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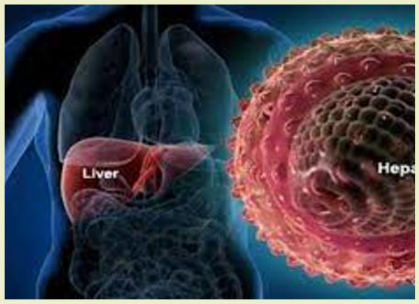

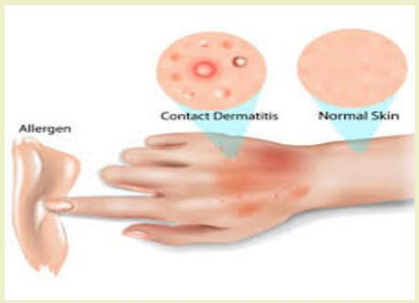

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Table of Contents

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ORIGINAL ARTICLE

PREVALENCE OF HEPATITIS A VIRUS AND HEPATITIS E VIRUS IN A TERTIARY CARE HOSPITAL, EAST DELHI, INDIA

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ABSTRACT

Background & Aim: Acute viral hepatitis (AVH) is a condition that is known to be caused by enterically transmitting Hepatitis A virus (HAV) and Hepatitis E virus (HEV). Usually, they result in self-limiting disease but can be seriously threatening if complications arise. This study was done to determine the prevalence rate of HAV and HEV in a tertiary care hospital in East Delhi, India.

Material & Methods: The retrospective and observational study of 2-year duration was conducted in the Department of Microbiology at UCMS and GTBH Delhi, India. A total of 410 samples from patients presenting with a clinical diagnosis of acute hepatitis were considered in the study. The serum samples were analysed for IgM anti-HAV and IgM anti-HEV, respectively, using commercially available ELISA kits.

Results: The seroprevalence of HAV and HEV were 2.19% and 0.24%, respectively. No case was found to be reactive for both parameters, indicating no case of co-infection. The majority of clinical samples were from female patients.

Conclusion: The incidence of HEV and HAV illnesses suggests that East Delhi has a lower prevalence rate of the reported viral illnesses. This finding suggests one of the following: limited circulation of the agents, good sanitary conditions, and/or protective immunity among the population tested. Nonetheless, we should continue to assess the ongoing conditions and take measures to improve them.

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INTRODUCTION

Hepatitis is an infection of the liver caused by several pathogenic viruses and non-pathogenic substances. It can cause a variety of health problems, some of which can be fatal. Hepatitis A, B, C, D, and E are the five main viruses that cause hepatitis [1]. Hepatitis A virus (HAV) and Hepatitis E virus (HEV) are both transmitted by water and produce acute infections that are often self-limiting. They may also lead to fulminant hepatitis. The most common method of transmission is feco-oral, and cases typically manifest as outbreaks in which the patients excrete huge quantities of infectious viruses into the surrounding area.

The enterically transmitted HEV is most common in Asia, Africa, and Central America. HEV is a non-enveloped herpesvirus belonging to the family Herpesviridae with a single-stranded positive-sense

RNA. Anti-HEV IgM and anti-HEV IgG antibodies (which may be identified) decline quickly after acute infection, reaching low levels within 6 months. Serologic testing for HEV infection is not routinely available in many diagnostic set ups.[2].

HAV is a 27-nm, non-enveloped RNA virus in the genus Hepatovirus of the family Picornaviridae that is resistant to heat, acid, and ether. When serum aminotransferase activity is high and faecal HAV shedding is still occurring, HAV antibodies (anti-HAV) might be found during the acute phase. The IgM class predominates during early immune response, which may lasts for six to twelve months. However, after convalescence, the IgG class of anti-HAV antibody becomes the dominant antibody. Hepatitis A continues to be self-limiting and does not develop into a chronic liver condition [2].

In developing countries like India, HAV and HEV have a considerable impact on public health [3]. Both of these viruses may infect humans to varying degrees, from asymptomatic infection to severe viral hepatitis, and are mostly transmitted enterically via the feco-oral route. The National Viral Hepatitis Control Program (NVHCP), which was introduced in July 2018 and seeks to drastically lower the risk, morbidity, and mortality linked to HAV and HEV by 2030 [3]. There is scanty of data on long-term study from India about the severity of the disease and clinical manifestations brought on by these two viruses [3]. Scientific understanding is lacking since laboratory aetiological diagnosis in such self-limiting hepatitis cases is underreported. To understand the frequency of HAV and HEV infections in the population, it is essential to study the epidemiological patterns of these illnesses. Due to the socioeconomic and demographic complexity that exists in India, this is important. The developments in the sanitation system as a result of the Clean India Mission 2014 will benefit from this knowledge [3]. The study we report here examines the prevalence of AVH caused by HAV and HEV among patients utilising a tertiary care facility in East Delhi, India.

MATERIAL AND METHODS

This retrospective and observational study was carried out in the Department of Microbiology at University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi, India. The research included all patients with clinical suspicion of acute viral hepatitis-like symptoms. The blood samples were sent for standard serological testing against HAV and HEV in the Virology section of the Department of Microbiology. The serum was separated using the prescribed procedure for laboratory testing [4]. Demographic and important clinical data were collected using information from the patient's record.

The aliquoted serum was stored at 4 °C (up to 7 days). According to the manufacturer's instructions, tests were run on serum samples using ELISA-based kits (OnSite R0095C, Hannover, Germany; and OnSite R0090C, Hannover, Germany). Along with test samples, kit controls and internal quality controls were used for quality assurance.

STATISTICAL ANALYSIS

Microsoft Excel was used to import the data, while SPSS version 11 was used for analysis.

RESULT

A total of 410 clinically suspected cases of acute hepatitis were included in the study from June 2019 to August 2021. Among the tested samples, 276 samples were from females and 134 were from

males. Approximately 41% (n = 171) were young adults aged 21 to 30, with the remaining 1.21 percent (n = 05) being people aged 71 to 80 (Figure 1).

Out of tested, 2.19 percent (n = 9) were reactive to anti-HEV IgM and 0.24 percent (n = 01) were reactive to anti-HAV IgM. The remaining samples tested negative for anti-HEV and anti-HAV IgM in 97.8 percent (n = 401) and 99.75 percent (n = 409) of the samples, respectively. No case was found to be reactive for both parameters, indicating no case of co-infection.

Among males**,** the patients belonging to age group of 31 to 40 (19.40%, n = 26) were higher in number as compared to elderly age group (61-80 years age) which had the lowest percentage of samples tested (2.98%, n = 4 in each group). Moreover, among 276 **females**, most samples were screened from the age groups of 21 to 30 (58.33%, n = 161) and the least from the age group of 60-70 (0.36%, n = 01), respectively. (Figure 1).

It was observed that no samples belonged to the antenatal care group or from pregnant females.

HEV POSITIVE: Out of the 410 tested samples, 09 came out as HEV positive. Male patients accounted for 73 percent (n = 05) of anti-HEV IgM positive samples, while female patients accounted for only 1.4% (n = 04) of positives. The majority of those who tested positive for HEV antibodies belonged to the age group of 21 to 30 amongst both genders (Table. 1). The seasonal distribution reveals that the positive HEV cases—66.66% (n = 6)—clustered between April and June, followed by 22.22% (n = 02) from the months of October to December (Table 2).

HAV POSITIVE: Out of the 410 tested samples, only 1 was found to be HAV positive**.** It was from a male patient of the age **group of** 11 to 20. The case was from tested in July to September quarter (Table 2).

Figure 1: Distribution of patients according to age group and gender.

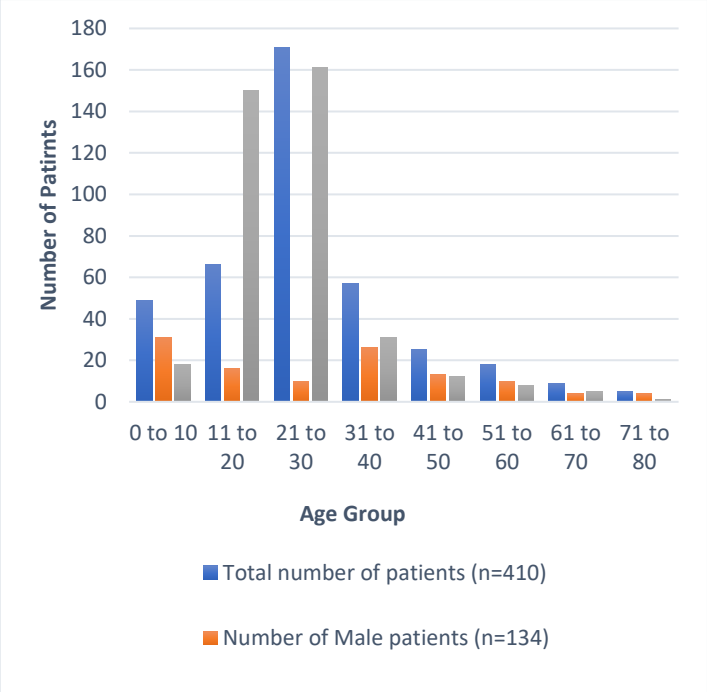

Table 1: Age and Gender wise distribution of HEV positive cases

Age Groups	Males (n=05)	Females (n=04)
0 to 10	01	00
11 to 20	00	00
21 to 30	03	03
31 to 40	00	01
41 to 50	00	00
51 to 60	01	00

61 to 70	00	00
71 to 80	00	00

Table 2: Seasonal distribution of Positive HAV and Positive HEV cases.

Months	**HEV Positive (n=09)**	**HAV Positive (n=01)**
January – March	01	00
April – June	06	00
July – September	00	01
October – December	02	00

DISCUSSION

The current study was conducted from June 2019 to August 2021. The observed HEV and HAV positive rates were 2.19% and 0.244%, respectively. Literature shows that HEV positivity rates in India ranged from 10.5% to 78.6% [2,5,6], while HAV positivity rates ranged around 8.3% to 18.3% [7]. The number of HEV cases was higher compared to HAV, which was also reported in studies by *Radhakrishnan S, Raghuraman S, et al* and *Netra S, Bithu R, et al* [8,9]. A contrasting result was reported by *Joon et al* and *Bansal et al*, which documented a higher HAV number [2,3]. The survival capability of Hepatitis E Virus (HEV) is better as compared to Hepatitis A Virus (HAV) [10,11]. This could also be a contributing factor to the higher prevalence of HEV in our study. The reason for the higher HEV prevalence could also be attributed to the circulation of specific genotypes that have zoonotic potential [12,13]. Various studies have shown that HEV has a higher predisposition to cause outbreaks in communities as compared to HEV [14, 15].

In a study done by *A Joon P Rao et al*., 11.5% of tested groups were found to have HAV & HEV coinfection [2]. Similarly, a study done by *Samaddar A et al.*, also found the HAV-HEV coinfection rate of about 2.07% [16]. Other studies of Mongolia and Cuba have also reported the presence of dual infections [17]. Such data was not observed in our study. This finding is significant as it indicates that the study population was probably not exposed to two different water-borne circulating viruses at the same time (i.e., HAV & HEV). It is usually reported that co-infection does not affect the prognosis as most cases improve by symptomatic therapy, but there are case reports highlighting complications like hepatic encephalopathy in co-infection [18].

Compared to other studies, gender-wise positivity did not differ significantly in HEV [19,20]. The predominance of disease in a particular gender often implies one's exposure and also susceptibility. Despite clinical suspicious & testing, our study did not find any prepondance of HEV.

In this investigation, we discovered a low incidence of HEV in younger patients (>10 years of age). A lack of exposure was cited as the cause of this in research *by Takahashi M et al*. [21]. The majority of infection cases were found in patients between the ages of 21 and 50. Clinical presentation in a particular age group for an agent that is common in the environment suggests that the particular host is susceptible to developing symptoms. Although an

infection may be present, it is possible that such illness signs go unnoticed in younger age groups due to the absence of disease manifestation. Similar findings were also recorded by *Kamal SM, Mahmoud S et al and by Pelosi E, Clarke I.* [20,22].

There were no cases of pregnant women among the tested group. This is significant since HEV is known to create a complex course in these patient populations [23, 24]. In addition, Joon *A et al.* and *Radhakrishnan S, Raghuraman S, et al.* reported fulminant hepatitis in such cases [2, 8].

According to the seasonal patterns, cases tend to cluster in the months of April through June. This result is clearly apparent in other research from India that has been reported, which indicates a greater transmission of HEV during the start of the rainy season [25,26].

The one HAV IgM positive patient belongs to the 11–20 age range. This result contrasted markedly with those of *Joon et al.,* who discovered that young adults made up 13.25% of the maximum cases [2]. In other investigations by *Aggarwal R et al., Murhekar MV et al., Agrawal A et al., and Arankalle V et al., they* discovered that the majority of cases—90%, 74.6%, 70.8%, and 57.1%—belong to young adults, respectively [27,7,28,29].

A lesser number of cases of HAV may be because of the introduction of the vaccine. Even though it is not part of the universal immunisation program, the vaccine is being sought after by parents of children who can bear the cost. Shifting patterns among the affected age group of HAV could be brought on by the Hepatitis A vaccine [30,7,28,31,32]. According to *Murhekar et al.* [7], HAV is a disease that may be prevented by vaccination even if it is not included in the universal immunisation programme. Most children have antibodies by the age of 10 as a result of a mild natural sickness.

The efforts of the government, in the form of the National Viral Hepatitis Control Program (NVHCP), launched in July 2018, aim to address such viral infections to combat the mortality and morbidity caused by the hepatitis virus. These findings suggest a low level of viral circulation among the people in East Delhi. Testing on a large number of samples is required to further corroborate this conclusion. Such data helps authorities concentrate on outbreak prevention strategies during a particular season based on the forecast. The main goal of control measures should be to stop feco-oral transmission of HEV and HAV. It is clear from our study that both enteric hepatic virus (HEV) and HAV) infections are common. When considering the significance of the trends for public health, the availability of diagnostic kits for these illnesses is a crucial need.

One of the limitations of the study was that it was based on hospitals. Therefore, the prevalence in asymptomatic groups in the community could not be determined. Such prevalence data needs to be reported to find the circulating states of the virus.

CONCLUSION

The incidence of HEV and HAV illnesses suggests that East Delhi has a lower prevalence rate of the reported viral illnesses. This finding suggests one of the following: limited circulation of the agents, good sanitary conditions, and/or protective immunity among the population tested. Nonetheless, we should continue to assess the ongoing conditions and take measures to improve them.

CONFLICT OF INTEREST

The author started there is no conflict of interest.

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ORIGINAL ARTICLE

BIOCHEMICAL CORRELATION OF SEX HORMONE PROFILE WITH DIABETES MELLITUS TYPE 2 IN INDIAN MEN- A CASE-CONTROL STUDY

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ABSTRACT

Introduction: India, the country with the highest prevalence of diabetes, has between 62,4 and 77,2 million diabetics and pre-diabetics. The purpose of this study was to investigate the biological correlation between sex hormone profile and type 2 diabetes in Indian men.

Methodology: In this case-control study, total of 181 diabetic cases and 181 healthy controls were enrolled as per WHO norms. Along with clinic-demographical data, fasting blood glucose, Postprandial blood glucose, HBA1c, insulin, lipid profile and Testosterone, LH, FSH were measured and compared.

Results: A non-significant difference was observed [p=0.7831] between different ages among the study population's case and control groups. The FPG, HbA1c, total cholesterol, LDL, triglycerides were significantly elevated in cases as compared to controls, except HDL and SHBG, showing non-significant differences. The spearman correlation between Testosterone and different parameters, and all the correlations showed a significant negative correlation. However, Testosterone Vs. Testicular Volume (ml) [r=0.2981], Testosterone Vs. HDL cholesterol(mmol/l) [r=0.04884] and Testosterone Vs. Calculated Free Testosterone (mmol/L) [r=0.007494] respectively shows significant positive correlation.

Conclusion: Type 2 Diabetes male patients had lower testosterone levels. As a biomarker for Type 2 Diabetes, it is possible to measure changes in serum testosterone levels.

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INTRODUCTION

Over 422 million individuals were diagnosed with diabetes in 2014, making it the most common chronic disease in the world today. International Diabetes Federation (IDF) estimates that 463 million people worldwide have diabetes and that one in two persons are undiagnosed [1]. It is estimated that 5.9% of the global population has diabetes mellitus (T2DM).

There are roughly 62,4 and 77,2 million diabetics and pre-diabetics in India, the country with the highest prevalence of diabetes in the world [2]. Several studies [3,4] have demonstrated a link between hypogonadism and diabetes in men. According to a Massachusetts study on male ageing,

seventy-five percent of diabetic men had low testosterone levels. These males are susceptible to acquiring ED [5]. Low testosterone levels (hypogonadism) have been documented in numerous investigations [1, 2, 6] in males with T2DM.

Insulin resistance is the primary risk factor for this type of diabetes, which is also caused by central obesity and previously upper abdominal adiposity [7]. Numerous studies have demonstrated an inverse relationship between free Testosterone and the degree of obesity, indicating that low testosterone levels are observed in obese men [8,9]. Obesity stimulates aromatase to convert Testosterone to oestrogen, resulting in a further decline in testosterone levels [10]. In fact, testosterone supplementation improves insulin sensitivity and glucose homeostasis [11] in individuals with diabetes and hypogonadism. Despite this, certain investigations [12,13] indicate that testosterone supplementation has no effect on blood sugar control in hypogonadic diabetic patients. Men's atherosclerosis and coronary heart disease are connected with glycosylated haemoglobin (HbA1C), a marker of hyperglycemia, IR, and HbA1C. However, it is unknown if decreased testosterone levels are the cause or result of diabetes or metabolic syndrome development. Of the above background, the present study aimed to study the biological correlation of sex hormone profile with diabetes mellitus type 2 in Indian men.

MATERIAL AND METHODS

The present case-control study was conducted at the Department of Biochemistry, Index Medical College Hospital and Research Centre, Indore. After ethical clearance (Approval No-MU/Research/EC/PhD/2019/34) and informed consent, patients aged 30-60 years of male diabetic patients diagnosed on the basis of WHO norms [blood sugar (≥126mg/dl) and 2 hour post-prandial blood sugar (≥200mg/dl)] were included as cases (n=181). However, patients with chronic diseases like CKD, CVD, MI, cancer, etc, patients with infectious diseases like TB, HIV and Hepatitis, patients with metabolic disorders like Hypothyroidism, and non willing patients were excluded. Normal healthy subjects as per WHO norms of fasting blood sugar (<126mg/dl) and 2-hour post-prandial blood sugar (<200mg/dl), were included as controls (n=181).

Along with family history and Medical history of subjects, demographic details including BMI, Waist to Hip ratio, Systolic Blood pressure, and Diastolic Blood pressure were measured. American Diabetic Association (ADA) criteria were followed for Impaired Fasting Glucose (IFG) as a fasting plasma glucose value of 100- 125 mg/dl (5.6-6.9 mmol/L) in the absence of a previous diagnosis of diabetes.
Minimum 5ml of blood will be drawn from each group under the aseptic condition in a suitable vial and used for the investigation of fasting blood glucose (GmbH-120200), Postprandial blood glucose (GmbH-120200), HBA1c (EM-01-XSYS), insulin (EIA-2935), lipid profile (ERBA kit-120194, 120211, 120227) and Testosterone (DRG-

EIA-1559), LH (DRG-EIA-1289), FSH (DRG-EIA-1288) as per manual protocol.

***Statistical Analysis**:*

Statistical analysis was performed using SPSS software (SPSS Inc., Chicago, IL, USA) for Windows program (21.0 version). When required, the continuous variables were presented by mean (Standard deviation) or range value and analysed using the Student t-test. The dichotomous variables were presented in number/frequency and analysed using the Chi-square test. The correlation was done using Spearman correlation analysis. All the analysis was done at 95% confidence level and p-value of < 0.05 or 0.001 was regarded as significant.

RESULTS

The mean age of the patients in the case and control groups were 45.51±5.35 and 43.79±12.69, respectively. A non-significant difference was observed [p=0.0938] between the mean age among the case and control groups of the study population.

The majority of the patients in the case groups were aged between 31-40 years [82(45.30%)], followed by 41-50 [56(30.94%)] and 18-30 [22(12.15%)]. However, in the control group, most of the patients were aged 31-40 years [77(42.54%)], followed by 41-50 [62(34.25%)] and 18-30 years [25(13.81%)]. A non-significant difference was observed [p=0.7831] between different ages among the study population's case and control groups.

[FIGURE-1]

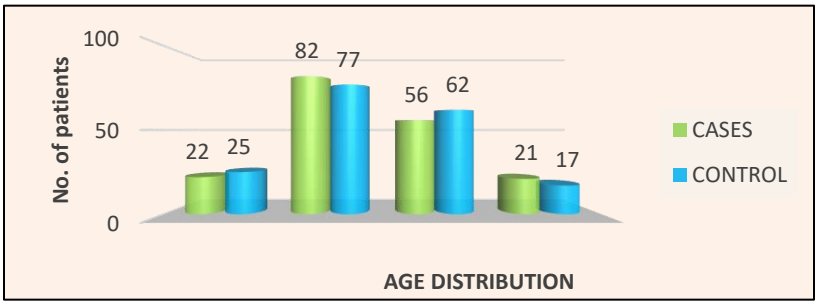

Figure-1: Graphical representation of age distribution of the enrolled patients among the case and control groups

The mean SBP [142.72±25.36 and 127.35±22.68], DBP [83.16±13.42 and 80.46±14.25], WC [91.25±11.85 and 78.29±9.68], BMI [24.52±4.87 and 23.42±3.75] and Testicular volume [21.34±4.32 and 22.61±3.68] in the case and control groups showed a significant difference except DBP [p=0.0643]. **[TABLE-1, FIGURE-2]**

Table-1: Clinical parameter of the enrolled patients among the case and control groups.

CLINICAL PARAMETER	CASES [n=181]		CONTROL [n=181]		P-VALUE
	MEAN	SD	MEAN	SD	
SBP (mmHg)	142.72	25.36	127.35	22.68	t=6.078 **p<0.0001***
DBP (mmHg)	83.16	13.42	80.46	14.25	t=1.856 p=0.0643
WC (cm)	91.25	11.85	78.29	9.68	t=11.4 **p<0.0001***
BMI (m/kg^2)	24.52	4.87	23.42	3.75	t=2.408 **p=0.0166***
Testicular Volume (ml)	21.34	4.32	22.61	3.68	t=3.011 **p=0.0028***

Student t-test, Significant

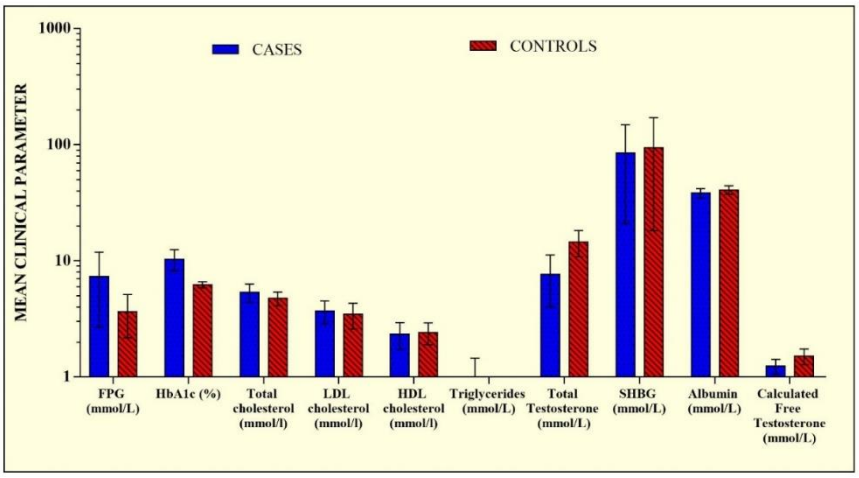

Figure-2: Graphical representation of Biochemical parameters of the enrolled patients among the case and control groups.

The FPG, HbA1c, total cholesterol, LDL, and triglycerides were significantly elevated in cases as compared to controls, except HDL and SHBG, showing non-significant differences. However, serum albumin ($p<0.0001$) and free testosterone ($p<0.0001$) were significantly lower in cases as compared to controls **[TABLE-2, FIGURE-2]**.

Table-2: Biochemical parameters of the enrolled patients among the case and control groups.

BIOCHEMICAL PARAMETER	CASES [n=181]		CONTROL [n=181]		P-VALUE
	MEAN	SD	MEAN	SD	
FPG (mmol/L)	7.30	4.61	3.65	1.48	t=10.14 **p<0.0001***

HbA1c (%)	10.32	2.16	6.24	0.37	t=25.05 **p<0.0001***
Total cholesterol(mmol/l)	5.36	0.96	4.75	0.64	t=7.113 **p<0.0001***
LDL cholesterol(mmol/l)	3.69	0.82	3.46	0.86	t=2.604 **p=0.0096***
HDL cholesterol(mmol/l)	2.34	0.61	2.41	0.52	t=1.175 p=0.2408
Triglycerides (mmol/L)	0.61	0.84	0.43	0.12	t=2.854 **p=0.0046***
Total Testosterone (mmol/L)	7.64	3.62	14.53	3.69	t=17.93 **p<0.0001***
SHBG (mmol/L)	84.76	63.78	94.48	76.36	t=1.314 p=0.1896
Albumin (mmol/L)	38.41	3.55	40.84	3.49	t=6.567 **p<0.0001***
Calculated Free Testosterone (mmol/L)	1.24	0.18	1.51	0.23	t=12.44 **p<0.0001***

Student t-test, Significant

As per serum gonadal hormones assessment, LH and FSH showed significantly elevated levels in cases as compared to controls. However, the insulin level was remarkably lower in cases than in controls (p<0.0001) **[TABLE-3]**.

Table-3: Serum Gonadal hormones of the enrolled patients among the case and control groups.

SERUM GONADAL HORMONES	**CASES [n=181]**		**CONTROL [n=181]**		**P- value**
	MEAN	**SD**	**MEAN**	**SD**	
LH (MIU/ml)	7.74	3.62	5.97	3.57	t=4.684 **p<0.0001***
FSH (MIU/ml)	12.84	5.38	7.22	4.63	t=10.650 **p<0.0001***
Insulin (IU/ml)	8.78	1.23	13.02	1.63	t=27.93 **p<0.0001***

Student t-test, Significant

The majority of the patients had 0-5 years[90(49.72%)] of T2DM duration, followed by 6-10 years [46(25.41%)] and 11-15 years [28(15.47%)] of enrolled patients in case groups **[FIGURE-3]**. The majority of the patients in the case groups were given Metformin + Glimepiride Medication [63(34.81%)] followed by Metformin + Glibenclamide [39(21.55%)] and Metformin Alone [28(15.47%)] respectively **[FIGURE-4]**.

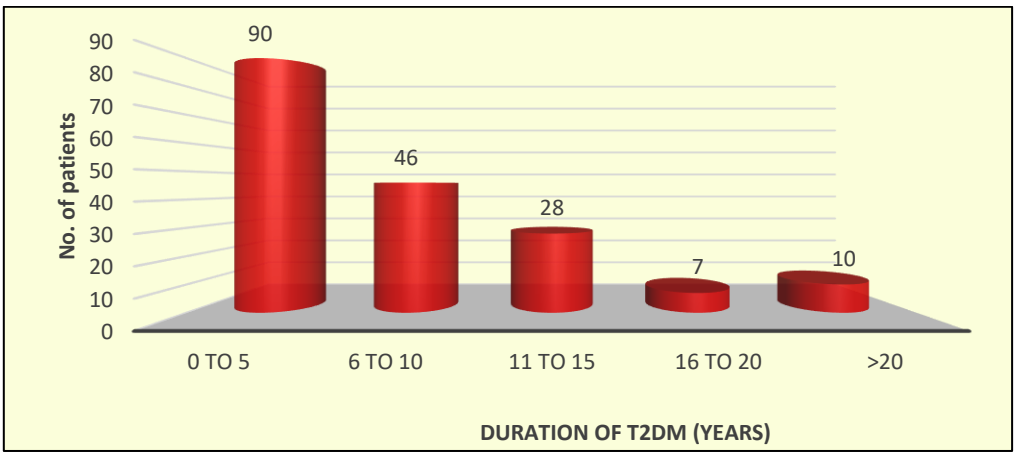

Figure-3: Graphical representation of Duration of T2DM(Years) of the enrolled patients among the case and control groups.

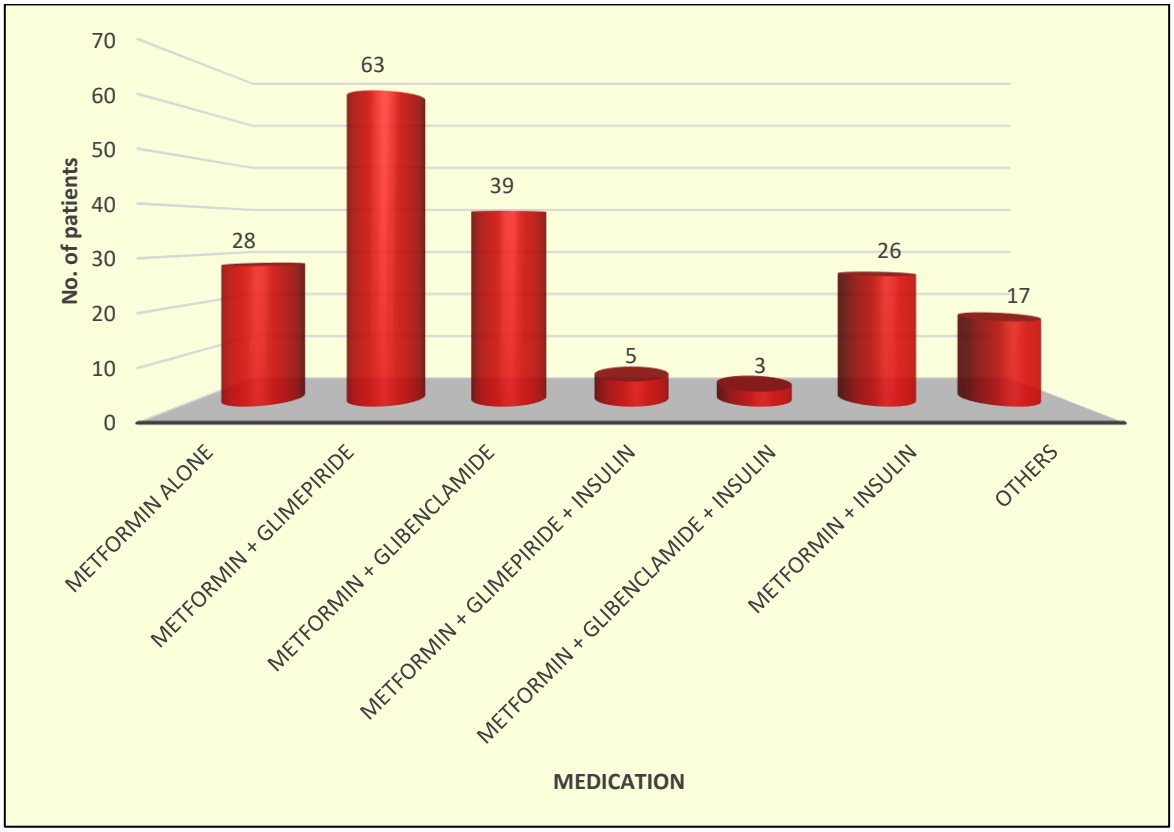

Figure-4: Graphical representation of Medication of the enrolled patients among the case and control groups

The spearman correlation between Testosterone and different parameters, and all the correlations showed negative correlation. However, Testosterone Vs. Testicular Volume (ml) [r=0.2981], Testosterone Vs. HDL cholesterol(mmol/l) [r=0.04884] and Testosterone Vs. Calculated Free Testosterone (mmol/L) [r=0.007494] respectively shows positive correlation.

DISCUSSION

Insulin resistance is a key factor in the development of type 2 diabetes. It is becoming more common knowledge that low testosterone levels in males are associated with decreased insulin sensitivity and the development of type 2 diabetes [9]. The present study aimed to study the biological correlation of sex hormone profile with diabetes mellitus type 2 in Indian men.

Ezekiel Musa et al., 2021 [14] observed that both total and estimated free testosterone levels were significantly lower in individuals with T2DM compared to non-diabetic controls. In Accra, Ghana and Lagos, Nigeria, Asare-Anane et al. [15] and Onung et al. [16] reported comparable results. In addition, Paruk et al. [17] in South Africa found reduced total and free testosterone levels in men with type 2 diabetes compared to controls. In the present study, we also observed significantly lower levels of total Testosterone in diabetic patients compared to healthy individuals. Two meta-analyses by Ding et al. [18] and Corona et al. [19] that included 20 cross-sectional studies (850 diabetic men and 2000 non-diabetic controls) and 28 cross-sectional studies (1,822 men with diabetes and 10,009 non-diabetic controls), respectively, revealed consistently lower total testosterone levels in men with diabetes compared to non-diabetic controls. The connection between low total Testosterone and diabetes has previously been ascribed to low SHBG levels, which are typically reported in T2DM [20]. Nonetheless, Ezekiel Musa et al., 2021,[14] determined that free Testosterone was considerably lower in males with T2DM than in non-diabetic controls, indicating that causes other than SHBG may be involved in reducing testosterone levels. In addition to low SHBG, we believe that abnormal levels of cholesterol, fasting plasma glucose, and HbA1c may contribute to low Testosterone. Farooq et al. 2020[21] also demonstrated that diabetes produces low testosterone levels in males, and that low testosterone levels can serve as a diabetes marker. Consequently, with appropriate management, mortality and co-morbidity linked with diabetes can be averted.

The relationship between poor glycemic control and hypogonadism did not approach statistical significance, although it was clinically significant. The conclusion of Ezekiel Musa et al., 2021[14] is congruent with the findings of a Nigerian study [22]. In contrast to previous findings, we observed that hypogonadism was associated with significantly higher FPG and HbA1c. Asare-Anane et al., 2013 [15] and Kapoor et al., 2007 [23] revealed a substantial connection between hypogonadism and FPG and glycated haemoglobin, similar to our findings.

In addition, the study by Ezekiel Musa et al., 2021[14] found no statistically significant connection between LDL cholesterol and hypogonadism, despite the high mean LDL cholesterol in hypogonadal participants. This result is corroborated by Mirzaei et al.

[24] investigation, which demonstrated no association between total Testosterone and the lipid profile. On the other hand, Wickramatilake et al. [25] and colleagues found a substantial connection between LDL cholesterol and hypogonadism. The correlation between hypogonadism and systolic and diastolic blood pressure observed by Ezekiel Musa et al., 2021[14] was not statistically significant. These results are consistent with those from other investigations [26, 27]. In contrast, a number of studies [23, 28] have established a correlation between hypogonadism and blood pressure. We also identified a significant connection between SBP and hypogonadism in the present study, although the association between DBP and hypogonadism was not statistically significant. Clinically, but not statistically, a correlation was established between hypogonadism and abdominal obesity, as measured by waist circumference, despite the increased prevalence of abdominal obesity in type 2 diabetic men with hypogonadism. Zheng et al. [29] similarly showed that there was no significant relationship between hypogonadism and abdominal obesity, although Laaksonen et al. [30] found the opposite. Ezekiel Musa et al., 2021[31] observed no relationship between hypogonadism and global obesity, similar to previous studies [22, 32]. In contrast to previous research, the present study demonstrated a strong relationship between abdominal obesity and hypogonadism. Similar to this, o bservations by some researchersalso demonstrated a significant association between obesity (using BMI) and hypogonadism [33, 34]. Although the absence of a statistically significant association between obesity and hypogonadism, despite the higher odds of developing hypogonadism in obese type 2 diabetic men compared to non-obese men, could be attributed to a significantly high proportion of hypogonadism in the non-obese men.

In multivariable analysis, there was a substantial negative connection between total Testosterone and triglycerides and HDL cholesterol, with total testosterone levels decreasing linearly as these factors rose. These results concurred with those of other researchers [33, 34] but opposed those of Asare-Anane et al. [15] and Chang et al. [35]. These findings suggest that male T2DM patients with dyslipidemia may frequently have hypogonadism. Similarly, we detected a strong negative connection between hypogonadism and lipid profile in the present investigation. This demonstrated the connection between dyslipidemia and hypogonadism. Low Testosterone is related with obesity, type 2 diabetes, inflammation, and hyperlipidemia [36]. In contrast to Kapoor et al. [23] and Asare-Anane et al. [15], Ezekiel Musa et al. [14] found no significant relationship between total Testosterone and anthropometric measurements and FPG.

In contrast, waist size, testicular volume, duration of diabetes, and BMI were not associated with an increased risk of predicting low total Testosterone. The 88 percent sensitive ADAM questionnaire indicated that erectile dysfunction and loss of libido are predictors of low Testosterone [37]. In contrast to Ezekiel Musa et al., 2021[14], Mahmoud et al. [38] found that testicular volume was a predictor of low Testosterone, but Travison et al. [39] indicated that obesity using WC and BMI and duration of diabetes were predictors of low total Testosterone. In contrast, we found no

association between hypogonadism and the BMI of the patients. According to IDF, the significantly lower cut-off for diagnosing abdominal obesity in sub-Saharan African men may account for the apparent lack of statistical significance despite the higher risks of low Testosterone with abdominal obesity. In addition, the abnormally high number of hypogonadal and eugonadal males who responded positively to erectile dysfunction and lack of libido may have diminished the relevance of the results.

Thus the present study reveals a significant association of dyslipidemia with hypogonadism in diabetic patients. However, small samples and the single centric study was the limitation of the study. Author recommended further multicentric study with a large sample size to increase the reliability and generalizability of the present findings.

CONCLUSION

The T2DM male patients showed decreased levels of Testosterone or we can assume that decreased testosterone levels significantly raised the risk of T2DM. Serum testosterone levels can be utilised as a biomarker for the course of Type 2 Diabetes. Additionally, diabetic men may explore testosterone supplementation to improve clinical outcomes.

CONFLICT OF INTEREST

The author started there is no conflict of interest.

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ORIGINAL ARTICLE

COMPARISON OF RISK FACTORS USE PERSONAL PROTECTION EQUIPMENT AND EXPOSURE TO SULPHATE CONTENT WITH IRRITANT CONTACT DERMATITIS IN CAR WASHING OFFICERS IN MALANG CITY

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ABSTRACT

Background: Irritant contact dermatitis (ICD) is an occupational disease that involves non-immunological inflammatory mechanisms of the skin, resulting from a response to exposure to irritants, physical, or biological. ICD disease often occurs in car wash employees who are exposed to laundry soap containing sulfate. Most of the factors that cause ICD are the length of exposure to chemicals or from the workers themselves such as knowledge, use of personal protective equipment, and personal hygiene. The purpose of this study was to determine the effect of using personal protective equipment (PPE) and exposure to sulfate content of car wash soap on the incidence of ICD in car wash employees in the city of Malang with and without a history of skin disease.

Method: The research method uses an analytic observational research type with a cross sectional design. The samples studied were 84 respondents who were car wash employees in the city of Malang, both those who had a history of skin diseases (39 respondents) and those who did not have a history of skin diseases (45 respondents). Data were analyzed using univariate and bivariate tests with SPSS application.

Results: The results of the chi square test showed that there were significant differences in risk factors ($p < 0.05$) on the incidence of ICD.

Conclusion: The conclusion of this study is there is an effect of the use of PPE and exposure to sulfate content on the incidence of ICD in car wash employees in the city of Malang with and without a history of skin diseases.

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INTRODUCTION

Irritant contact dermatitis (ICD) is inflammation of the skin, resulting from a response to exposure to an irritant, physical, or biological substances that come into contact with the skin without being mediated by an immunological respons.[1]ICD is a non-specific response of the skin to direct chemical damage that releases inflammatory mediators, especially epidermal cells. [2]Approximately 80% of individuals with occupational contact dermatitis involve hands and irritant contact dermatitis (ICD). Epidemiological studies in Indonesia showed that 97% of 389 cases of dermatitis were contact dermatitis, of which 66.3% were irritant contact dermatitis and 33.7% were allergic dermatitis. [3] Approximately 80% - 90% of cases of irritant contact dermatitis are caused by exposure to irritants in the form of chemicals and solvents. Inflammation can occur after a single exposure or repeated exposure [7].

Irritant contact dermatitis and allergic contact dermatitis can appear with three morphological patterns: acute, subacute, and chronic phases. The acute-phase reaction in ICD usually reaches its peak within minutes to hours after exposure and then begins to heal or is commonly referred to as the de-crescendo. [2]. ICD will appear after the first exposure to a strong irritant. Subacute and chronic ICD is characterized by hyperkeratosis, fissures, and skin blisters with clear lesion boundaries[4].

The risk factors for ICD consist of two factors, endogenous factors and exogenous factors. Endogenous factors include factors in individuals such as genetics, gender, age, ethnicity, skin type, and a history of atopy.[5] While exogenous factors are the properties of irritant chemicals such as physical state, concentration, amount, polarization, ionization, carrier material, and solubility.[6] The types of irritants that usually cause ICD include animal products, cosmetics, detergents, cosmetics, solvents, tear gas, topical medications, and water and work in a wet environment.[9]

Continuous and repeated use of risky materials can cause ICD. Some examples of materials that can cause ICD include soapy water, cleaners, spirits, chemicals and work related to water (wet). Previous research explained that the duration of contact with chemicals also greatly influences the incidence of ICD because the longer the contact with chemicals will further damage skin cells to the deeper layers of cells and cause complaints to get worse. From the results of research that was conducted on workers who were in contact with one of the chemicals, namely acetic acid, for > 3 hours, they had a risk of inflammation or skin irritation that would cause ICD. [19]

Contact dermatitis accounts for 95% of causes of occupational skin disease, 80% of which is irritant contact dermatitis which is often caused by cumulative exposure to weak irritants such as soap and water. Work related to repeated exposure and types of work related to water, one of which is car wash employees who are directly exposed to car wash soap containing chemicals. Chemicals that are often used as soap ingredients are anionic surfactants, where anionic surfactants have superior solubility and cleaning power, therefore these surfactants are often used as detergents and soaps. [10]

One of the jobs related to repeated exposure and types of work related to water is car wash employees who are directly exposed to car wash soap that contains chemicals. Chemicals often used as soap ingredients are anionic surfactants, where anionic surfactants have superior solubility and cleaning power; therefore, these surfactants are

often used as detergents and soaps. In this regard, sulfate is the oldest anionic surfactant that can produce foam as a suitable wetting agent and the main ingredient in detergents.[10]

Factors obtained from work are the length of exposure to chemicals and the work period or from the workers themselves, such as knowledge, use of personal protective equipment, and personal hygiene. Personal Protective Equipment (PPE) is a device designed as a barrier against the penetration of substances, solid, liquid, or air particles to protect the wearer from injury or the spread of infection or disease. [20]From introduction above, a research was made to explain the comprarison of risk factor use personal protection equipment and exposure to sulphate content with irritant contact dermatitis in car Washing employees.

METHODS

The research method uses an analytic observational research type with a cross-sectional design. The study was conducted by distributing questionnaires to 84 car wash employees in Malang City with a history of skin disease (39 respondents) and without a history of skin disease (45 respondents). The research was carried out based on a permit with the number No.E.5.a/260/KEPK-UMM/XII/2019 from the UMM Health Research Ethics Commission, and each respondent had signed an informed consent.

Data analysis processed using using the Statistical Package for the Social Science (SPSS) 25.0 program. Univariate analysis was carried out to describe the characteristics of each variable presented in the form of a frequency distribution because the research data was categorically scaled. Then Bivariate Analysis using data analysis techniques chi-square and old Ratio (OR) (sig. < 0.05) to assess the strength of the relationship between variables

The sulfate level test was conducted using the spectrophotometric method with 200x and 400x dilutions. The dilution depends on the concentration of soap in each sample where the more concentrated the soap, the more dilution so that the results of the concentration are the same; spectrophotometric analysis was carried out at the Laboratory of Analytical Chemistry, State University of Malang.

RESULTS

This research involves 84 car washing employees in Malang city who had history of skin disease 39 respondents and those who didn't have a history of skin disease 45 respondents. The characteristic respondents was show in Table 1.

Table 1: Characteristic of Respondents

No.	Characteristics	n	%
1.	**ICD**		
	Yes		
	Have skin disease history	20	51,3%
	Didn't have skin disease history	27	60%
	No		
	Have skin disease history	19	48,7%
	Didn't have skin disease history	18	40%
2.	**PPE**		
	Yes		
	Have skin disease history	9	23,1%
	Didn't have skin disease history	19	42,2%
	No		

	Have skin disease history	30	76,9%
	Didn't have skin disease history	26	57,8%
3.	**Sulfate content**		
	<1%		
	Have skin disease history	25	64,1%
	Didn't have skin disease history	23	51,1%
	>2%		
	Have skin disease history	14	35,9%
	Didn't have skin disease history	22	48,9%

Based on table 1 the number of respondents who experience ICD mostly have skin disease history 60%. Number of respondents who not experience ICD mostly didn't have skin disease history 48,7%. The number of respondents who use PPE mostly didn't have skin disease history 42,2%. Number of respondents who not use PPE mostly have skin disease history 48,7%. The number of respondents who use car wahing soap with sulfate content < 1% mostly have skin disease history 64,1%. Number of respondents who use car washing soap with sulfate content > 2% mostly didn't have skin disease history 48,9%.

Table 2: Spectrophotometer test results sulfate content

No.	Sample Code	Sulfate (mg/L)	%
1.	Sample A	98,0224	3,9%
2.	Sample B	53,2979	1%
3.	Sample C	7,2827	0,1%
4.	Sample D	115,0602	4,6%
5.	Sample E	14,0269	0,2%

Table 2 shows the results of the spectrophotometric test for the sulfate content of each sample. Samples A and D were tested using a 400x dilution and obtained the percentage of sulfate content in the sample >1%. Samples B, C, and E were tested using a 200x dilution and obtained the percentage of sulfate content in the sample >1%.

Figure 1: The palms of a car wash employee

Figure 1 shows polymorphic efflorescence (erythema, edema, papules, vesicles, scales, lichenification) and complaints of itching.

Table 3: Relationship between Use of Personal Protective Equipment (PPE) and Incidence of ICD in Employees with No History of Skin Diseases

Based on the results of the chi-square test in table 3, it is obtained sig = 0.007 (sig < 0.05), which concludes that there is a significant relationship between the use of PPE and the incidence of ICD in car wash employees in Malang City who do not have a history of skin disease. The amount of OR obtained is 5,714 with 95% CI (1,551 – 21,058). This means that car wash employees who do not have a history of skin disease and do not wear PPE have 5,714 times more likely to experience ICD than those who use PPE at work. An OR value > 1 can also mean that employees who do not use PPE increase the risk of ICD even though they have no history of skin disease.

Table 4: The Relationship between the Use of Personal Protective Equipment (PPE) with ICD Incidence in Employees with a History of Skin Diseases

Use of Personal Protective Equipment (PPE)	Incidence of ICD						P value	OR (CI 95%)
	ICD		No ICD		Total			
	f	%	f	%	f	%		
Not using PPE	20	74.1%	6	33.3%	26	57.8%	0.007	5.714 (1.551-21.058)
Using PPE	7	25.9%	12	66.7%	19	42.2%		
Total	27	100.0%	18	100.0%	45	100%		

Use of PPE	Incidence of ICD						P value
	ICD		No ICD		Total		
	f	%	f	%	f	%	
Not using PPE	17	85%	13	68.4%	30	76.9%	0.273
Using PPE	3	15%	6	31.6%	9	23.1%	
Total	20	100%	19	100.0%	39	100%	

Based on the results of the chi-square test in table 4, it is obtained sig = 0.273 (sig > 0.05), which concludes that there is no significant relationship between the use of PPE and the incidence of ICD in car wash employees in Malang City who have a history of skin diseases. Although there is no statistically significant relationship, clinically, it can be seen that more employees who use PPE do not have ICD (31.6%) than had ICD (15%).

Table 5: The Relationship between Exposure to Sulfate Content with ICD Incidence in Employees with No History of Skin Diseases

Exposure to Sulfate Content	Incidence of ICD						P value
	ICD		No ICD		Total		
	f	%	F	%	f	%	
<1%	12	44.4%	11	61.1%	23	51.1%	
>2%	15	55.6%	7	38.9%	22	48.9%	0.273
Total	27	100.0%	18	100.0%	45	100%	

Based on the results of the chi-square test in table 5, it was obtained sig = 0.273 (sig > 0.05) which concluded that there was no significant relationship between exposure to sulfate content and the incidence of ICD in car wash employees in Malang City who did not have a history of skin disease. Although there is no statistically significant relationship, it can be seen clinically that employees exposed to sulfate >2% tend to have more ICD and vice versa. These employees exposed to sulfate <1% tend to be more likely not to have ICD.

Table 6 : The Relationship between Exposure to Sulfate Content with ICD Incidence in Employees with a History of Skin Diseases

Exposure to Sulfate Content	Incidence of ICD						P value	OR (CI 95%)
	ICD		No ICD		Total			
	f	%	f	%	f	%		
<1%	9	45%	16	84.2%	25	64.1%		
>2%	11	55%	3	15.8%	14	35.9%	0.011	0.153 (0.034 – 0.698)
Total	20	100.0%	19	100.0%	39	100%		

Based on the results of the chi-square test in table 6, it was obtained sig = 0.011 (sig < 0.05) which concluded that there was a significant relationship between exposure to sulfate content and the incidence of ICD in car wash employees in Malang City who had a history of skin diseases. The OR obtained is 0.153 with 95% CI (0.034 – 0.698). Car wash employees who have a history of skin disease and are exposed to sulfate <1% have 0.153 times more likely to experience ICD than those exposed to sulfate >2%

DISCUSSION

This study showed that out of 84 respondents, there were 45 respondents who had no history of skin diseases and there were 39 who had a history of skin diseases. Of the 45 respondents who did not have a history of skin diseases employees who experienced the occurrence of ICD, 27 respondents, the remaining 18 people were not affected by ICD. For those who had a history of

skin diseases from 39 car wash employees, the ICD incident was 20 respondents and 19 people were not affected by ICD.

Research by Zania et al (2018) which concluded that there was no significant relationship between a history of skin disease and the incidence of ICD. The results of observations made in Latambaga District

Kolaka Regency said that this could happen because previously, employees who had a history of skin diseases had completely recovered either using treatment or not at all. [11] However, these results are not following the theory presented by Lurati (2015) which states that workers with a history of skin diseases will be at higher risk of developing ICD because workers with a history of skin disorders have skin disorders where the epidermal barrier in the skin is disrupted. , there is increased transepidermal water loss and increased permeability of allergens and irritants. [12]

The results of this study were seen in several car wash workers where the condition of the hands showed an efflorescence in the form of polymorphism, namely erythema, edema, papules, vesicles, scales, lichenification (figure 1). This condition is by Nedorost (2019) statement that skin efflorescence in ICD is characterized by scales, mild erythema, blisters, or erosions limited to the manus and fingers; this usually occurs in someone who works in wet work. [14]

Based on table 3 concludes that there is a significant relationship between the use of PPE and the incidence of ICD in car wash employees in Malang City who do not have a history of skin disease. The amount of OR obtained is 5,714 with 95% CI (1,551 – 21,058). This means that car wash employees who do not have a history of skin disease and do not wear PPE have 5,714 times more likely to experience ICD than those who use PPE at work. Research by Chafidz et al (2018) which states that there is a relationship between the use of PPE with the incidence of contact dermatitis on tofu workers. This happens because of the skin about cooking process workers in the filtering section is in direct contact with the tofu coagulation solution causing each employee to have a high risk of contact dermatitis because they do not use PPE. [15]

But the results of this study contradict the results of research from Prakoso, 2018 which states that the use of PPE is not associated with the incidence of irritant contact dermatitis in motorized vehicle steam workers in East Ciputat District. One of the factors that contributed to this study when it was associated with age and work experience was that younger workers had less experience than older workers, so older workers were more experienced and knew the irritants used and paid more attention to safety and health. [16]

Table 4 showed there is no relationship between the use of Personal Protective Equipment (PPE) with the incidence of ICD in employees who have a history of skin diseases; this result is supported by Lurati (2015)**,** factors that cause ICD risk, such as a history of previous skin diseases that cause workers with a history of skin diseases will be at higher risk of developing ICD because of the disruption of the epidermal barrier in the skin, increased transepidermal water loss and increased permeability of allergens and irritants. Another factor is the age and work experience of the employee, where the longer the employee's work experience, the more experienced the employee will be and know the irritant materials used and pay more attention to their safety and health.[12]

Table 5 showed there is no relationship between exposure to sulfate and the incidence of ICD in employees who do not have a history of skin

disease, but this result is not by the theory; we know that sulfate is the oldest anionic surfactant that can produce foam, as a suitable wetting agent and as the main ingredient is detergent. The use of soap containing sulfate should not be used every day with long exposure because it has a negative effect on cosmetics, such as skin irritation In contact with the skin for a long time, it will be safe if the concentration is < 1%.[17,18]

Table 6 shows there is relationship between exposure to sulfate and the incidence of ICD in employees with a history of skin disease. These results are consistent with the theory that irritants are physical and chemical agents that can cause cellular damage if they contact the skin for a long time and in high concentrations. Detergents, surfactants, disinfectants, and antiseptics are the substances that most often cause occupational dermatitis, both irritant contact dermatitis (ICD) as much as 42% and allergic contact dermatitis 26.3%. [39]

CONCLUSION

The conclusion obtained is that the use of PPE is known to reduce the intensity of sulfate exposure to the incidence of ICD in car wash employees in the city of Malang with and without a history of skin disease.

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ORIGINAL ARTICLE

LEFT VENTRICULAR GEOMETRY AMONG CHRONIC KIDNEY DISEASE PATIENTS: THE ROLE OF ANEMIA.

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ABSTRACT

Background: Anaemia and abnormal left ventricular (LV) geometric pattern are common findings in Chronic Kidney disease (CKD) patients.

Objectives: To assess LV geometric pattern and its relationship with anaemia among CKD patients.

Methods: A cross sectional study of 163 subjects (102 and 61 CKD subjects with and without anaemia respectively). Echocardiography determined the LV geometric pattern while packed cell volume (PCV) levels determined anaemia.

Results: The mean age of subjects with and without anaemia was 54.04 ± 14.47 and 54.92 ± 15.67 years respectively (p = 0.717) while the prevalence of LVH among the two groups was 68.8% and 57.9% respectively (p = 0.174). The most frequent LV geometry in both groups was concentric LVH (53.8% and 43.9% respectively). Prevalence of LV systolic dysfunction was 45%, higher among anaemic subjects (58(61.7%) vs 10(17.5%)) p < 0.001. There was a strong negative correlation between PCV and left ventricular mass index (r = -0.345, p = 0.001) among anaemic subjects, but weak positive correlation among patients without anaemia (r = 0.001, p = 0.993).

Conclusion: Anaemic CKD patients had a high prevalence of abnormal LV geometry with significant contribution from anaemia. Early management of anaemia may thus improve cardiovascular outcomes.

Medical and Health Science Journal.

INTRODUCTION

Chronic kidney disease (CKD) is a global problem with worsening prevalence. [1-6] It is associated with several cardiovascular risks, with estimated death rates up to 10-20 times those of an age-matched population. [4, 7] Many of these patients develop cardiomyopathy, left ventricular dilation, left ventricular hypertrophy and systolic dysfunction which ultimately lead to cardiac failure, haemo-dynamic overload, maladaptive cardiac responses and death, if untreated. [4, 7-9]

Cardiovascular disease (CVD) is highly prevalent among CKD patients and it is the main reason for the high mortality and morbidity rates among end-stage renal disease (ESRD) patients. [10] Many factors account for the strong relationship between CKD and CVD, but the contribution of anaemia and hypertension to the development of cardiac abnormalities and CKD have been proven to be

significant, with hypertension being a common etiology as well as a complication of CKD. [9-15]

Left ventricular hypertrophy (LVH) is an eventuality in untreated and poorly controlled hypertension and an independent cardiovascular risk factor in hypertensive patients, LVH also puts additional burden on the cardiovascular system of CKD patients and thus worsens prognosis. [9, 13, 16-18] Anaemia, advancing age, dyslipidemia, diabetes mellitus, glomerulonephritis and atherosclerosis are also commonly associated with CKD as well as LVH. [8-12, 14]

It is therefore important to find the association of anemia, left ventricular hypertrophy, left ventricular systolic dysfunction and the various LV geometric patterns in CKD patients, while controlling for these many confounders.

This study therefore sets out to assess the prevalence of the various geometric patterns of LVH, the prevalence of LV systolic dysfunction and to determine the relationship between LVH and anemia among CKD patients seen in our facility.

METHODS

STUDY DESIGN

The study was a descriptive cross sectional study conducted among patients with the diagnosis of chronic kidney disease (CKD), at the adult nephrology out-patient clinic of Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos.

STUDY POPULATION

Adult CKD patients in stages 3 to 5 with anaemia were consecutively recruited into the anaemia group while age and sex-matched CKD patients in stages 3 to 5 without anaemia were recruited into the non-anaemic group to serve as control. Patients with underlying cardiac disease such as valvular heart disease, congenital heart disease and cardiomyopathy, those with arteriovenous fistula and patients with features of volume overload (pulmonary oedema, peripheral congestion and congestive cardiac failure) were all excluded.

SAMPLE SIZE DETERMINATION

The minimum sample size of 100 for this study was calculated using the fisher's formula. [19] A standard normal deviation of 1.96 with a confidence level of 95% and a precision of 5% was used. A proportion of 7% obtained from a previous study on prevalence of CKD was used. The targeted sample size was achieved within a 10 month period (April 2016 to January 2017). A total sample size of 102 anaemic CKD subjects were recruited as well as 61 CKD subjects without anaemia, to serve as control; with a case: control ratio of approximately 2:1.

SAMPLING TECHNIQUE

A stratified systematic sampling technique was used for the selection of subjects. Patients were stratified into different stages of CKD 3 to 5 based upon their eGFR. A systematic random sampling technique was used to recruit patients, in which every 3rd patient that qualified were recruited into CKD subjects with anaemia group until the sample size was achieved. This also involved recruitment of at least 26 patients into each stages of CKD 3 to 5.

However, CKD subjects without anaemia were recruited using stratified random sampling technique into CKD stages 3 to 5, and simple random sampling technique was used to recruit them into each of the stages, and they were matched for age and gender. This technique was employed because of the challenges of achieving equal proportion of subjects in each of the stages especially in stage 5 CKD.

STUDY PROCEDURE

Clinical history was obtained using a structured questionnaire. Recruited subjects were stratified into appropriate CKD stages 3-5, in accordance with their eGFR (MDRD). [1] CKD was defined as abnormalities of kidney structure or function present for more than 3 months with implication for health and was classified into stages 3 to 5 of chronic kidney disease as follows: stage 3 with eGFR of 30 – 59 ml/min/1.73M^2, stage 4 with eGFR of 15 – 29 ml/min/1.73M^2, stage 5 with eGFR of < 15 ml/min/1.73M^2. [1]

Anaemia was defined as haemoglobin (Hb) concentration less than 13.0 g/dl (<130 g/l) in males and less than 12.0 g/dl (<120 g/l) in females. [14] Height and weight were measured using standard procedures, while Body mass index (BMI) was calculated using the formula: weight (kg)/ Height^2 (M^2) and Body surface area (BSA) was calculated using Dubois formula. [20] Blood pressure was measured in accordance to the recommendation of the American Heart Association guidelines. [21] Hypertension and Obesity were defined according to standard reference ranges. [19-21]

A total of 10mls of venous blood was collected from the antecubital fossa of each subject for estimation of fasting lipid profile (total cholesterol-TC, high density lipoprotein- HDL, low density lipoprotein- LDL, and triglycerides- TG), random blood glucose (RBG), packed cell volume (PCV) and serum electrolytes, urea and creatinine (E,U,Cr). [19, 22]

Transthoracic echocardiography (M-mode, two dimensional and Doppler) was performed with the General electric vivid Q echocardiographic machine, using 3.5 MHz phased array probe (cardiac probe) transducer following the American Society of Echocardiography and the European Association of Cardiovascular Imaging convention (ASE/EACI). [23] Two cardiologists read the echocardiograms to reduce intra-observer bias. Left ventricular mass (LVM), Left ventricular mass index (LVMI) and Relative wall thickness (RWT) were calculated by using the validated formula of American Society of Echocardiography and the European Association of Cardiovascular Imaging convention (ASE/EACVI). [23]

Left ventricular hypertrophy was defined in absolute terms as Left ventricular mass index >115 g/m2 in men and >95 g/m2 in women. [23] Left ventricular geometric pattern was classified as follows: Eccentric hypertrophy was defined as relative wall thickness (RWT) less than or equal to 0.42 in the presence of LVH, while concentric hypertrophy was defined as RWT greater than 0.42 in the presence of LVH, and concentric remodelling was defined as RWT greater than 0.42 in the absence of LVH, and normal left ventricular geometry was defined as RWT less than or equal to 0.42 in the absence of LVH. [23] Left ventricular systolic function was classified according to the standard values of the American Society of Echocardiography. [23]

DATA ANALYSIS

This was computed using statistical package for social science (SPSS) version 20. Continuous variables were described by calculating the means and standard deviation, and was compared using unpaired student t test in which normal distribution is assumed while screwed data (duration of hypertension and duration of CKD) were described with median and percentile, and compared using Mann Whitney U test.

Categorical variables were analyzed using percentages and compared using Chi squared test. Analysis of variance (ANOVA) was used to compare means across groups. Pearson's correlation was used to assess the relationship between LVMI and selected variables (age, sex, body mass index, systolic blood pressure (SBP), diastolic blood pressure (DBP), haemoglobin and eGFR), while linear regression was used to control for confounders. Confidence levels was set at $p<0.05$ and taken to be statistically significant and confidence interval was set at 95%. Microsoft Excel was used to produce charts.

ETHICAL APPROVAL

Ethical approval was sought and obtained from the Health Research Ethics Committee of Lagos State University Teaching Hospital Ikeja, before the commencement of the study. The respondents were assured of strict confidentiality regarding all the information obtained throughout the study period. Written and verbal informed consent was obtained from all respondents before data collection.

RESULTS

A total of one hundred and sixty three subjects were recruited which included one hundred and two anaemic CKD subjects and sixty one CKD subjects without anaemia as controls. The mean age of anaemic CKD subjects was 54.04 ± 14.47 years,

while those of controls was 54.92 ± 15.67 years (p = 0.717). The gender distribution among anaemic CKD subjects was male 53 (52%) and female 49 (48%), while among controls male was 31(50.8%), and female was 30(49.2%) (p = 0.888).

Table 1 showed the baseline clinical profile of all subjects.

Table 1: Baseline Clinical Profile of Subjects

Parameter	Anaemic CKD mean ± SD	Control mean ± SD	T	p- value
Age (years)	54.04 ± 14.47	54.92 ± 15.67	-0.364[a]	0.717
Weight (kg)	69.85 ± 15.65	73.26 ± 16.66	-1.314	0.191
Height (m)	1.66 ± 0.09	1.65 ± 0.09	0.534	0.594
Body mass index (kg/m^2)	25.34 ± 5.49	26.98 ± 6.17	-1.766	0.079
Systolic blood pressure (mmHg)	144.13 ± 27.01	147.33 ± 28.87	-0.706	0.481
Diastolic blood pressure (mmHg)	83.40 ± 15.36	86.75 ± 15.78	-1.318	0.189
Body surface area (m^2)	1.77 ± 0.20	1.80 ± 0.21	-0.530	0.958
Stages of chronic kidney disease				
Stage 3 n(%)	30(29.4)	41(67.2)	29.699[a]	<0.001
Stage 4 n(%)	32(31.4)	17(27.9)		
Stage 5 n(%)	40(39.2)	3(4.9)		
Dialysis				
Yes n(%)	17(16.7)	1(1.6)	8.888[a]	0.003
No n(%)	84(82.4)	60(98.4)		
Blood pressure control				
Controlled n(%)	58(56.9)	26(42.6)	2.88[a]	0.90
Uncontrolled n(%)	44(43.1)	35(57.4)		
Body mass index (kg/m^2)				
< 18	7(6.9)	2(3.3)	1.592[a]	0.661
18 – 24.9	48(47.1)	25(41.0)		
25 – 29.9	28(27.5)	21(34.4)		
>30	19(18.6)	13(21.3)		

BMI; Body mass index, SBP; Systolic blood pressure, DBP; Diastolic blood pressure, BP; Blood pressure, BSA; Body surface area, a: statistics result derived with chi square test.

Table 2: Biochemical and haematological parameters of subjects

Parameters	Anaemic CKD mean ± SD	Control mean ± SD	T	p – value
Sodium (mmol/l)	140 ± 6.51	141.33 ± 7.32	-1.176	0.241
Potassium (mmol/l)	4.99 ± 0.81	3.97 ± 0.66	4.105	< 0.001
Bicarbonate (mmol/l)	19.86 ± 4.58	22.39 ± 3.60	-3.509	0.001
Chloride (mmol/l)	102.41 ± 10.26	101.82 ± 4.83	0.407	0.685
Urea (mg/dl)	103.08 ± 66.13	51.90 ± 26.71	5.720	<0.001
Creatinine (mg/dl)	4.91 ± 4.03	2.37 ± 1.56	4.696	<0.001
Total Cholesterol (mg/dl)	191.16 ± 48.15	206.64 ± 59.63	-1.708	0.090
High density lipoprotein (mg/dl)	53.34 ± 18.69	58.73 ± 20.89	-1.616	0.108

Low density lipoprotein (mg/dl)	117.90 ± 37.32	128.09 ± 48.09	-1.428	0.155
Triglyceride (mg/dl)	112.84 ± 55.05	111.96 ± 52.28	0.095	0.924
Very low density lipoprotein (mg/dl)	21.83 ± 10.32	25.99 ± 15.81	-1.824	0.070
Packed cell volume (%)	28.48 ± 5.37	40.51 ± 3.29	-15.78	<0.001
Fasting blood sugar (mg/dl)	107.36 ± 36.71	103.37 ± 23.91	0.747	0.456
Estimated glomerular filtration rate (ml/min/1.73m^2)	22.67 ± 15.21	38.73 ± 14.79	-6.590	<0.001

Table 3 showed Prevalence and pattern of left ventricular hypertrophy and left ventricular function among participants. The overall prevalence of left ventricular hypertrophy among CKD subjects was 103(63.2%) with 95% C.I = 56.99 – 72.34. The prevalence of LVH among anaemic CKD subjects was 68(66.7%), while among CKD subjects without anaemia was 35(57.4%) (X^2 = 1.845, p = 0.174, O.R = 1.61, and 95% C.I was 0.81 – 3.17).

Table 3: Prevalence and pattern of left ventricular hypertrophy and left ventricular function among participants

Parameters	**Anaemic CKD n(%) N = 102**	**Control n(%) N = 61**	**X^2**	**O.R**	**p – value**	**95% C.I**
Left ventricular hypertrophy						
Present	68(66.7)	35(57.4)	1.845	1.61	0.174	0.81 – 3.17
Absent	34(33.3)	26(42.6)				
Left ventricular geometry						
Normal	12(11.8)	8(13.1)	2.385		0.497	
Concentric remodelling	20(19.6)	18(29.5)				
Eccentric hypertrophy	15(14.7)	9(14.8)				
Concentric hypertrophy	55(53.9)	26(42.6)				
Systolic function						
Abnormal	63(61.8)	11(18.0)	27.952	7.57	<0.001*	3.43 – 16.73
Normal	39(38.2)	50(82.0)				
Systolic dysfunction severity						
Normal	39(38.2)	50(82.0)	29.726		<0.001*	
Mildly abnormal	44(43.1)	8(13.1)				

Moderately abnormal	15(14.7)	1(1.6)
Severely abnormal	4(3.9)	2(3.3)

* $P < 0.05$

Table 4 showed the relationship between left ventricular hypertrophy and some clinical variables. However, none of the relationship was statistically significant.

Table 4: Relationship between left ventricular hypertrophy and clinical variables

	Anaemic CKD N = 102				**Controls N =61**			
Parameter	**LVH**	**No LVH**	**X^2**	**p value**	**LVH**	**No LVH**	**X^2**	**p value**
Age range								
< 40 years	16(15.7)	3(2.9)	6.793	0.033	10(16.4)	4(6.6)	1.83	0.40
40 – 59 years	32(31.4)	13(12.8)			8(13.1)	9(14.8)		
≥60 years	20(19.6)	18(17.7)			17(27.9)	13(21.3)		
Gender								
Male	33(32.4)	22(21.6)	3.396	0.065	15(24.6)	17(27.9)	3.27	0.07
Female	35(34.3)	12(11.8)			20(32.8)	9(14.8)		
Hypertension								
Yes	60(58.8)	24(23.5)	0.373	0.541	29(47.5)	22(36.1)	0.081	0.77
No	8(7.8)	10(9.4)			6(9.8)	4(6.6)		
Diabetes								
Yes	22(21.6)	15(14.7)	0.907	0.341	4(6.6)	2(3.3)	0.516	0.472
No	46(45.1)	19(18.6)			31(50.8)	24(39.3)		
Blood pressure control								
Controlled	33(32.4)	22(21.6)	1.77	0.183	18(29.5)	9(14.8)	0.151	0.698
Uncontrolled	35(34.3)	12(11.8)			17(27.9)	17(27.9)		
Dialysis								
Yes	16(15.7)	5(4.9)	1.86	0.173	2(3.3)	0(0)	0.740	0.390
No	52(51.0)	29(28.4)			33(54.1)	26(42.6)		
Antihypertensive								
Yes	53(52.0)	26(25.5)	0.08	0.76	29(47.5)	17(27.9)	3.745	0.053
No	15(14.7)	8(7.8)			6(9.8)	9(14.8)		

There was a significantly strong negative correlation between packed cell volume and left ventricular mass index among CKD subjects with anaemia (r = -0.345, p = 0.001), while in the control group there was a weak positive correlation (r = 0.001, p = 0.993). There was also a negative correlation between eGFR and left ventricular mass index among both CKD subjects with anaemia (r = -0.436 and p < 0.001) and controls (r = -0.363, p = 0.006), this is as shown in Table 5.

Table 5: Correlation between left ventricular mass index and selected variables among participants

	Anaemic CKD		Controls	
Parameters	**R**	**p – value**	**R**	**p – value**
Packed cell volume	-0.345	0.001	0.001	0.993
eGFR	-0.436	<0.001	-0.363	0.006
Systolic blood pressure	0.112	0.292	0.098	0.472
Diastolic blood pressure	0.212	0.043	0.078	0.567
Body mass index	-0.084	0.423	0.016	0.909
Age	-0.372	<0.001	-0.008	0.951

Furthermore, linear regression analysis revealed anaemia as a significant predictor of increased left ventricular mass index when compared to other selected variables; this is as represented in Table 6.

Table 6: Linear regression for the predictors of left ventricular hypertrophy among participants

Parameters	Unstandardized Coefficient (β)	Std error	Standardized Coefficient	T	p – value	95% C.I
Constant	152.793	35.897		4.256	< 0.001	81.813 – 223.773
SBP	-0.012	0.177	-0.008	-0.068	0.946	-0.361 – 0.337
DBP	0.452	0.316	0.159	1.433	0.154	-0.172 – 1.077
FBS	-0.139	0.120	-0.096	-1.158	0.249	-0.377 – 0.099
PCV	-1.170	0.495	-0.198	-2.362	0.020	-2.149 – -0.191
Hypertension	-6.495	11.296	-0.049	-0.575	0.566	-28.831 – 15.841

SBP; Systolic blood pressure, DBP; Diastolic blood pressure, FBS; Fasting blood sugar, PCV; Packed cell volume.

DISCUSSION

The objective of this study was to assess the prevalence and pattern of left ventricular geometry and determine its relationship with anemia, among established CKD patients seen at Lagos State University Teaching Hospital, Nigeria.

Majority of the CKD patients were in their middle age with a slight male predominance. This is in keeping with the demographics of CKD patients in previous works. [3, 5, 7, 11, 24] Most of the anaemic CKD subjects were in stage 5 with a fraction of them on hemodialysis. This is not unexpected and has been documented in previous works because declining

renal function has been associated with anemia. [10-12, 14, 25]

The overall prevalence of left ventricular systolic dysfunction was 45.4% among studied participants, with significantly higher prevalence among anaemic CKD group (61.8%), than CKD subjects without anaemia (18%) with $p < 0.001$. This was significantly higher than the prevalence of 22% for systolic dysfunction reported by Foley et al. [12, 13] This difference could be explained by the diagnostic method used for defining systolic dysfunction, in which fractional shortening was used to assess ejection fraction, and this has been shown to be unreliable in the presences of asymmetric left ventricular geometry and regional wall motion abnormality from coronary artery disease or conduction abnormality, which are common in CKD patients, and thus, not currently recommended. [23]

The overall prevalence of LVH in the study population was 63.2%. The prevalence of LVH was slightly higher among anaemic CKD subjects (66.7%) than CKD subjects without anaemia (57.4%), though not significantly different. This is slightly lower to the works of Adejumo et al and Jesurobo et al who reported a prevalence of 76 and 77.6% respectively, and much lower to reports by Ulasi et al with a prevalence of 95.5%. [9, 15, 26] The difference in the prevalence could be attributed to subject selection because their studies had more patients with hypertension as the aetiology of CKD. Conversely, the prevalence of LVH in our study was however significantly higher than reports by Chijioke et al who reported a prevalence of 27.6% using electrocardiogram. [27] Electrocardiogram has been shown to have lower sensitivity and specificity for the detection of LVH compared to Echocardiogram. [28]

Prevalence of anaemia, hypertension and LVH increased as CKD stage advanced among both groups of studied participants, with a negative correlation between eGFR and LVMI among both anaemic CKD subjects ($r = -0.436$, $p < 0.001$) and CKD subjects without anaemia ($r = -0.363$, $p = 0.006$). For instance in this study, 42.3% of CKD stage 3 patients in this study were anaemic, and 83.1% were hypertensive, compared to 93% and 90.7% prevalence of anaemia and hypertension stage 5 CKD respectively. Ijoma et al and Akinsola et al had previously reported increasing prevalence of anemia as renal function worsens. [14, 24] This may suggest that the LVH seen down the CKD groups may be a result of anaemia and hypertension or other variables. LVH has been shown to be multifactorial. [15, 16] Our findings are also similar to reports by Adejumo et al and Levine et al, that both reported increasing prevalence of LVH as CKD stages advanced. [18, 26]

The most frequent left ventricular geometric pattern seen among both anaemic CKD group and those without anaemia were concentric hypertrophy (53.9% versus 42.6%) and concentric remodelling (19.6% versus 29.5%). These findings are comparable to reports from Foley et al, who reported higher frequency of concentric LVH (39.4%) among CKD patients with anaemia. [12, 13] However, this finding is at variance with the finding of Ulasi et al, who reported higher frequency of eccentric hypertrophy among CKD patients (54.6%). [15] Though Ulasi et al focused mainly on hypertensive CKD subjects, the variance in LV geometric pattern with our study may stem from the criterion used for the classification of left ventricular geometry. The diagnostic criteria used for the measurement of left ventricular dimensions was the Penn convention [29] which is now obsolete because of its inaccuracies, while the American Society of Echocardiography and the European Association of Cardiovascular Imaging convention [23] is now the recent recommendations of most guidelines because the LVMI assessment had good correlation with cardiac MRI which is the gold standard of cardiac measurements. [23]

There was a strong negative correlation between packed cell volume and left ventricular mass index among anaemic CKD patients ($r = -0.345$, $p = 0.001$), compared to those without anaemia ($r = 0.001$, $p = 0.993$). Furthermore, linear regression analysis to control for confounders such as hypertension revealed anaemia as the only predictor that significantly increased the risk of increased left ventricular mass index (β coefficient = -1.170, $p = 0.002$, and 95% C.I = -3.879 - -0.866). Therefore, there is a strong evidence that anaemia is associated with a 1.170g/m^2 increase in left ventricular mass per 1% decrease in packed cell volume (0.33g/dl of

haemoglobin) after controlling for other confounders such as hypertension, thus anaemia contributed to the development of LVH. This has also been supported by larger studies by Foley et al, which revealed 50% increase in the risk of developing LVH and systolic dysfunction with each decrease of 1g/dl of haemoglobin. [12]

From the foregoing, anaemia has been shown to have a role in the development of left ventricular hypertrophy in CKD patients and thus, early evaluation and treatment of anaemia will go a long way at mitigating LVH, which is an independent cardiovascular risk factor, and invariably reduce the incidence of cardiovascular deaths among CKD patients.

CONCLUSION

This study showed that chronic kidney disease patients had high prevalence of anaemia, left ventricular hypertrophy and left ventricular systolic dysfunction which is worse in anemic CKD patients. The commonest left ventricular geometric pattern was concentric left ventricular hypertrophy followed by eccentric left ventricular hypertrophy.

Anaemia contributed significantly to increased LV mass, LV mass index and poor left systolic function, therefore, early management of anaemia may improve cardiovascular outcomes.

CONFLICT OF INTEREST

There is no potential competing or conflicting interest. The authors received no support or grant from any funding agency in the public, commercial, or not-for-profit sectors.

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REVIEW ARTICLE

KNOWLEDGE AND ATTITUDE RELATIONSHIP WITH 3M PLUS MOSQUITO NEST ERADICATION ACTIONS IN SURABAYA: LITERATURE REVIEW

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ABSTRACT

Dengue is a viral disease transmitted by the Aedes mosquito that causes Dengue Hemorrhagic Fever (DHF) which is a major problem in public health and has social and economic impacts. One of the key factors for the success of DHF eradication is community behavior which includes knowledge, attitudes, and actions. The purpose of this study is to conduct a literature review by analyzing the relationship between knowledge and attitudes with the act of eradicating mosquito nests based on 7 (seven) journal articles that have been selected from the selection process measured using the quality assessment of the literature Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project (EPHPP) which assesses selection bias, study design, confounders, blinding, data collection methods and withdrawals and dropouts so that the quality of the reviewed journals can be seen. The quality assessment of the journal resulted in 3 points: Strong, Moderate, and Weak. The result is that most respondents are housewives. Knowledge level is good, attitude level is good, and action is good enough. There is a relationship between knowledge and action and there is a relationship between attitude and action. The recommendation is to improve the ability of housewives and improve coordination with local Jumantik.

Medical and Health Science Journal.

INTRODUCTION

In 2017, the city of Surabaya had 451 dengue cases (1). This figure is the second largest in East Java after Sampang regency which had 506 cases in the same year (2). Of course, this is a problem for the area, especially the city of Surabaya. The government-regulated Dengue Hemorrhagic Fever eradication program involves many parts of the community. Some of the factors that affect the spread of dengue fever include climate change (3), global, economic growth, population density (4), clean water availability and community behavior(5). One of the key factors of eradicating dengue fever is community behavior (6). The behavior of society in this case includes the knowledge, attitudes, and actions of society (7).

Knowledge can influence a person's attitude and actions as mentioned

by Savayong (8) in terms of Mosquito Nest Eradication. The level of attitude shown by a person can influence his actions (9). A person's attitude towards a problem can affect the person's willingness to act (8).

This study aims to analyze the relationship of knowledge and attitudes with mosquito nets eradication measures. The benefit of this research is to enrich the library and prove the relationship between knowledge and attitudes with mosquito larvae eradication actions and to find out the behavior of the community towards the eradication of mosquito larvae so that they can provide feedback to the Surabaya City Health Office so that the area is achieved free of dengue fever.

METHODS OF THE STUDY

The type and design of this research is a comprehensive literature review identifying, assessing, and analyzing all relevant studies on the given topic. Meanwhile, the method used in this study is about assessing the relationship between Knowledge and Attitudes with 3M Plus Mosquito Nest Eradication Measures in Surabaya in different demographic groups, it can be a cross-sectional or case control approach. This research reviews based on the results of scientific analysis, differences, and similarities of knowledge, attitude, practice (KAP) even though there are differences in instruments in data collection and methods for data analysis.

Data is collected from Literature that can be found through the Google Scholar search engine written in Indonesian. The literature found will then be filtered with inclusion and exclusion criteria.

Inclusion Criteria:

1. The type of study chosen is the study that is the primary research. Single-group case studies and exploratory designs are reviewed and discussed to help provide explanations for positive or negative outcomes, as well as provide a basis for future research (Littell et al. 2008)(10).
2. The subject and place of research is the community, especially mothers in the Surabaya City area.
3. Studies conducted between 2014 - 2019.

Exclusion Criteria: Literature that does not meet the predetermined keywords.

In-depth searches for studies and research were searched using the keywords "Knowledge" AND "Attitudes" AND "Dengue Prevention Measures in Surabaya".

The electronic database used as a search for this study using Google Scholar only includes journals. The last search was in June 2020. Then there is a need for selection with an assessment of the quality of literature. EPHPP (Effective Public Health Practice Project) was used to assess the quality of the literature in this study. There are seven assessment items with three assessment tier categories each.

RESULTS AND DISCUSSION

Literature Search Results

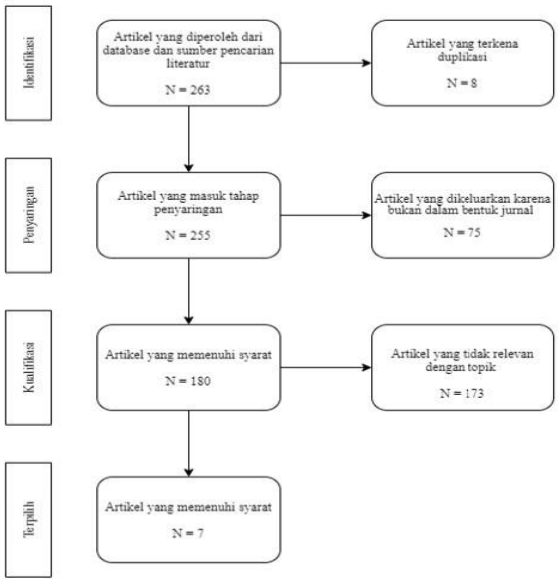

Figure 1 Diagram of the process of determining the source of literature to be analyzed

Based on figure 1, it has been explained the stages of literature selection that will be analyzed in this literature review. The selected literature was searched based on the search word "knowledge relationships, attitudes and precautions of DHF" on google scholar from 2014 to 2019. The search was conducted in June of 2020.

From the first stage of the search, 263 articles were obtained. The next selection was carried out by issuing literature that was duplicated because the title was the same but was published by different media, then 8 literatures were obtained that experienced duplication so that there were 255 articles.

From the selection, 123 articles were obtained that had to be issued because the research was carried out outside the city of Surabaya. The focusing of the research area was carried out to obtain literature review results that were more focused and reduced variations in research variables. So that researchers can conduct a more objective analysis. Up to 7 articles left to proceed to the analysis process.

Literature Quality Assessment

In this study, the literature quality assessment used the Quality Assessment Tool for Quantitate Studies from the Effective Public Health Practice Project (EPHPP) which assessed selection bias, study design, confounders, blinding, data collection methods and withdrawals and dropouts so that the quality of the journals reviewed would be visible. The journal quality assessment yielded 3 values: Strong, Moderate, and Weak.

Tabel 1 Kualitas Jurnal berdasarkan Effective Public Health Practice Project (EPHPP)

Author	*Selection Bias*	*Study Design*	*Confounders*	*Blinding*	*Data Collection Method*	*Withdrawals and* –	*Rating*
Prastiani , dkk (2018)	1	1	3	2	2	1	1
Muda, dkk(2019)	1	1	3	2	2	1	1
Agustin (2019) (8)	1	1	2	2	2	1	1
Rismawati , dkk (2017)	1	1	3	2	2	1	1
Sari (2015)	1	1	3	2	2	1	1
Fauziah, dkk (2019)	1	1	2	2	2	1	1

Jayawardhana, dkk (2018)	1	1	3	2	2	1	2

Information: 1 = *Strong*, 2 = *Moderate*, 3 = *Weak*

The results of the critical appraisal assessment are that there are 6 (six) journals with a strong rate, 1 (one) journal with a moderate rate, and there are no journals with a weak rate. The details of the assessment in each component of the assessment are contained in table 1.

The seven studies that fit the inclusion criteria of this literature review involved 5 cross-sectional studies and 2 case control studies (Table 2). The publication time of the study used in this study ranged from 2015 to 2020. The location of all studies is in the city of Surabaya, including Gunung Anyar Village and Rungkut Menanggal Village, Rangkah Buntu Village, Tenggilis Health Center Area, Wonokusumo Village, Putat Jaya Village, Jambangan Village.

Of the seven studies that have been selected in this literature review, it generally uses independent variables of knowledge, attitudes and actions/behaviors with the dependent variables used are larvae detection, the presence of larvae and the incidence/incidence of DHF as listed in table 2.

The research instruments used by the selected study are interviews with questionnaires and observation sheets, as well as examination of the presence or density of larvae.

Literature Characteristics

Socio-demographic overview of the article

The characteristics of respondents are often used as variables in research related to analyzing the relationship

Characteristics of Inclusion Studies

Table 2 Characteristics of the inclusion study methodology

Literature (Year)	Types of Studies and Sampling Techniques	Implementation Location	Independent Variables	Dependent Variables	Research Instruments
Prastiani, dkk (2020) (11)	*Cross Sectional Study, Cluster, Random Sampling*	Gunung Anyar Village and Rungkut Menanggal Village,	Air temperature, occupancy density, knowledge and attitude towards DHF and PS	House Indeks (HI)	Interview (questionnaire), observation, Container Index
Muda, dkk (2019) (12)	*Cross Sectional Study, Simple, Random Sampling*	Rangkah Buntu Village	Education, income, knowledge and attitudes	The presence of larvae	Interview (questionnaire), observation
Agustin (2019) (13)	*Case Control, Purposive Sampling*	Tenggilis Health Center Area	Knowledge, attitudes, and actions	DHF incidents	Interview (questionnaire), observation
Rismawati, dkk (2017) (14)	*Cross Sectional Study, Simple,*	Wonokusumo Subdistrict,	*Host* and environment behavior	DHF incidents	Interview (questionnaire), observation,

	Random Sampling				Flick-Free Number
Sari, dkk (2015) (15)	*Cross Sectional Study, Simple Random Sampling*	Putat Jaya Village, Surabaya	Knowledge and actions	DHF incidents	Interview (questionnaire)
Fauziah, dkk (2019) (16)	*Case Control, Purposive Sampling*	Tenggilis Health Center Area,	Knowledge and actions	DHF incidents	Questionnaires, observations
Jayawardhana, dkk (2017) (17)	*Cross Sectional Study, Simple Random Sampling*	Jambangan Village,	Family behavior	DHF incidents	Questionnaire

between knowledge, attitudes and behaviors for dengue fever prevention or eradication of mosquito nests (PSN)

Some of the characteristics of respondents that are variable include the age of the respondents (11) (14) (15) (17), gender (11) (12), employment (11) (14) (15) (17), income (12), and Education level (11) (12) (14) (15) (17) In studies with respondents who tend to be homogeneous on sex variables, gender is not one of the characteristic variables of respondents, such as all respondents are cadre mothers (14) (15) or gender is considered not to be one of the variables to consider (17). However, there are some studies that do not make the characteristics of respondents as variables written on the research results because they are not discussed in the study (13) (16).

Variable respondents at the age of the majority 41 – 50 years, at least 23 years maximum 80 years (11), 30 – 35 years (14), aged > 40 years (15), 41 – 65 years (12), aged 24 people (17). Most respondents were female (11) (12).

Employment variables in respondents of most housewives (11) (14) (15) and most of the private work (17). Education level variables of most high school respondents (11) (12) (14) (15) (17).

Interpretation and Discussion of Results

Knowledge of PSN with 3M

Knowledge as one of the variables of research consists of being spelled out with several questions. It consists of 5 questions (12), 7 questions (11) and 10 questions (14). There are variables of knowledge categorized into three, namely less, sufficient, and good (11) (15) (16); (12) bad, sufficient, and good (13); (14). There are also those who do not discuss knowledge in terms of dengue incidents (17).

Most respondents had less category knowledge (11). In some studies, the results were obtained that most respondents had good knowledge (15).

Some studies have also compared knowledge from case and control groups (13) (12). Most respondents in the study group had good knowledge (31.82 %). Most respondents

in the comparison group had poor knowledge (40.91%) (13). The percentage of respondents with good knowledge was higher in the control group than the case group (16).

Attitude about PSN with 3M

The attitude assessed was the attitude about dengue fever and mosquito nets eradication (PSN) with 11 questions (11). The attitude also discusses the attitudes of respondents regarding 3M (16). Attitude is measured by 10 questions (13).

The attitude variables are categorized into three, namely less, sufficient, and good (11) (16). There are also attitudes that are not used as variables studied (15); (17). There are also categories of attitude variables that are categorized into two, namely good and less (12). Most respondents had sufficient attitudes (11) (14). Most respondents had a good attitude (16).

Actions about PSN with 3M

Preventive measures in this regard such as the eradication of mosquito nests (11) (16); (17). The action also looks at how it relates to cases of dengue fever (11); (15). The description of actions includes draining the bathroom once a week, not allowing clothes to hang in the house, using mosquito repellent / mosquito repellent (burn, rub, spray) and sprinkling abate powder on the water reservoir / bathroom (12) (14).

Actions include bringing family members affected by DHF to health facilities and reporting to RT, RW, or lurah cadres (14). The discussion of actions is also related to jumantik actions to empower the community in implementing mosquito nets eradication efforts programs with the implementation of 3M plus. Action is measured by 17 questions (13).

Measures also include first aid efforts in people with DHF. In addition, actions taken include hand washing efforts, planting mosquito repellent plants. Actions are categorized into two, namely high and low (11) , doing 3M+ Actions and not doing 3M Actions (12). Categorization is also divided into three, namely less, sufficient, and good (15); (16) or good, enough, and bad (13).

Most respondents had actions with low categories (11), bad (13). However, there is also most respondents having sufficient Actions (15), Good actions (16) Active category actions.

The actions taken were to drain the bathtub at least once a week 115 people while 96 people did not, hang dirty clothes for more than one day a total of 105 people and 106 people did not, 184 people cleaned the house while 28 people sometimes (12). The action is also carried out based on whether to experience the incidence of DHF then the result is obtained that the majority have never experienced the occurrence of DHF (14); (15).

The categories of behavior are good, sufficient, lacking (17). Most residents behave quite 54% (17). The percentage of respondents with good action was higher in the case group than the control group (16). The incidence of DHF is categorized into three, namely good, sufficient, lacking. The percentage of the three

categories is almost the same, but the highest is the percentage in the sufficient group (17).

The relationship of knowledge with the actions of PSN

Knowledge is the result of knowing and occurs after a person has sensed an object(18). Knowledge is an important factor in the formation of a behavior because behavior based on knowledge will last longer than without being based on knowledge (11). In this study, the selected inclusion study will assess respondents' knowledge related to DHF disease, Mosquito Nest Eradication, and 3M+ measures. In Rismawati's research (14) a meaningful relationship (p = 0.00) was obtained between knowledge and incidence of DHF where most respondents who had never experienced DHF had a sufficient level of knowledge (44.9%) and obtained a meaningful relationship between actions and the incidence of respondents who had never experienced DHF, the majority had sufficient invaluable actions (54%). From the study, it can be interpreted that the level of knowledge will affect the manifestation of respondents' actions related to DHF and PSN diseases.

The research is not in line with the research of Agustin (13), Muda (12) Sari (15) and Fauziah et al., (16), where in the four studies there was no relationship between knowledge and actions related to DHF disease and PSN activities. A meaningful relationship was obtained between knowledge and incidence of DHF (p = 0.009) with most respondents who had never experienced the incidence of DHF having a less valuable level of knowledge (13). The research of Muda et al., (12) found a meaningful relationship between knowledge and incidence of DHF (p = 0.001) with respondents who found the presence of larvae in their home areas, the majority of whom had a good level of knowledge. Research by Fauziah et al. (16) suggests that knowledge and action have no relationship related to the incidence of dengue fever

The relationship of attitude to action

Attitude is a reaction or response that is still closed from a person to a stimulus or object (19). The manifestation of an attitude may not necessarily be directly manifested into an action or an activity. However, attitude is a predisposing factor to the actions of an individual's behavior. In this study, the attitudes assessed were respondents' attitudes related to Mosquito Nest Eradication (PSN), 3M behavior, and DHF disease. Meanwhile, in terms of actions, including reviewing respondents' actions related to draining the bathroom once a week, not allowing clothes to depend in the house, using mosquito repellent / mosquito repellent drugs (burn, rub, spray) and sprinkling abate powder on the tub of the water storage container / bathroom.

Research by Rismawati et al., (14) respondents who have never experienced DHF tend to have sufficient attitudes (56.4%) p = 0.00 and respondents who have never experienced DHF are most actions that are considered sufficient (54%) p = 0.00 (14). So, in the study, it can be said that in respondents who have never contracted DHF, most of them have sufficient attitudes and actions. This

research is supported by the research of Fauziah et al. (16), where in their research found a statistically meaningful relationship between respondents' attitudes and the incidence of DHF with a p value of 0.013 where most respondents had a good attitude. In addition, in his research, it was found that most respondents had good invaluable actions. So, from the two studies, it can be said that there is a relationship between attitudes and manifestations of respondents' actions related to dengue incidence.

The two studies were not in line with the research of Muda et al., (12) and the research of Fauziah et al., (16) where in both studies there was no relationship between attitudes and actions with the incidence of DHF and the number of larvae presence. This is contradictory because it is suspected that the public's sense of awareness in preventing and overcoming dengue fever events is still low. An individual in acting to do something should be based on a high sense of awareness so that his actions are in accordance with the knowledge they have. If an action is not based on a high sense of awareness, PSN DBD activities as an effort to prevent and overcome the occurrence of dengue cases will not run optimally (15). Therefore, predisposing factors to the manifestation of an individual's actions in the prevention of DHF not only affect his attitude and knowledge related to DHF and PSN diseases, but a high sense of awareness will be able to provide maximum efforts in preventing and overcoming the occurrence of DHF cases.

CONCLUSION

Based on the results obtained from the processing of research data, it was concluded that:

1. There was no relationship between knowledge and actions related to DHF disease and PSN activities.
2. There is a relationship between attitudes and actions related to dengue disease and PSN activities, but this needs to be reviewed because the literature that supports this statement is not very strong.

RECOMMENDATIONS

From this research, it is hoped that it will add search engine references and add journal language, expand areas that do not yet have data

CONFLICT OF INTEREST

The author started there is no conflict of interest.

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REVIEW ARTICLE

A LITERATURE REVIEW ON MANTRA MEDITATION

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ABSTRACT

Objective: Meditation has gained popularity in modern times as an adjunctive of therapeutic treatment. This study aimed to study meditation and use of mantra meditation in application of health problems.

Materials and methods: After searching literature through electronic databases, with regards to meditation and mantra meditation in accordance with PRISMA method was done.

Conclusion: Meditation does not deal only spiritual aspect but it has various application as complimentary in various health related problems.

Medical and Health Science Journal

INTRODUCTION

For many years meditation has attracted clinicians, researchers, and the general public using it as an adjunctive treatment for many health-related problems.[1, 2] It has been a spiritual activity and practice of healing for more than 5000 years.[3] Meditation helps medicine achieve optimal physical and mental health. Medicine deals primarily with the 'outer world', including the body, whereas meditation deals with the 'inner world' or mind. The mind-body connection is so highly valued that it is very likely that the science of meditation will converge toward the goal of optimal functioning of the human body and mind. In complementary and alternative medicine (CAM) it is considered as practice of mind and body. [4]

The word “meditation” is derived from the Latin meditari, which means “to engage in contemplation or reflection.” To be called meditation, the procedure must include (1) the Use of specific well defined techniques; (2) muscle relaxation at specific moments in the process; (3) "logical relaxation." (4) It must necessarily be a self-guided state; and (5) the use of self-focus skills .[5] Meditation can be explained as a specific and well-defined state of “thoughtless awareness” or silence of mental activity, in which mind is relaxed without reducing the level of alertness.[6] Meditation can be defined as practice of self-regulation practices that put focus on bringing mental processes under greater voluntary control that leads to general mental well-being and development of various capacities such as calmness, clarity, and increase in concentration.[7] In many other explanations of meditation specific emphasize has been given to relaxation, concentration, and state of alertness, decreasing in processing of logical thoughts, and development of an attitude self-observing.[8]

METHODS

Literature published between the years 2000 to 2019 was searched for by three independent researchers from the following databases: PubMed, Google Scholar, ScienceDirect, IndeMED, NIH Clinical Trials for reports related to the meditation. The types of studies included were in vivo, in-vitro and narrative reviews with regards to meditation. Case reports, animal studies, and those published in languages other than English were excluded from the study. The following keywords were used to develop the search strategy (meditation AND application, meditation AND mantra meditation, meditation AND health). The electronic database search yielded 108 articles, and after excluding the duplicates; 58 were retained following this eventually, 18 studies were included in this review.

Categorization of meditation

Traditional and contemporary meditation practices are grouping them into attentional (Concentrative meditation), constructive types, and deconstructive types. The primary cognitive mechanisms in these three families are (1) attention regulation and meta-awareness, (2) perspective taking and reappraisal, and (3) self-inquiry, respectively. [9] The term meta-awareness term has been related to the cognitive functions including state of awareness about the processes of consciousness. Lack of Meta awareness can result into merely attention on the object without being ware of process of thinking, feeling, and perceiving. [10]

Concentrative meditation focuses the attention on the breath, an image, or a sound (mantra), to still the mind and allow a greater awareness and clarity to emerge. The following practices are categorized as attentional meditation types: mindfulness of breathing, breath counting, dhyana practice, samadhi practice, visualization, mantra recitation, Kirtan Kriya, choiceless awareness, and mindfulness meditation (e.g., as taught by mindfulness-based stress reduction programs. Unlike the practice of concentration meditation, constructive meditation involves a positive process of changing the quality of thoughts and emotions and cultivating qualities like patience and calmness that help protect the mind from damage by the stresses of mundane activities. It also involves restructuring of priorities and values and a dovetailing of the mind towards more meaningful activities of life. Deconstructive type of meditation aims to undo maladaptive cognitive patterns by exploring the dynamics of perception, emotion, and cognition and generating insights into one's internal models of the self, others, and the world. A central mechanism in the deconstructive family is self-inquiry, which is defined as the process of investigating the dynamics and nature of conscious experience. Vipassana /insight meditation, Mahamudra, Dzogchen, Shikantaza/'just sitting', Self-inquiry, and Koan practice are listed as deconstructive types. [11]

Other types of meditation

Rajyoga meditation, OM meditation, TM (Transcendental Meditation), Mindfulness meditation, focused meditation, movement meditation, Mantra meditation, etc.

Rajyoga meditation includes Relaxation stage that brings the mind and body into a condition of calmness and mental peace by stopping thinking of tension and stress. Stage of concentration allows to increase focus on voluntary thoughts. Stage of contemplation deals about observing into the inner self deeply. Stage of realisation helps in understanding of reality a more profound, more

meaningful way. Final stage of meditation focuses awakening and regaining about state of eternal identity. [12] OM meditation includes mental chanting of OM leads to a single thought state and a subjective feeling of deep relaxation.4 Movement meditation focuses on different motions which may include walking, gardening, etc. It's an active type of meditation where the meditation is guided by the movements. Mindfulness meditation has origin from teachings of Buddhism. In this type of meditation focus is given on pattern of thoughts as that passes through the mind without being involved or judging them. This practice increases concentration with alertness, which helps to focus on an object or breathe while observing bodily sensations, thoughts, or feelings.

Challenges in meditation

Time demands- time-consuming meditation

Leaning curve - references the Affective Demands and Task Demands of meditation. Affective Demands references commonly reported (12.6%) difficulty, effort, and frustration experienced in and because of meditation, especially in beginners.

Social and Interpersonal Drawbacks-

Stigma and Disconnection references perceived social stigma against meditators, feeling judged and misunderstood by others, inability to share experiences with non-meditators, and feeling disconnected from people who do not meditate.

Existential and Personal Change- it references personality changes, world view, and personal life circumstances that the participant appraised as negative and stressful as well as decreased ambition and materialism, existential realizations, and existential dread.

Negative Health Outcomes - This category references physical discomfort, such as pain or discomfort in the legs or back, and sleep disturbances, such as insomnia and drowsiness.

Negative Emotional and Psychological Outcomes-Negative Emotional Outcomes captured negatively valenced emotional states, such as boredom, anxiety, nervousness, doubt, and fear of failure in meditation.

Some other unpleasant meditation-related experiences may be:

(i) **practice-related:** high intensity frequent sessions having long duration.

(ii) **relationship-related**: Commonly, retreats are held in silence, and take place in a secluded environment with limited access to distractions (e.g., phones, internet, books).

(iii) **practitioner-related:** meditators **who choose to attend intensive retreats might systematically differ from regular meditators** who do not attend retreats in personality, intentions, and worldviews.

(iv) **Health behavior-related**: Meditators are commonly encouraged to follow a strict schedule that limits sleep to several hours (e.g., the wake-up bell at 4 am), discourages extensive physical activity (e.g., jogging), and includes a change in diet (e.g., vegan).

Mantra meditation (mantra yoga / japa yog)

A mantra is a word or phrase generally with spiritual meaning that requires repeating silently or chanting out loud, done alone or with a group. It is the simplest type of meditation because It is easier to focus on a word than on their breath, image, etc. Above mentioned meditation challenges are the minimum in mantra meditation.

There are several ways to practice Mantra Meditation. Repeat the Mantra verbally or mentally or whisper for some time. Mantra meditation employs the use of a mentally repeated word or phrase, intending to maintain attention on those words. A mantra, usually representative of a holy

name such as Jesus, the Buddha, Sri Krishna, or Divine Mother, is a word or phrase with spiritual meaning that has been handed down for generations within all major spiritual traditions. [13]

Table 1: List of common mantras used in meditation [14]

Mantra and pronunciation	Meaning
Buddhist	
Om Mani Padme Hum(Ohm Mah-nee Pod- may Hume)	An invocation to the jewel (self) in the lotus of the heart.
Namo Butsaya (Nah- mo boot-sie-yah)	I bow to the Buddha
Christian	
May God and my all	St. Francis of Assissi's mantra
Maranatha (Mar-uh-nah-tha)	Lord of the heart (Aramaic)
Kyrie Eleison (Kir-ee-ay Ee-lay-ee-sone)	Lord have mercy, or the Lord is risen,
Christe Eleison (Kreest-ay Ee-lay-ee-sone)	Christ have mercy, Christ has risen
Jesus, Jesus or Lord Jesus Christ	Jesus, son of God
Hail Mary or Ave Maria	Mother of Jesus
Hindu/indian	
Rama (Rah-ma)	Eternal joy within
Ram Ram Sri Ram (rahm rahm shree rahm)	(Variation on Rama)
Ohm Namah Shivaya (Om Nah-mah Shee-vy-yah)	An invocation to beauty and fearlessness
Ohm Prema (Ohm-Pray-Mah)	A call for universal love
Om Shanti(Ohm Shawn-tee)	In invocation to eternal peace
So Hum (So hum)	I am that Self within
Jewish	
Barukh Atiah Adonoi(Bah-ruke-Ah-tah Ah-don-aye)	Blessed are Thou' O Lord
Ribono Shel Olam(Ree-boh-noh Shel Oh-lah)	Lord of the Universe
Shalom	Peace
Sheheena (Sha Hee-nah)	Feminine aspect of God
Muslim	
Allah	One True God
Bismallah Ir-rahman Ir-rahim (Beese-mah-lah ir-rah-mun ir-rah-heem)	In the name of Allah, the merciful, the compassionate
Native american	
O Wakan Tanka	Oh, Great Spirit

Application of mantra meditation in medicine.

Research on the benefits of frequent, silent mantra repetition has shown improvements in lowering perceived stress, anxiety, and anger in veterans and healthcare providers. Mantra intervention reduced trait-anger in HIV-positive persons by enhancing positive reappraisal coping. This is the first investigation to determine that a mantra intervention may reduce trait-anger by enhancing the utilization of cognitive coping efforts. By way of improved attention, awareness, and coping skills, mantra meditation may have an extended impact on healthcare operations including (healthcare practitioner) HCP – patient interaction, quality of care, and patient safety. [15] Recitation of prayer or the mantra has a similar effect to that of slow breathing, increasing arterial baroreflex which is a favorable prognostic factor in cardiac patients. [16] The effect of faith/assurance on cortisol levels are enhanced by a spiritual mantra intervention in adults with HIV. Decreased cortisol could potentially benefit functioning among HIV-infected individuals. [17] Increase in positive reappraisal coping during a group-based mantra intervention mediate sustained reductions in anger in HIV-positive persons. Mantra meditation may have

minimal to moderate beneficial effects on mental health in the general population. [18]

CONCLUSION

Meditation has been part of lives since existence of human being from rudimentary level to the most recent type of meditation. Earlier meditation mainly related to the spiritual rejuvenation but in modern times many researches has put emphasis on medicinal application of it. As meditation has a long history of existence which results into different types of mediation based on concentration, constructive and deconstructive activities. Among them mantra meditation could be considered as simplest method, which impacts not only cognitive function but have adjunctive effect on other health related issues.

CONFLICT OF INTEREST

The author started there is no conflict of interest.

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CASE REPORT

PSYCHODYNAMIC OVERVIEW OF GENERALIZED ANXIETY DISORDER IN YOUNG ADULTS

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ABSTRACT

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines an anxiety disorder as an excessive feeling of fear that occurs in a person that interferes with daily activities. Generalized anxiety disorder causes a person to feel anxious about a wide range of situations and issues. Patients often experience anxiety, feelings of fear and constantly on edge, difficulty concentrating, difficulty sleeping, muscle tension, and frequent irritability. Based on data from the Indonesian Ministry of Health in 2007, there were 450 million people who had to live with mental disorders. The prevalence of adult individuals (aged 18 years and over) and the elderly, there were 11.6% who experienced emotional disorders, such as anxiety and depression. This case report discusses a 20-year-old woman with the main complaint of unclear anxiety, not knowing what to worry about, floating between things she worries about is death, fear of having a serious illness, breakup, fear of losing her job as a content creator, and feeling of being blamed that keeps on coming. Management in the form of giving SSRI antidepressants and psychodynamic psychotherapy is done to try to reinterpret feelings of guilt that often arise as a result of fixation in one phase of their growth and development.

Medical and Health Science Journal

INTRODUCTION

Anxiety is a persistent feeling of worry as a response to threats or stressors that can come from within the individual or the environment. Anxiety is a normal and pathological response depending on its intensity, duration and the individual's ability to cope. Anxiety is a pathological condition characterized by feelings of fear accompanied by a hyperactive autonomic nervous system. Anxiety is also an emotional reaction arising from non-specific causes such as subjective individual experiences that can cause feelings of discomfort and threatened. About 2/3 of adolescents and young adults with anxiety disorders do not seek help and only a few report contact with a psychotherapist (1). Almost all individuals have experienced anxiety, especially as a result of accumulated life problems (2).

Meanwhile, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines an anxiety disorder as an excessive feeling of fear that occurs in a person which has an impact on disrupting their daily activities. Anxiety disorders can be experienced by many individuals regardless of age or gender. The causes of this anxiety disorder are quite varied. Therefore, the DSM-5 divided this anxiety disorder into several types, namely phobias, social anxiety disorder, separation anxiety disorder, panic disorder, and generalized anxiety disorder (3).

Based on data from the Ministry of Health of Indonesia in 2007, there were 450 million people who had to live with mental disorders. The prevalence of adult individuals (aged 18 years and over) and the elderly, there were 11.6% who experienced emotional disorders, such as anxiety

and depression (4). Basic Health Research on adult individuals in Indonesia shows an increase in emotional disorders, in 2013 by 6% and in 2018 by 9.8% with the most common symptoms being headaches, sleep problems, decreased appetite, and fatigue (5).

One in five teens experiences moderate to severe anxiety during the COVID-19 pandemic. There are some differences in anxiety levels among adolescents by region and income level, highlighting the need for targeted public health interventions based on nationally identified priorities (6). One in five Indonesians may experience anxiety during the COVID-19 pandemic. The groups most at risk are young women, people suspected of having COVID-19, and those with unsatisfactory social support. However, health workers were found to have a lower risk of experiencing anxiety because they have a better level of self-awareness. Accessible health information and care, social connections, a supportive environment, and mental health surveillance are important for preventing larger post-pandemic psychiatric problems (7).

CASE(S)

Today's teens and young adults are more tech-savvy than any previous generation; however, any discussion of technology should acknowledge concerns about potential negative consequences for psychological health (8).

A 20-years-old woman, a 5th-semester student, unmarried, Muslim, came independently to the outpatient polyclinic of Muhammadiyah Lamongan Hospital with a complaint of anxiety. The patient lives at home with her mother, sister, grandmother, and grandfather. The patient's father migrated for work since the patient was still in the womb and returned home every 2 years, but since the corona pandemic, it has been a long time since he last went home.

Generalized mental disorders are very common among young adults in their twenties, and less frequently in their thirties/forties. Those who develop mental disorders in their twenties have a higher risk of developing them ten years later. This has significant implications for young people's abilities to obtain an education, raise a family, and participate in work life (9).

Patients are cared for by a mother who tends not to talk much and is typical of a rural mother who spends more time in the fields than at home. The patient admits that she sometimes feels that she has lost her father figure, someone who should be with her all the time, especially when the patient remembers her childhood when she was in trouble and there was no place to complain. Although, sometimes, there is a feeling of freedom because she feels that by being left alone, there is no one who can control her life, and instead, feels happy about it. She is the type of patient who likes to be alone and only communicates with others when she is in absolute need.

In 2019, the patient started complaining of shortness of breath and shaking. She was afraid, thinking it was a symptom of heart disease. Then the patient went to an internist and was diagnosed with gastric disease. However, the patient said that she believed she had a mental disorder. Later that year, the patient developed a relationship with someone, but the patient did not dare to talk to her partner regarding the patient's mental condition, and she only told her partner about her gastric disease.

Therefore, the patient still feels alone despite being in a relationship and having no friends to confide in. One month ago, the patient's boyfriend was caught cheating with someone else. The patient was angry and then experienced an anxiety disorder that felt unclear until it interfered with her daily activities as a student at one of the public universities in Surabaya.

Psychiatric status obtained an appearance that was in accordance with her age, clean and neat clothes, wearing a hijab, and a mask. The patient is compos mentis with GCS 456. Behavior and psychomotor activity before, during, and after the interview, showed the patient sitting quietly with both hands on her thighs. When interviewed, the patient was cooperative with the examiner, was open, told the current problems calmly, and answered according to the examiner's questions in a voice that was enough to be heard.

Overall, the patient's speech was good, it was coherent, and no speech disturbance was found. The patient's feeling (mood) was in a euthymic state where the patient's sense of feeling is broad and congruent with the rhythm of her life, broad affect, broad emotional expressions with variations in facial expressions, voice rhythms, and body movements in harmony with the atmosphere, these can conclude the congruent between mood and affect. There were no perceptual disturbances in the patient such as hallucinations (-) and illusions (-).

The patient's intellectual function, both sensory and cognitive, was good. The patient's thought process consists of a coherent stream of thought, and preoccupation thought related to her shortness of breath. The patient is able to control impulses. The value of the observation on the patient is grade 6 where the patient is fully aware of the situation with the motivation to achieve improvement. The patient's physical status and neurological status were within normal limits.

The patient's multiaxial diagnosis is: axis I F41.1 Generalized anxiety disorder. Axis II Anxiety (avoidance) personality traits. Axis III K00-K93 Diseases of the digestive system. Axis IV Problems related to the social environment. Axis V GAF Scale 70-61 Some mild and persistent symptoms, mild disability in function, generally still good.

DISCUSSION

Generalized anxiety disorder is an anxiety disorder characterized by the appearance of excessive feelings of anxiety when going to do a job or activity (3). Generalized anxiety disorder causes a person to feel anxious about a wide range of situations and issues. Patients often experience anxiety, feelings of fear and constantly on edge, difficulty concentrating, difficulty sleeping, muscle tension, and frequent irritability (10).

Based on the DSM-5, there are six criteria for someone to be diagnosed with generalized anxiety disorder. First, excessive anxiety and restlessness for several days in the past six months. Second, difficulty in controlling feelings of anxiety and restlessness. Third, feeling of anxiety and restlessness appears with at least three other symptoms, such as feeling depressed, the body easily feels tired, difficulty concentrating, irritability, muscle tension, and sleep disturbances. Fourth, feelings of anxiety, restlessness, and other physical symptoms cause disruption in carrying out social and occupational functions in daily life. Fifth, not caused by any other medical condition. Sixth, this disorder cannot be explained by other mental disorders (3).

There are three psychological theories about the causes of anxiety:

1) Sigmund Freud's psychoanalytic theory

Freudian psychology is a science based on the unconscious (id) and consciousness (ego) (11). Defines anxiety as a sign of unconscious danger. Anxiety is seen as the result of a mental conflict between aggressive desires or unconscious sexual urges and concurrent threats from the superego or external reality. In response to this signal, the ego creates a defense mechanism to prevent unacceptable thoughts or feelings from escaping into consciousness.

2) Behavior theory

This theory suggests that anxiety is a conditioned response in accordance with the presence of a specific stimulus from the environment. Individuals receive certain stimuli as unwelcome stimuli, causing anxiety. After it happens repeatedly, it eventually becomes a habit to avoid the stimulus. Theory represents the accumulation of knowledge about mechanisms of action (mediators) and moderators of change as well as a priori assumptions about what human behavior is, and what effect it has on it (12).

3) Existential theory

This theory provides models of generalized anxiety, in which there is no identifiable stimulus for chronic feelings of anxiety. The core concept of this theory is that people experience the feeling of living in a purposeless world. Anxiety is a response to the perception of emptiness. There are also biological theories about the causes of anxiety. Existential concerns such as death, responsibility, futility, and isolation are not only hallmarks of existential psychotherapy but also frequently encountered by Cognitive Behavioral therapists (13).

This theory relates to the autonomic nervous system and neurotransmitters. Stimulation of the

autonomic nervous system causes certain symptoms such as: cardiovascular (eg. tachycardia), muscular (eg. headache), gastrointestinal (eg. diarrhea), and respiratory (eg. tachypnea). There are three neurotransmitters associated with anxiety: norepinephrine, serotonin, and gamma-aminobutyric acid (GABA) (2).

In addition to the above theories, there are also several other causes, such as:

1) Failure to complete developmental tasks

Adolescents have developmental tasks that must be completed. The main psychological dangers of adolescence are generally caused by failure to make the psychological transition to maturity which is an important developmental task of adolescence.

Common danger signs of adolescent inability to self-adjust include irresponsible behavior that appears in the behavior of ignoring lessons to have fun and getting social support, aggressive behavior and overly hot teen, feelings of insecurity that cause adolescents to comply with group standards, flight response if you are away from familiar surroundings, feelings of giving up, fantasizing too much to compensate for the dissatisfaction gained from everyday life, regressing to previous levels of behavior in order to be liked and noticed, and using defense mechanisms such as rationalization, projection, fantasizing, and displacement.

2) Past experience

Disorders that occur during adolescence cannot be separated from childhood experiences, for example: trauma, psychological violence (swearing, demeaning, defaming, and insulting), psychological neglect (neglecting the right to express feelings, lack of feelings of being loved, and being cared for), physical violence, physical neglect, and sexual violence. Anxiety disorders that occur in adolescents are mostly caused by the experience of psychological violence and psychological neglect in childhood. Anxiety disorders are associated with negative experiences in daily life, which cannot be explained by co-morbidities alone (14).

3) Bereavement

'Attachment' is an important concept in psychiatry because it encompasses patterns of social relationships and subsequent interactions with others. Short or long separations and events of loss will cause a disturbance.

4) Physical Condition

Adolescence is characterized by rapid physical growth. Physical condition is seen as an important matter. When physical conditions do not match expectations, dissatisfaction, anxiety, and low self-esteem will arise. A study in Indonesia (2016), stated that the higher the level of health anxiety, the higher the level of subjective somatic symptoms. Symptoms of a minor illness can cause disproportionate health anxiety if the person exaggerates the seriousness of the sensation (15).

5) Family Problem

Conflict in the family is often caused by disharmony between parents and children and family background problems. Parents who are too busy, are dictatorial, old-fashioned, and have favoritism towards their children will make the relationship in the family disharmonious.

6) Interpersonal conflict

Adolescence is a period in which adolescents must be able to mature relationships with their peers, so selective friendships begin to emerge which sometimes triggers quarrels. Adolescence is also a time to get to know the opposite sex and love. Problems related to love are complicated problems. Women's sense of self that is more dependent on relationships with others makes them more susceptible to social anxiety. However, all individuals in East Asian cultures generally have a higher degree of social construction of interdependence (16).

7) Fear of failure and losing oneself

For adolescents, the opinion of the people around them is very important. Constant criticism or failure with a mismatch of praise or success will cause a sense of inferiority and even loss of self-esteem. Someone who has low self-esteem or loses self-esteem will feel used to failure and sometimes even develop self-sabotaging behavior. Adolescence is clearly a critical period for the process of maturation of the neurobiological system which is the basis of emotions and behavior. Adolescence marks a period of great susceptibility to developing disorganized levels of social anxiety (17).

8) Living environment

An adaptation is needed to live in a new environment (boarding house, dormitory, relation house). The inability to adapt will cause anxiety. Several factors were found to be negatively or

positively related to depression. Perception of health is negatively related to depression, while smoking behavior, smoking cessation, and acute illness are positively related to depression (18).

9) School environment

School environmental conditions such as intense competition, academic demands / high-grade standards, piling assignments, school rules, teaching-learning methods, majors, and student-teacher relations as well as student-to-student relationships are very important in determining the success of adolescents in school. The inability to adapt to the school environment will cause anxiety. Usually, to meet academic demands, teenagers will take various courses, sometimes even not having time to do things they enjoy/hobbies. This will further worsen their adaptability.

10) Social environment

Adolescents spend more time outside the home with their peers, so the influence of their social environment on attitudes, speech, interests, appearance, and behavior is greater than other environmental influences (2).

When associated with the above theories, what is experienced by the patient is closely related to several theories include:

1) Past experience.

The patient had an experience where she felt unloved by his parents because she had been left behind since the patient was in the womb. During the developmental period, the patient also has difficulty developing trust in others and peaks in the time of interview when she experienced her physical complaints, the patient also does not want this to be known by her partner because there is an excessive fear of losing her partner due to her mental disorder. 2) Bereavement

Closely related to the event of separation both short, long, and loss events. Now, the patient is still hurting from her breakup with her partner and feels like losing something that had healed the wounds of being abandoned by his father and mother. The patient feels fear of another abandonment by others.

3) Interpersonal conflict

The patient does not stop blaming herself because according to the patient, his father and mother work for her well-being. Likewise, the case of a partner who left her was because she could not be a good partner. In addition, the patient also said that her friendship environment did not help the patient to forget her problems. They always make her feel guilty. A study states that there is a relationship between the characteristics of depression, anxiety, and stress with gender, age, marital status, and income in adults during a pandemic. This shows that men, younger age, single status, and low income have higher depression, anxiety, and stress characteristic scales(19).

4) The patient's fear of failure and loss of self-esteem has long been present, but during elementary to high school, it did not show because the patient was quite intelligent, but during college, the patient felt that he was the stupidest person. Therefore, it is related to the patient's job as a content creator which is always required to provide what the client wants. The patient keeps on accepting criticism and trying to pursue the target for client fulfillment. This resulted in fear of failure to fulfill client expectations.

Everyone has a different reaction to stress, and some of the symptoms that appear are not the same. Common anxiety symptoms include:

1) Palpitation
2) Pain or tenderness in the chest
3) Shortness of breath
4) Excessive sweating
5) Changes in sexual arousal or interest in sexual activity
6) Sleep disturbance
7) Trembling
8) Hands or limbs become cold and sweaty
9) Anxiety accompanied by depression leads to suicidal ideation
10) Health problems such as frequent headaches (migraines).

Some common anxiety disorders include:

A. Generalized anxiety disorder – often feeling anxious or worried.

B. Panic disorder – having panic attacks regularly, often for no apparent reason.

C. Post-traumatic stress disorder (PTSD) – experiencing anxiety problems after experiencing a very stressful or frightening event.

D. Social anxiety disorder - fear or fear of social situations

E. Obsessive-compulsive disorder (OCD) – repeating unpleasant thoughts (obsessions) and

engaging in certain routines (compulsions) to relieve anxiety.

F. Phobia - an overwhelming fear of a particular object, place, situation, or feeling (10).

The symptoms of anxiety above can be grouped into four symptoms:

a. Somatic disorders

Tremors, fluctuating body temperature, seizures, sweating, palpitations, nausea, diarrhea, dry mouth, decreased libido, shortness of breath, and difficulty swallowing

b. Cognitive impairment

Difficulty concentrating, confusion, fear of losing control, excessive vigilance, and thoughts of a great catastrophe.

c. Behavioral disorders

Expression of fear, irritability, aggression, immobilization, and withdrawal from society.

d. Perceptual disturbance

depersonalization and derealization (2).

Several symptoms that appeared in the patient were caused by the patient's anxiety. Lately, the patient was occupied with the thought of many targets that must be achieved as a content creator because of the client's demands. The patient still felt symptoms such as shortness of breath, stomach disturbances, chest feels heavy, cold and sweaty hands even though she has taken medication regularly. This condition makes the patient develop difficulty sleeping until she can't sleep (sleep disturbances occur).

Evidence-based psychological treatments (cognitive-behavioral therapy; CBT) for this disorder have been developed and investigated, and in recent years a promising low-intensity CBT intervention version has been proposed that offers a way to improve access to evidence-based care. There is some evidence of the effectiveness of pharmacological treatments for anxiety disorders in children and adolescents, but their routine prescription is discouraged because of fears of potential harm (20).

Pharmacological treatment of generalized anxiety disorder is carried out by administering antidepressants (Selective Serotonin Reuptake Inhibitors (SSRIs), and anti-anxiety (benzodiazepines (BZD) and non-BZDs (buspirone)). Antidepressants and BZD can inhibit LC thereby reducing norepinephrine activity, while BZD modulates receptors GABA to increase its activity. Antidepressants can selectively inhibit serotonin reuptake, while buspirone is a partial serotonin receptor agonist.

In addition to pharmacological therapy, management of therapy for generalized anxiety disorder can also be carried out by non-pharmacological therapy. Non-pharmacological therapy includes psychoeducation, short-term counseling, stress management, psychotherapy, meditation, exercise, or Cognitive Behavioral Therapy (CBT).[21]

Most adolescents with anxiety disorders tend to discuss their problems with friends and family to relieve anxiety, whereas some do not seek help because they can deal with their own anxiety disorders, they think they don't really need help, they feel no one cares about them, their problems, and the lack of supporting health facilities in the youth environment. Adolescents in East Java are advised to consult their mental health problems with experts to find relevant solutions.[22]

CONCLUSION

Based on PPDGJ III and DSM-5, the patient was diagnosed with generalized anxiety disorder. Based on the theories that cause anxiety, the causes of this patient's anxiety are included in several theories including past experiences, loss events, interpersonal conflicts, fear of failure, and self-esteem. While the symptoms that appear in this patient such as shortness of breath, worsening gastric problems, chest feels heavy, and cold and sweaty hands were to be found even though they have taken medication regularly. This condition makes the patient develop difficulty sleeping until she can't sleep (sleep disturbances occur).

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CASE REPORT

TRAUMATIC DIAPHRAGMATIC RUPTURE WITH VISCERAL HERNIATION: A CASE REPORT

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ABSTRACT

Background: The diaphragm is a dome-shaped respiratory muscle located near the lower ribs; the exact location is below the chest. Diaphragmatic rupture is a medical condition caused by blunt or penetrate trauma, which often leads to herniation of the abdominal viscera into the thoracic cavity.

Case: We presented a case in which a 39-year-old man complained of left chest pain and abdominal pain radiated to his back, after involved in a traffic accident. On physical examination, the left chest was left behind when breathing, a dull sound was found on percussion, with diffuse abdominal tenderness. Thoracal Abdomen CT-scan was performed, and it concluded that there was a rupture of the left posterior diaphragm with a diameter of 15 cm which caused herniation of the gastric and intestines to the left of thoracic cavity, accompanied by a collapse of the left lung due to blunt trauma. The patient underwent an explore laparotomy with the aim of repairing his diaphragmatic rupture, and splenectomy procedure to remove the affected spleen.

Conclusion: Surgery is a mandatory action in order to repair the diaphragm. The choice of the approach to be used, either laparotomy or thoracotomy depends on other organ abnormalities, acute or latent cases, stable or unstable condition of the patient and depends on the experience of the operator.

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INTRODUCTION

Background

Diaphragmatic rupture is a medical condition caused by blunt or penetrating trauma and often results in herniation of the abdominal viscera into the thoracic cavity (1). The diaphragm develops from the pleuroperitoneal membrane and body wall, the dorsal mesentery of the oesophagus and the septum transversum from the embryo (2). Traumatic diaphragmatic injury (TDI) occurs in 1% of patients of blunt abdominal trauma (3).

The incidence of trauma-induced diaphragmatic rupture is 1 to 7% of all patients with blunt trauma, and 10-15% with penetrating injuries. Diaphragmatic rupture due to trauma is usually associated with

multiple injuries because of the large forces resulting rupture of the diaphragm (1)(4). Acute diaphragm injuries are best approached through the abdomen (5).

The pathophysiology of this injury remains unclear up to this date, but the most accepted hypothesis has described, an increase of intra-abdominal pressure followed by a blunt trauma mechanism which creates a high-pressure gradient between chest and abdomen can cause visceral intrathoracic rupture and herniation.(6)(7) Normally, there is a positive gradient of 7–20 cmH_2O between intraperitoneal and intrapleural pressures, but during blunt injuries this pressure gradient can exceed 100 cmH_2O and this can lead to rupture and herniation (8)(7).

The physical examination often fails to identify a traumatic diaphragmatic rupture and basic investigations such as a chest X-ray may miss half the time. Although not part of the standard FAST (focused assessment with sonography for trauma) ultrasound scan in trauma, bedside ultrasound has the potential to detect pathology of a ruptured diaphragm (9).

There are no specific signs and symptoms to diagnose a diaphragmatic rupture. A high level of clinical suspicion is required in all cases of thoraco-abdominal injury to diagnose diaphragmatic rupture. Computed Tomography (CT) of the chest and abdomen is very useful in the diagnosis of this patient case. If there is any doubt, diagnostic laparoscopy should be performed to confirm the diagnosis to reduce mortality and morbidity (10).

Diagnostic techniques included X-Ray, Computed Tomography, and Intraoperative findings. Clinical diagnosis is relatively difficult because the signs found are like other disorders. The signs and symptoms that appear are pain in the chest and abdomen, also respiratory problems. When rupture is found, an operation is required to repair it (11).

The best management for patients with diaphragmatic rupture is surgery. No cases of diaphragmatic rupture have been found to heal spontaneously. This happens because of the difference in pressure between the abdominal cavity and the thoracic cavity, causing a slight rupture of the diaphragm, herniation of the abdominal organs will occur into the thoracic cavity.(12) Surgery can be performed either through the thorax (thoracotomy) or abdomen (laparotomy). There are no studies on which type of surgery is considered the best course of action for patients with diaphragmatic rupture, to date (2).

A case report presents a patient with a visceral herniation, detected 5 years after pneumonectomy for non-small cell lung cancer surgery with a diaphragmatic muscle flap supported on the bronchial stump. The patient underwent emergency thoraco-laparotomy 9 years after the first operation due to acute abdominal symptoms. This is the first reported case of a late period visceral disc herniation that improved after surgery (13).

Figure 1. Whole-body non-contrast CT scan (scout view): detection of left-sided posterior diaphragmatic hernia involving visceral herniation and hemothorax.

Case Presentation

A 39-year-old man admitted to hospital accompanied by his family, he complained pain in his left chest and abdominal pain that radiated to his back after experiencing a traffic accident one hour ago. The patient said that he had driven a motorcycle and hit the car in front of him, then fell to the left, the patient was not wearing a helmet. The patient came with GCS 15 consciousness, respiratory rate 20 breaths per minute and blood pressure 113/70 mmHg.

On physical examination, it was found that the left chest was left behind when breathing, a dull sound was obtained on percussion, with diffuse abdominal tenderness, but no signs of peritonitis were found. From the results of the plain chest X-ray, it was found that the left hemithorax was covered with elevation of the diaphragm with 7,8,9 rib fractures.

Focused assessment with CT-Scan Thoracoabdominal and concluded that there was a rupture of the left posterior diaphragm with a diameter of 15 cm which caused herniation of the gastric and intestines into the left thoracic cavity with collapse of the left lung due to blunt trauma due to a traffic accident. The patient also suffered several other traumatic injuries, including multiple left rib fractures, left hemothorax, left lower lobe pulmonary contusion, and 5th degree of splenic laceration.

Figure 2. CT scan showed diaphragmatic rupture and intrathoracic bowel herniation.

The patient had undergone an exploratory laparotomy to repair the ruptured diaphragm and had a splenectomy procedure performed to remove the damaged spleen. Intraoperatively, the stomach and intestines were returned to the abdominal cavity and the diaphragm was sutured with interrupted sutures using non-absorbable sutures on the ruptured side of the diaphragm on the left posteriorly. No gastric ischemia or perforation was found.

All the intra-abdominal organs and the left lung were intact. The operation was carried out for 3 hours. The patient was placed on a chest tube with left intrapleural Water Sealed Drainage (WSD) and an intra-abdominal drain on the left sub diaphragm. The patient eventually recovered and was discharged after 2 weeks of hospitalization. At 2 weeks after follow-up the patient was in good condition.

Discussion

The diaphragm is a dome-shaped respiratory muscle located near the bottom of the rib cage, just below the chest (4). The actual

incidence of diaphragmatic rupture is difficult to ascertain because the diagnosis is usually missed and delayed, ranging from 1 to 7% of all blunt trauma patients, and 10 -15% with penetrating injuries, and this number is expected to increase due to the increasing number of traffic accidents each year. The most common causes of blunt injuries are high-speed traffic accidents and penetrating injuries are knife attacks and gunshot wounds (1).

Penetrating or blunt trauma to the chest and abdomen can cause diaphragmatic rupture, is usually associated with multiple injuries because great force is required to rupture the diaphragm and is usually fatal. A high index of clinical suspicion is necessary to diagnose and effectively manage diaphragmatic rupture even with a distant history of high-velocity injury. This is especially the case when there are other signs of severe trauma such as multiple rib fractures, lacerations of the liver and spleen, or a history of deceleration injuries (14).

A significant complication of diaphragmatic rupture is a traumatic diaphragmatic hernia; Organs such as the stomach that enter the thoracic cavity can become strangled and cause ischemic herniation of the abdominal organs which occurs in 3-4% of abdominal trauma patients presenting to the trauma center (15).The most frequently herniated organs on the left side are the stomach (80%), omentum, small intestine, large intestine, and spleen (1). This is because these organs are structurally weak because they are pleuroperitoneal membranes. Diaphragmatic rupture on the left is more common than on the right because of the protective effect of the liver, underdiagnosis of right hemidiaphragm rupture and weak location of the left hemidiaphragm due to embryonic fusion (2). [4] Diaphragmatic rupture following blunt trauma generally results in a wider wound than that caused by penetrating trauma has a size of about 5-15 cm.

Initially most cases of diaphragmatic rupture are often overlooked especially in the acute phase because of other associated injuries. Diagnosing diaphragmatic rupture is often difficult to establish and easily missed due to non-specific signs and findings (11). Neglected diagnosis of diaphragmatic rupture injury which eventually presents as a hernia which can appear years later with potentially fatal complications. Delayed diaphragmatic rupture and diaphragmatic hernia should be considered in patients with blunt abdominal trauma and gastrointestinal or respiratory complaints, especially patients with a history of recent trauma (16).

Detection may be delayed if the diaphragmatic tear remains asymptomatic at the time of injury and manifests only in the presence of a hernia. Delayed rupture can occur if diaphragm tissue is damaged at the time of injury but maintains a weak barrier until several days later when excessive inflammation weakens it (17). Less traumatic cases and smaller diaphragmatic ruptures are associated with a delay in diagnosis. Thoraco-abdominal computed tomography scanning is necessary for patients with peripheric injuries to avoid delaying the diagnosis of TDH. Increased awareness and understanding of diaphragmatic injuries will increase the early diagnosis rate and improve the prognosis (18).

Diaphragmatic rupture is usually treated by laparotomy. The most common therapeutic approaches for diaphragmatic rupture are thoracotomy or laparotomy. At laparotomy, regardless of whether the diagnosis is suspected or confirmed preoperatively, a full evaluation of both diaphragms should be carried out, and consideration should also be given to other injuries such as a haematothorax that may arise and are more urgent to treat first if there is a rupture of the diaphragm. All herniated viscera should be carefully returned and moved to their original position (1)(8). The diaphragmatic

tissue is carefully repaired using non-absorbable monofilament sutures. In some cases, complicated by adhesions and extensive defects, MESH is sometimes required to help manage the defect (4)(16).

The American Association for Trauma Surgery (AAST) Organ Injury Scaling Committee proposes a classification system for diaphragmatic injuries: Grade 1 contusions; Grade 2 laceration <2cm; Grade 3 lacerations 2–10 cm; Grade 4 laceration >10 cm or with tissue loss <25 cm2; and Grade 5 laceration with tissue loss >25 cm2.7,8 According to this classification system, our patient's case was a grade 4 diaphragmatic injury.

Treatment for an injured diaphragm is operative whether the injury is acute or chronic, the acute injury can usually be repaired first. Improvement can be achieved via laparoscopy or laparotomy, depending on the hemodynamic stability of the patient and the associated injury. In the patient with chronic trauma-related diaphragmatic hernia, a careful history and physical examination may be suggestive (19).

In multitrauma patients with diaphragmatic rupture as in our case, patient survival is determined by the severity of the associated injury, timely diagnosis, and early intervention (6). Although diaphragmatic rupture is still difficult to diagnose in trauma patients, a high index of suspicion with the use of appropriate radiological modalities helps in arriving at a correct diagnosis. Emergency surgical repair should be performed as soon as possible to reduce morbidity and mortality (20).

In this regard, our patient had undergone a CT-Scan with clinical evaluation as the main determining factor for deciding on exploratory surgery. CT Scan is more accurate in establishing the diagnosis compared to X-ray, another diagnostic method that has been carried out is by laparotomy, but in 15% of cases of diaphragmatic rupture it is missed. Trauma to the diaphragm is often discovered incidentally during laparotomy for other organ injuries. Thoracoscopy is preferred over laparotomy especially for detecting chronic diaphragmatic hernias (11).

In chronic cases, repair may be difficult or even impossible. Delay in detecting and repairing diaphragmatic rupture can increase morbidity and mortality. A significant complication of diaphragmatic rupture is traumatic diaphragmatic hernia, where organs such as the gastric that have entered thoracic cavity can strangulate and cause ischemia (11)(16). Recommends the collection of information that is not limited to index hospitalization and type of trauma to better determine the diagnosis of the disease (8).

CONCLUSION

Diaphragmatic rupture should be suspected in all trauma patients, especially if they have blunted abdominal and lumbar trauma. High suspicion with detailed information about the mechanism of injury and the use of appropriate diagnostics are the most important factors in establishing the correct early diagnosis of diaphragmatic rupture. There is a differential diagnosis of diaphragmatic rupture in adult patients with upper abdominal symptoms or chest X-ray depicting diaphragmatic elevation, therefore it is necessary to ask whether there is a history of trauma, whether it occurred a few days ago or years ago. If no abnormalities are found, serial chest X-rays and high-quality CT scans in stable patients can be performed to diagnose diaphragmatic rupture and other abnormalities in the thoracic and abdominal organs.

Surgery is a mandatory action to repair the affected diaphragm. The management approach can be in the form of laparotomy, thoracotomy, and laparoscopy which is determined from the acute or latent case, stable

or unstable patient condition, and operator experience. In most cases, repaired diaphragmatic rupture has a good prognosis. The mortality rate is around 15-40% but the presence of other organ injuries plays a major role in determining the prognosis.

CONFLICT OF INTEREST

All authors declared that there is no conflict of interest related to the publication of this article.

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