No	no	yes	no	no	no
	Migraine with aura		No	no	yes	no	no	yes
	Frequent TTH		No	no	no	no	no	no
	Migraine w/o aura	Yes		no	no	no	yes	yes
	Migraine w/o aura	Yes		no	yes	no	no	no
	Infrequent TTH		No	no	yes	no	no	no

9.	Chronic TTH	Yes		yes	yes	no	no	no
0.	Frequent TTH	Yes		yes	no	yes	no	no

Footnotes: migraine w/o aura=migraine without aura

CHAPTER 5: DISCUSSION

55% of the headache patients had dyspepsia, and migraine was more likely to be associated with dyspepsia compared to TTH

We conducted a study to find out the frequency of dyspepsia in the patients with migraine and tension-type headache (TTH) in University Malaya Medical Centre. The frequency of dyspepsia in the headache patients was 55%. Our results were in accordance with previous population based and clinic-based studies concerning comorbidity of headache and gastrointestinal conditions such as dyspepsia. (15-17, 42-43) In the population based Head-HUNT study, there was a higher headache prevalence in all the age groups among those with many reflux symptoms compared with those with some or no such complaints. (16)

In this study, migraine was more likely to be associated with dyspepsia compared to TTH. 71% of the patients with migraine presented with dyspepsia. A previous clinic-based study showed a higher prevalence of dyspepsia among the patients with migraine compared to controls. (17) In another study on the patients with dyspepsia, 29% of them were found to have migraine. (15)

This was also evident in a study conducted in the Middle East which demonstrated that migraine was associated with dyspepsia. (44) Lankarani et al conducted a population based study in Fars province, Iran and demonstrated that there was a strong significant association between migraine and functional dyspepsia. (44) Histological analysis from gastric or duodenal biopsy in these patients showed no positive pathological findings. (44)

37.9% of the patients with TTH in our study also complained of dyspepsia. This may suggest that the headache patients are more predisposed to other pain syndromes and somatic complaints. (45)

Abnormal visceral mechanosensory and vagal function play a role in some patients with dyspepsia. (46-48) In addition, a disturbance of visceral nerves is involved in the pathophysiology of migraine. (49-50) The other likely mechanism is the involvement of neuropeptides in both migraine and dyspepsia. (51, 52) Particularly, the neuropeptide calcitonin gene-related peptide (CGRP) level has been raised during the migraine attack. (51)

Autonomic nervous system (ANS) dysfunction, which has previously been linked to both headache and GI complaints, might be a common mechanism. (53) The association between headache and GI symptoms may be related to interactions between the nociceptive system and the ANS. (54) Some studies have shown that autonomic dysfunction in the patients with migraine during migraine attacks and headache free intervals. (55) Dyspepsia may result from the dysregulation of the bi-

directional communication between the gut with its enteric nervous system and the central nervous system; the brain–gut axis. (46)

It has been postulated that the migraine patients with dyspepsia may have increased hypersensitivity to gastric distension and reduced tolerance to food compared to healthy individuals. (56)

50% of the patients had chronic headache

In our study we noted 50% of the patients had headache for more than 15 days. This result may reflect that some of the patients were in transition from episodic migraine patients or infrequent TTH type of headaches to chronic phase of the respective disease. (57, 58) Chronic migraine (CM) and episodic migraine (EM) are part of the spectrum of migraine disorders, but they are distinct clinical entities. (57, 59) Multiple factors are associated with this clinical condition. Although obesity (BMI>30) is not a risk factor for the development of EM, it is a risk factor for progression of EM to CM. (57, 60) One large population-based study reported that the prevalence of CM ranged from 0.9% in normal-weighted persons to 1.6% in the obese population and 2.5% in the morbidly obese. (60) We found that in our cohort of patients, about 20% patients had BMI more than 30.

However, recently presented results support a casual rather than consequential relationship between depression and the onset of CM. Adjusted longitudinal modelling of the American Migraine Prevalence and Prevention (AMPP) study data aimed to assess the role of depression as a predictor of new onset of CM among

persons with EM and concluded that, among persons with EM, severe depression was associated with an about 1.28-fold increased risk of the subsequent onset of CM the following year, even after controlling for factors of headache-related disability and headache-day frequency. (61)

Headache with personality trait

The people who report their headache complaints are more likely to report other complaints such as GI symptoms. This may create strong associations that are explained by personality traits rather than by biological mechanisms. (62) In addition, psychological factors may be a common denominator for headache and GI symptoms, as both have been demonstrated to be strongly associated with anxiety and depression. (63)

Neuroticism

The personality trait of neuroticism has been associated with primary headache disorders. (64) In our study, 25% of the headache patients had neuroticism.

In a previous study, the migraine patients had higher neuroticism scores on the MMPI. (65) The patients rated themselves as less calm, less capable of relaxing and more often irritable and they responded more often with internal tension especially in work and other achievement situations. (65) In our study, 50% of patients are in working category but only 11.7% are in the higher income category. Hence higher cost of living in urban area and generally lower quality of life may well contribute to the development of this particular trait. (66)

Psychoticism

70% of the headache patients have psychoticism. A Malaysian study showed that depression/anxiety commonly associated with psychoticism, was more common in females. (67) Various demographic and socioeconomic factors may have contributed to this particular trait such as higher level of stress and financial burden in the urban population. The majority of patients in our study are city dwellers. About 45% of our patients were dependent on family financially, and only about 25% of patients were in the middle income group (RM 2001-RM5000).

Introversion

20% of the headache patients had introversion. Asian populations are thought be introverted in general due to deep rooting of our culture and social upbringing. (68, 69) Asians also are noted to be less defensive, less given to risk taking and less extraverted compared to our European/ Western counterparts. (23, 68-70)

Aggression

Headache patients particularly those with migraine showed higher level of aggression. (71) However only about 8% of the headache patients in our study had aggression. Recurrent pain symptoms and intensity of headache may have influenced the development of this trait. We noted that 50% of our patients had moderate intensity headache whereas 40% of the patients had severe intensity headache.

Overly constrained

25% of the headache patients were overly constrained. Our culture too would have contributed to this particular trait, as Asians are known to be overly constraint compared to the westerners. (68)

Dyspepsia with personality trait

Unfortunately, due to the very small number of completed MMPI questionnaires among patients with headache, we were unable to demonstrate any obvious associations between personality traits and our study subjects.

In a previous study, the patients with dyspepsia had higher scores of neuroticism. (72) These patients also increased rate of somatization and anxiety. (73) In another study, moderate to high neuroticism and marked aggressiveness predicted poor response to treatment for functional gastrointestinal disorder. (74)

The strength of this study was this study helped in the evaluation of personality traits in the patients and dyspepsia, as there is limited literature available on headache, dyspepsia and personality trait. An assessment of personality traits can assist with the further management and treatment of these patients, such as with pharmacological management or behavioural therapy.

Several limitations in our study should be noted. Firstly, the sample size was too small to detect for differences in personality traits between patients with headache/ dyspepsia and those with headache alone. Hence, the lack of association between personality types and headache patients with dyspepsia may have been a Type II statistical error. This was a hospital-based research and relative proportion of headache and dyspeptic patients may not represent the main population.

As most headache and dyspepsia cases are usually managed in primary care, the severity of symptoms may differ between primary, secondary or tertiary care. Therefore, there was a selection bias present. This study also did not examine cultural factors as potential co-founders in the association of headache, dyspepsia and personality traits.

In conclusion, 55% of the headache patients in this study had dyspepsia. Migraine was more likely to be associated with dyspepsia compared to TTH. A high proportion of the headache group and headache/dyspepsia group had psychoticism. The next most common personality trait was overly constrained.

REFERENCES

1. Lipton RB, Bigal ME, Steiner TJ, et al. Classification of primary headaches. Neurology 2004; 63:427–435.

2. Martelletti P, Haimanot RT, Lainez MJ, et al. The Global Campaign (GC) to Reduce the Burden of Headache Worldwide. The International Team for Specialist Education (ITSE). J Headache Pain 2005; 6:261–263.

3. Silberstein SD. Migraine. Lancet 2004; 363:381–391.

4. Vos T, Flaxman AD, Naghavi M, Lozano R, et al. Years lived with disability (YLD) for 1160 sequelae of 289 diseases and injuries 1990–2010: A systematic analysis for the global burden of disease study 2010. Lancet 2012; 380: 2163–2196.

5. Goadsby PJ. Recent advances in the diagnosis and management of migraine. BMJ 2006; 332:25–29.

6. Goadsby PJ. Migraine pathophysiology. Headache 2005; 45 Suppl 1: S14–S24.

7. Eriksen MK, Thomsen LL and Olesen J. Implications of clinical subtypes of migraine with aura. Headache 2006; 46:286–297.

8. Rasmussen BK, Jensen R, Schroll M and Olesen J. Epidemiology of headache in a general population – A prevalence study. J Clin Epidemiol 1991; 44: 1147–1157.

9. Headache Classification Committee of International Headache Society (IHS). (2013) The International Classification of Headache Diorders 3rd Edition (beta version). Cephalalgia 33(9): 629-808.

10. Holroyd KA, Stensland M, Lipchik GL, et al. Psychosocial correlates and impact of chronic tension-type headaches. Headache 2000; 40: 3–16.

11. N. J. Talley, V. Stanghellini, R. C. Heading, K. L. Koch, J. R. Malagelada, G. N. J. Tytgat. Functional gastroduodenal disorders. Gut. 1999; 45(2):1137-1142.

12. J. Tack, K. J. Lee. Pathophysiology and treatment of functional dyspepsia. Journal of Clinical Gastroenterology. 2005; 39(5): S211–S216.

13. Lebedeva ER, Olesen J, Osipova VV, Volkova LI, Tabeeva GR, et al. The Yekaterinburg headache initiative; an interventional project, within the Global Campaign against headache, to reduce the burden of headache in Russia. J Headache Pain. 2013; 14(1):101.

14. Mahadeva S, Goh KL. Epidemiology of functional dyspepsia: a global perspective. World J Gastroenterol. 2006; 12(17):2661–6.

15. Meucci G, Radaelli F, Prada A, Bortoli A, Crotta S, et al. Increased Prevalence Of Migraine In Patients With Uninvestigated Dyspepsia Referred For Open-Access Upper Gastrointestinal Endoscopy. Endoscopy 2005; 37(7):622–5.

16. Aamodt AH, Stovner LJ, Hagen K, Zwart JA. Comorbidity of headache and gastrointestinal complaints. The Head-HUNT Study. Cephalalgia. 2008; 28:144–151.

17. Kurth T, Holtmann G, Neufang-Hüber J, Gerken G, Diener HC. Prevalence of unexplained upper abdominal symptoms in patients with migraine. Cephalalgia. 2006; 26:506–510.

18. Tajti J, Uddman R, Edvinsson L. Neuropeptide localization in the 'migraine generator' region of the human brainstem. Cephalalgia 2001; 21:96–101.

19. Kaneko H, Mitsuma T, Uchida K, Furusawa A, Morise K. Immunoreactive-somatostatin, substance P, and calcitonin gene-related peptide concentrations of the human gastric mucosa in patients with nonulcer dyspepsia and peptic ulcer disease. Am J Gastroenterol. 1993; 88:898–904.

20. Kincannon JC. Prediction of the standard MMPI scale scores from 71 items: the mini-mult. J Consult Clin Psychol. 1968; 32: 319-25.

21. Gayton WF, Bishop JS, Citrin MM, Bassett JS. An investigation of the Mini-Mult validity scales. J Pers Assess 1975; 39: 511-3.

22. Digman, J.M. Personality structure: Emergence of the five-factor model. Annual Review of Psychology. 1990; 41: 417–440.

23. Allik J, McCrae RR. Toward a geography of personality traits: Patterns of profiles across 36 cultures. Journal of Cross-Cultural Psychology. 2004; 35:13–28.

24. Theodore Millon; Roger D. Davis (1996). Disorders of Personality: DSM-IV and Beyond. New York: John Wiley & Sons, Inc ISBN –471-01186-10

25. American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders (5th ed.). Arlington: American Psychiatric Publishing

26. A Guide to DSM-5: Personality Disorders Medscape Psychiatry, Bret S. Stetka, MD, Christoph U. Correll, May 21, 2013.

27. Bertolotti G, Vidotto G, Sanavio E, Frediani F. Psychological and emotional aspects and pain. Neurol Sci 2003; 24 Suppl 2: S71-5.

28. Chen W, Yu S, Zhu J, Chai H, He W et al. Personality characteristics of male sufferers of chronic tension-type and cervicogenic headache. J Clin Neurol. 2012; 8: 69-74.

29. Wittrock DA, Foraker SL. Tension-type headache and stressful events: the role of selective memory in the reporting of stressors. Headache. 2001; 41: 482-93.

30. Perozzo P, Savi L, Castelli L, Valfre W, Lo Giudice R, et al. Anger and emotional distress in patients with migraine and tension-type headache. J Headache Pain 2005; 6: 392-9.

31. Leonardi M, Musicco M, Nappi G. Headache as a major public health problem: current status. Cephalalgia 1998; 18 Suppl 21: 66-9.

32. Leonardi M, Steiner TJ, Scher AT, Lipton RB. The global burden of migraine: measuring disability in headache disorders with WHO's Classification of Functioning, Disability and Health (ICF). J Headache Pain 2005; 6: 429-40.

33. Lyngberg AC, Rasmussen BK, Jorgensen T, Jensen R. Incidence of primary headache: a Danish epidemiologic follow-up study. Am J Epidemiol 2005; 161: 1066-73.

34. Jelinski SE, Becker WJ, Christie SN, Giammarco R, Mackie GF, et al. Demographics and clinical features of patients referred to headache specialists. Can J Neurol Sci 2006; 33: 228-34.

35. Edmeads J, Findlay H, Tugwell P, Pryse-Phillips W, Nelson RF, et al. Impact of migraine and tension-type headache on life-style, consulting behavior, and medication use: a Canadian population survey. Can J Neurol Sci 1993; 20: 131-7.

36. Perozzo P, Savi L, Castelli L, Valfre W, Lo Giudice R, et al. Anger and emotional distress in patients with migraine and tension-type headache. J Headache Pain 2005; 6: 392-9.

37. Schmidt FN, Carney P, Fitzsimmons G. An empirical assessment of the migraine personality type. J Psychosom Res 1986; 30: 189-97.

38. T. T. Haug, S. Svebak, I. Wilhelmsen, A. Berstad, H. Ursin. Psychological factors and somatic symptoms in functional dyspepsia. A comparison with duodenal ulcer and healthy controls. Journal of Psychosomatic Research. 1994; 38 (4):281–291.

39. B. E. Lacy, K. Everhart, M. D. Crowell. Functional dyspepsia is associated with sleep disorders. Clinical Gastroenterology and Hepatology. 2011; 9(5):410–414.

40. L. Van Oudenhove, K. Demyttenaere, J. Tack, Q. Aziz. Central nervous system involvement in functional gastrointestinal disorders. Best Practice and Research: Clinical Gastroenterology. 2004; 18(4): 663–680.

41. Naing L, Winn T, Rusli BN. Practical Issues in Calculating the

Sample Size for Prevalence Studies. Archives of Orofacial Sciences 2006; 1: 9-14
9

42. Merikangas KR, Fenton BT. Comorbidity of migraine with somatic disorders in a large-scale epidemiologic study in the United States. In: Olesen J, editor. Headache classification and epidemiology, chap. 47. New York: Raven Press, Ltd., 1994:301–14.

43. Featherstone HJ. Medical diagnoses and problems in individuals with recurrent idiopathic headache. Headache 1985; 25:136–40.

44. Lankarani KB, Akbari M, Tabrizi R. Association of Gastrointestinal Functional Disorders and Migraine Headache: a Population Base Study. Middle East J Dig Dis. 2017 Jul; 9(3):139-145.

45. Hagen K, Einarsen C, Zwart JA, Svebak S, Bovim G. The co-occurrence of headache and musculoskeletal symptoms amongst 51 050 adults in Norway. Eur J Neurol 2002; 9:527–33.

46. Holtmann G, Goebell H, Jockenhoevel F, Talley NJ. Altered vagal and intestinal mechanosensory function in chronic unexplained dyspepsia. Gut 1998; 42:501–6.

47. Holtmann G, Goebell H, Talley J. Impaired small intestinal peristaltic reflexes and sensory thresholds are independent functional disturbances in patients with chronic unexplained dyspepsia. Am J Gastroenterol 1996; 91:485–91.

48. Andrews PL, Sanger GJ. Abdominal vagal afferent neurones: an important target for the treatment of gastrointestinal dysfunction. Curr Opin Pharmacol 2002; 2:650–6.

49. Sicuteri F, Nicolodi M. Visceral and somatic profiles of needless pain and nonpainful sensations in idiopathic headache. Clin J Pain 1991; 7 (Suppl. 1):S38–43.

50. Moskowitz MA. Basic mechanisms in vascular headache. Neurol Clin 1990; 8:801–15.

51. Edvinsson L. Calcitonin gene-related peptide (CGRP) and the pathophysiology of headache: therapeutic implications. CNS Drugs 2001; 15:745–53.

52. Gschossmann JM, Coutinho SV, Miller JC, Huebel K, Naliboff B, Wong HC et al. Involvement of spinal calcitonin gene-related peptide in the development of acute visceral hyperalgesia in the rat. Neurogastroenterol Motil 2001; 13:229–36.

53. Haug TT, Svebak S, Hausken T, Wilhelmsen I, Berstad A, Ursin H. Low vagal activity as mediating mechanism for the relationship between personality factors and gastric symptoms in functional dyspepsia. Psychosom Med 1994; 56:181–6.

54. Cortelli P, Pierangeli G. Chronic pain–autonomic interactions. Neurol Sci 2003; 24 (Suppl. 2):68–70.

55. Shechter A, Stewart WF, Silberstein SD, Lipton RB. Migraine and autonomic nervous system function: a population-based, case–control study. Neurology 2002; 58:422–7.

56. Pucci E, Di Stefano M, Miceli E, Corazza GR, Sandrini G, Nappi G. Patients with headache and functional dyspepsia present meal-induced hypersensitivity of the stomach. J Headache Pain 2005; 6:223-6.

57. Lipton RB. Tracing transformation: chronic migraine classification, progression, and epidemiology. Neurology. 2009; 72:S3–S7.

58. Kropp P, Egli G, Sándor PS. Tension-type headache introduction and diagnostic criteria. Handb Clin Neurol. 2010; 97:355-8.

59. Olesen J, Bousser MG, Diener HC, Dodick D, First M, Goadsby PJ, Gobel H, Lainez MJ, Lance JW, Lipton RB, Nappi G, Sakai F, Schoenen J, Silberstein SD, Steiner TJ. New appendix criteria open for a broader concept of chronic migraine. Cephalalgia. 2006; 26:742–746.

60. Bigal ME, Lipton RB. Obesity is a risk factor for transformed migraine but not chronic tension-type headache. Neurology. 2006; 67:62.

61. Ashina S, Serrano D, Lipton RB, Maizels M, Manack AN, Turkel CC, Reed ML, Buse DC. Depression and risk of transformation of episodic to chronic migraine. J Headache Pain. 2012 Nov; 13(8):615-24.

62. Hagen K, Stovner L, Zwart JA. Potentials and pitfalls in analytical headache epidemiological studies—lessons to be learned from the Head-HUNT Study. Cephalalgia 2007; 27:403–13.

63. Haug TT, Mykletun A, Dahl AA. Are anxiety and depression related to gastrointestinal symptoms in the general population? Scand J Gastroenterol 2002; 37:294–8.

64. Silberstein S, Lipton R, Breslau N. Migraine: association with personality characteristics and psychopathology. Cephalalgia 1995; 15:358–369.

65. Huber D, Henrich G. Personality traits and stress sensitivity in migraine patients. Behav Med. 2003; 29(1):4-13.

66. Guitera V, Muñoz P, Castillo J, Pascual J. Quality of life in chronic daily headache: A study in a general population. Neurology. 2002; 58(7):1062–1065.

67. Krishnaswamy S, Subramaniam K, Jemain AA, Low WH, Ramachandran P, Indran T, Patel V. Common mental disorders in Malaysia: Malaysian mental health survey, 2003-2005. Asia Pacific Psychiatry. 4(3)2012; 4(3): 201-209.

68. Mastor KA, Jin P, Cooper M. Malay culture and personality. American Behavioral Scientist. 2000; 44:95–111.

69. McCrae RR, Terracciano A. Personality profiles of cultures: aggregate personality traits. Journal of Personality and Social Psychology. 2005; 89:407–425.

70. Barrett P, Eysenck S. The assessment and personality factors across 25 countries. Personality and Individual differences. 1984; 5:615-632.

71. Cao M, Zhang S, Wang K, Wang Y, Wang W. Personality traits in migraine and tension-type headaches: a five-factor model study. Psychopathology. 2002 Jul-Aug; 35(4):254-8.

72. Filipović BF, Randjelovic T, Ille T, Markovic O, Milovanović B, Kovacevic N, Filipović BR. Anxiety, personality traits and quality of life in functional dyspepsia-suffering patients. Eur J Intern Med. 2013 Jan; 24(1):83-6.

73. Holtmann G, Kutscher SU, Haag S, Langkafel M, Heuft G, Neufang-Hueber J, Goebell H, Senf W, Talley NJ. Clinical presentation and personality factors are predictors of the response to treatment in patients with functional dyspepsia; a randomized, double-blind placebo-controlled crossover study. Dig Dis Sci. 2004 Apr; 49(4):672-9.

74. Tanum L, Malt UF. Personality Traits Predict Treatment Outcome with an Antidepressant in Patients with Functional Gastrointestinal Disorder. Scandinavian Journal of Gastroenterology. 2000; 35 (9): 935–94.

APPENDIX A

PARTICIPANT INFORMATION SHEET

Study Title: Association between types of personality traits in patients with functional dyspepsia and headache: does a relationship exist?

Version No: 1

Version Date: 24th March 2017

We would like to invite you to take part in a research study. Before you decide whether to participate, you need to understand why the research is being done and what it would involve. Please take time to read the following information carefully; talk to others about the study if you wish.

Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Attention to the investigator: Please fill in simple layman language as you would speak to research subjects.

1. **What is the purpose of this study?**
   To evaluate for stomach discomfort and various personality trait in headache patients

2. **Why is this study important?**
   The Malaysian people have both headache and stomach discomfort. A variety of personality trait is observed among these patients.

3. **What type of study is this?**
   Questionnaires

4. **What is the procedure that is being tested? (If applicable)**
   None

5. **Does the investigatory product contain cultural sensitive ingredients eg: bovine or porcine? (if applicable)**
   None

6. **Why have I been invited to participate in this study?**
   You have been invited because you have headache.

7. Who should not participate in the study?

(a) Headache with neck stiffness
(b) Presence of brain tumour
(c) Any patient who is under age 12.

8. Can I refuse to take part in the study?

Yes

9. What will happen to me if I take part?

The information of the patients, who have consented to the study, will be collected. The patients are evaluated using a headache questionnaire. The patients will be assessed regarding the character of headache and management of headache.
The headache intensity will be assessed by Visual analogue scale. The patients will be evaluated for stomach discomfort by a questionnaire. They will also be assessed for the personality tart by another questionnaire.

10. How long will I be involved in this study?

One year

11. What are the possible disadvantages and risks?

This will take about 30-60 minutes of your time.

12. What are the possible benefits to me?

This study will enable detection of stomach discomfort and assessment of personality trait. This will enable further management of stomach discomfort if present.

13. Who will have access to my medical records and research data?

Assoc Prof Sharon and Dr Anand

14. Will my records/data be kept confidential?

Yes

15. What will happen to any samples I give? (If applicable)

16. What will happen if I don't want to carry on with the study?

Nothing will happen to you if you do not wish to carry on with the study. Your headache will continue to be managed in clinic.

17. What if relevant new information about the procedure/ drug/ intervention becomes available? (If applicable)

18. What happens when the research study stops? (If applicable)

19. What will happen to the results of the research study?

For Master thesis presentation and publication in journal.

20. Will I receive compensation for participating in this study?
No

21. Who funds this study?
No funding

22. Who should I contact if I have additional questions/problems during the course of the study?

Name of investigator 1: Assoc Prof Sharon
Affiliation: University Malaya Medical Centre
Telephone number (Mobile number): 017-3508462

Name of investigator 2: Dr Anand
Affiliation: University Malaya Medical Centre
Telephone number (Mobile number): 016-3135567

23. Who should I contact if I am unhappy with how the study is being conducted?

Medical Research Ethics Committee
University of Malaya Medical Centre
Telephone number: 03-7949 3209/2251

BK-MIS-1116-E03

APPENDIX B

Patient Name:_____Date:_____

Visual Analog Scale (VAS)*

No pain

Pain as bad as it could possibly be

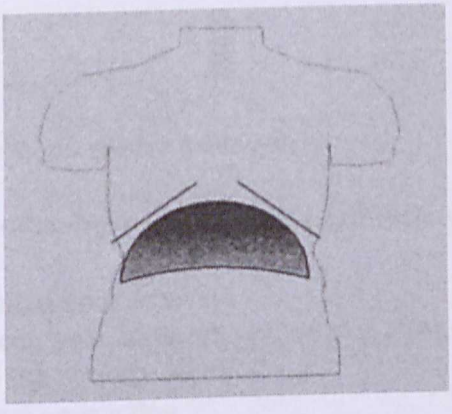
*A 10cm baseline is recommended for VAS scale

From: Acute Pain Management Objective of Medical Procedures and Trauma, Clinical Practice Guideline No.1 AHCPR Publication
No. 92-0032: February 1992. Agency for Health Research & Quality, Rockville, MD; pages 116-117

APPENDIX C

Malaysian English version of the Leeds Dyspepsia Questionnaire

1. Over the last **FOUR WEEKS** have you had any indigestion (a pain in the upper abdomen) (see picture)?



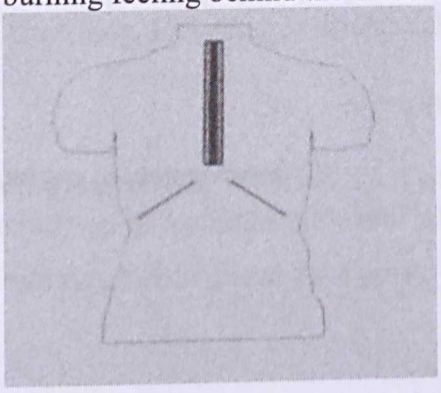
YES [ ]
NO [ ]

If the answer is no please go to question 2

a) How often have you had indigestion over the last **FOUR WEEKS** ?
   - Less than once a month [ ]
   - Between once a month and once a week [ ]
   - More than once a week [ ]
   - At least once a day [ ]

b) How severe has your indigestion been over the last **FOUR WEEKS**?
   - Very mild [ ]
   - Mild [ ]
   - Moderate [ ]
   - Severe [ ]
   - Very severe [ ]

2. Over the past **FOUR WEEKS** have you ever experienced heartburn (a burning feeling behind the breast bone) (see picture)?



YES [ ]
NO [ ]

If the answer is no please go to question 3.

a) How often have you had the heartburn over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your heartburn been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

3. Over the past **FOUR WEEKS** has food or drink ever got stuck in the middle of your chest as it went down?

YES [ ]
NO [ ]

If the answer is no please got to question 4.

a) What sticks in the middle of your chest as it goes down?

Food [ ]
Drink [ ]
Both food and drink [ ]

b) How often does it get stuck in the middle of your chest?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]

At least once a day [ ]

c) How long does food or drink stick here?

A few seconds [ ]
More than one minute [ ]

4. Over the last **FOUR WEEKS** have you experienced any regurgitation (an acid taste coming up into your mouth from your stomach)?

YES [ ]
NO [ ]

If the answer is no please go to question 5.

a) How often have you had regurgitation over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your regurgitation been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

5. Over the last **FOUR WEEKS** have you noticed excessive burping?

YES [ ]
NO [ ]

If the answer is no please go to question 6.

a) How often have you experienced burping over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your burping been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

6. Over the last **FOUR WEEKS** have you experienced any nausea (a feeling like vomiting without actually vomiting)?

YES [ ]
NO [ ]

If the answer is no please go to question 7.

a) How often have experienced nausea over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your nausea been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

7. Over the last **FOUR WEEKS** have you experienced any vomiting?

YES [ ]
NO [ ]

If the answer is no please go to question 8.

a) How often have experienced vomiting over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your vomiting been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

8. Over the last **FOUR WEEKS** have you noticed an excessive feeling of fullness after eating?

YES [ ]
NO [ ]

If the answer is no please go to question 9.

a) How often have experienced fullness over the last **FOUR WEEKS**?

Less than once a month [ ]
Between once a month and once a week [ ]
More than once a week [ ]
At least once a day [ ]

b) How severe has your fullness been over the last **FOUR WEEKS**?

Very mild [ ]
Mild [ ]
Moderate [ ]
Severe [ ]
Very severe [ ]

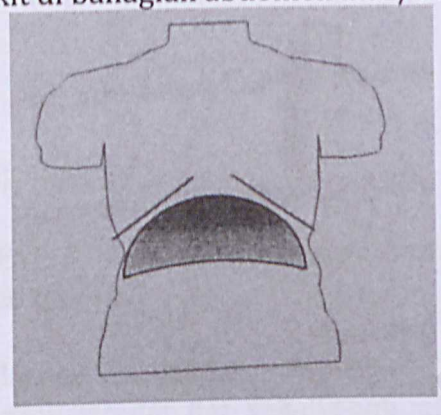
9. Which, if any, of these symptoms has been the most troublesome to you in the last **FOUR WEEKS**? **TICK ONE BOX ONLY**

a) Heartburn [ ]
b) Regurgitation [ ]
c) Indigestion [ ]
d) Burping [ ]
e) Nausea [ ]
f) Vomiting [ ]
g) Excessive fullness [ ]
h) None of these have troubled me [ ]

APPENDIX D

Malay version of the Leeds Dyspepsia Questionnaire

1. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda merasa perut tidak selesa (sakit di bahagian abdomen atas/atas perut) (lihat gambar)?



YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 2.

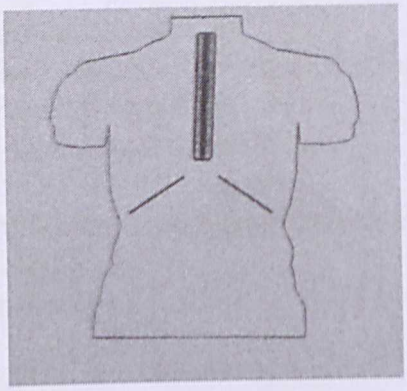
a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda merasa perut tidak selesa?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda merasa perut tidak selesa?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

2. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda mengalami pedih ulu hati (rasa terbakar dibelakang tulang dada) (lihat gambar)?



YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 3.

a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda mengalami pedih ulu hati?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda mengalami pedih ulu hati?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

3. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah ada makanan atau minuman tersangkut di tengah dada semasa ia bergerak ke bawah?

YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 4.

a) Apakah yang tersangkut di tengah dada semasa bergerak ke bawah?

Makanan [ ]
Minuman [ ]
Kedua-dua makanan dan minuman [ ]

b) Berapa kerapkah ia tersangkut di tengah dada?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

c) Berapa lamakah makanan atau minuman tersangkut di sini?
Beberapa saat [ ]
Lebih dari seminit [ ]

4. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda terluah (rasa seperti asid hendak keluar ke mulut dari perut anda)?
YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 5.

a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda terluah?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda terluah?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

5. Dalam tempoh EMPAT MINGGU yang lepas, adahkah anda sedar bahawa anda sendawa berlebihan?

YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 6.

a) Dalam tempoh EMPAT MNGGU yang lepas, berapa kerapkah anda mengalami bersendawa?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]

Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah keadaan sendawa anda?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

6. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda merasa loya (perasaan loya tetapi tidak muntah)?

YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 7.

a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda merasa loya?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda mengalami rasa loya?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

7. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda mengalami muntah?

YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 8.

a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda mengalami muntah?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda mengalami muntah?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

8. Dalam tempoh EMPAT MINGGU yang lepas, pernahkah anda merasa terlalu senak selepas makan?

YA [ ]
TIDAK [ ]

Jika jawapan anda tidak, terus ke soalan 9.

a) Dalam tempoh EMPAT MINGGU yang lepas, berapa kerapkah anda merasa senak?

Kurang dari sekali sebulan [ ]
Antara sekali sebulan dan sekali seminggu [ ]
Lebih dari sekali seminggu [ ]
Sekurang-kurangnya sekali sehari [ ]

b) Dalam tempoh EMPAT MINGGU yang lepas, berapa terukkah anda merasa senak?

Sangat ringan [ ]
Ringan [ ]
Sederhana [ ]
Teruk [ ]
Sangat teruk [ ]

9. Dalam tempoh EMPAT MINGGU yang lepas, jika ada, manakah antara gejala-gejala berikut yang mengganggu anda? TANDAKAN HANYA SATU KOTAK SAHAJA

a) Pedi ulu hati [ ]
b) Terluah [ ]
c) Perut tidak selesa [ ]
d) Sendawa [ ]
e) Loya [ ]
f) Muntah [ ]
g) Terlalu senak [ ]
h) Tiada satu pun yang mengganggu saya [ ]