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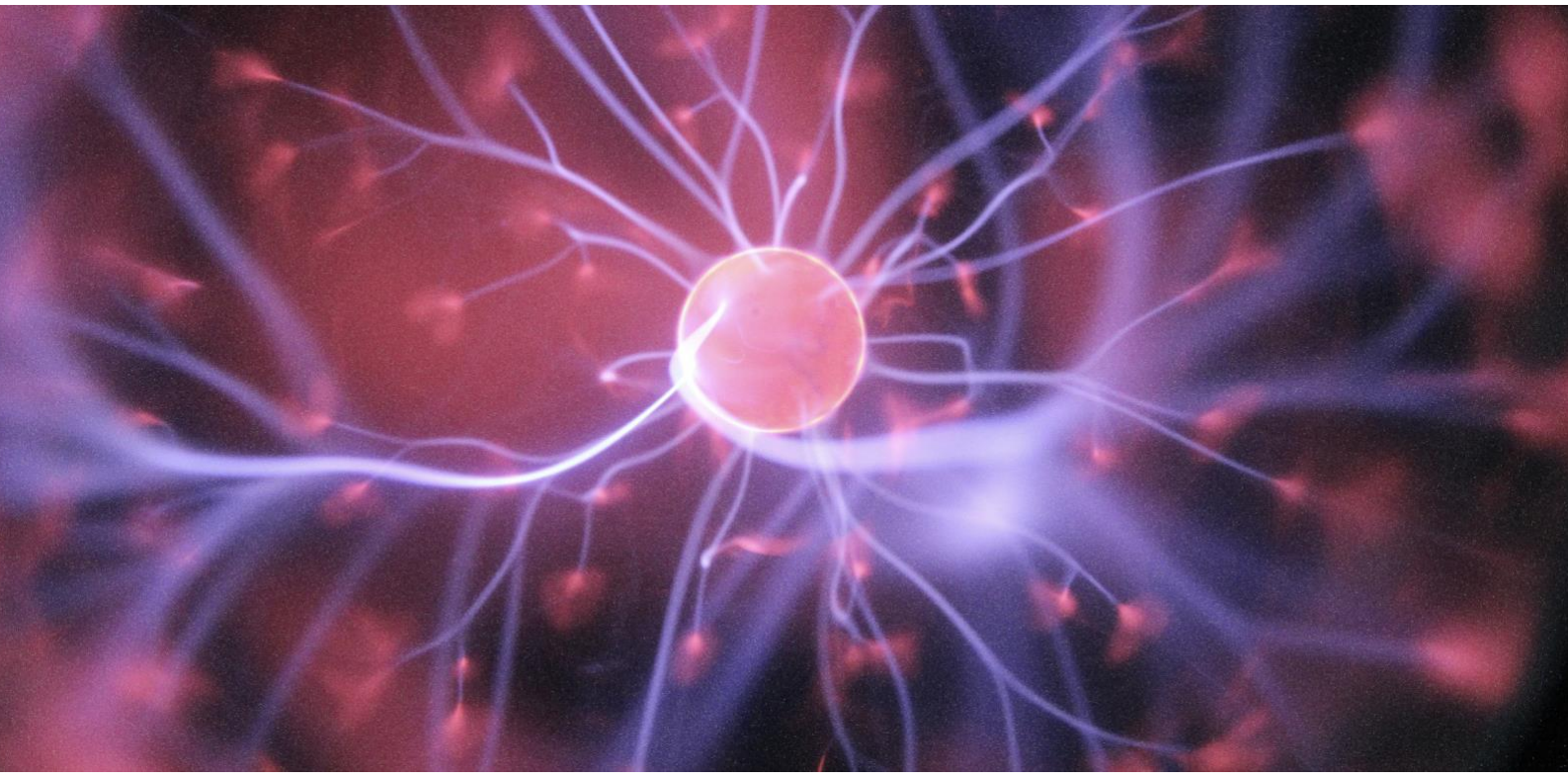

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Bilateral Medial Medullary Stroke: A Single Center Case Series

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Abstract
Introduction. Stroke in the posterior circulation accounts for 20-30% of ischemic strokes (Frid et al., 2019). The medial medullary stroke accounts for less than 1%. It is caused by a lesion in the vertebral artery or its branches, or the anterior spinal artery (Ropper, Samuels, Klein J, & Prasad, 2019). Prognosis depends on the age of the patient and the severity of the motor deficit on admission (Kim & Han, 2019). A bilateral medial medullary infarct is thus very rare. Methodology. We therefore present a case series of three patients in a tertiary hospital in the Philippines and describe their clinicodemographic profile, clinical presentation, imaging and ancillary diagnostic characteristics and outcome. Age range was from 35 to 64 years old. All three presented with dizziness and varying combinations of cranial nerve deficits, motor, sensory ataxia and cerebellar signs. Imaging modalities used are Magnetic Resonance Imaging (MRI) with time of flight (TOF) and computed tomography angiography (CTA). One had a left vertebral artery (VA) occlusion extending into the proximal basilar artery (BA). Another had a non-visualized right VA and bilateral posterior inferior cerebellar artery (PICA). The last case had an unremarkable vessel study. Treatment strategies include dual antiplatelet therapy (DAPT) with Aspirin and Cilostazol (2 of 3), and Enoxaparin plus Aspirin. One received intravenous thrombolysis with Alteplase prior to the DAPT. None were intubated and all were home discharged. Conclusion. We have shown that a bilateral medial medullary stroke can present with minimal disability and a good outcome.

Keywords: Stroke Syndromes, Bilateral Medial Medullary Infarct, Rare, Good Outcome

1. Introduction

Stroke is a devastating illness and the second leading cause of death worldwide. A bilateral medial medullary infarct is a rare occurrence. From case reports, we know that the medial medullary infarct is less than 1% of all stroke syndromes. In the reports made by separate studies of Hu, Nie, Bai, and Liang (2022) and Pongmoragot, Parthasarathy, Selchen, and Saposnik (2013) males are more commonly affected than females (74%) at a mean age of around 60 years old. Based on the structures in the medulla that are affected, a lesion in the bilateral medial area can present as quadriplegia, dysarthria, loss of vibratory and position sense, and tongue paralysis (Ropper et al., 2019). It may not always present with the complete syndrome.

A medial medullary infarct is caused by an occlusion of the intracranial portion of the vertebral artery extending into the orifice of the anterior spinal artery branch. Around 10% of these occurs as a bilateral lesion (Caplan & Van Gijn, 2012). With the use of advanced imaging techniques such as an MRI with a vessel study, appreciation of the lesion location has now become possible although sometimes can still be missed. The common descriptions used for this syndrome are: the heart shape lesion, V shape lesion, and recently, the airpod sign.

Depending on the extent of lesion, patients can have difficulty breathing, swallowing and most likely be intubated or a feeding tube inserted. Case reports and recent studies generally agree that it carries a worse prognosis. The study of Hu et al., (2022) reported a poor prognosis in 93.3% of the 15 cases reviewed. In another study of 38 patients, mortality was at 23.8% (Pongmoragot et al., 2013). We therefore present the following cases seen last year in our institution documented to have the appearance of a bilateral medial medullary infarct on MRI and discuss their clinic-demographic profile, stroke presentation clinically and radiographically, management and outcomes.

2. Case 1

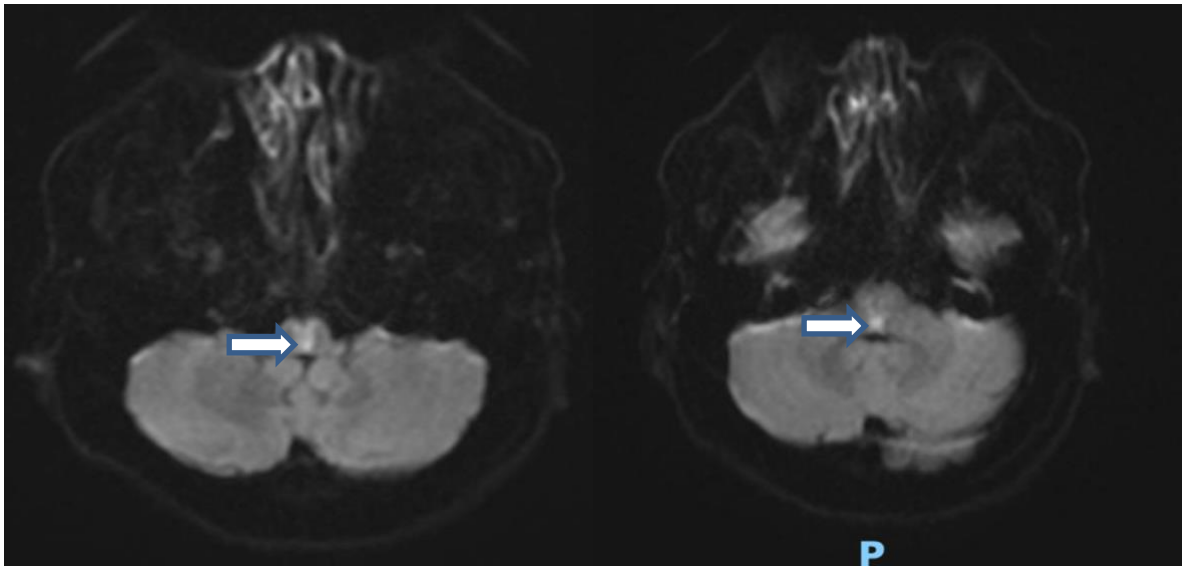

Figure 1.1: A V-shaped hyperintense lesion on diffusion weighted imaging (DWI) in the bilateral medial medulla extending up to the dorsal aspect of the caudal pons

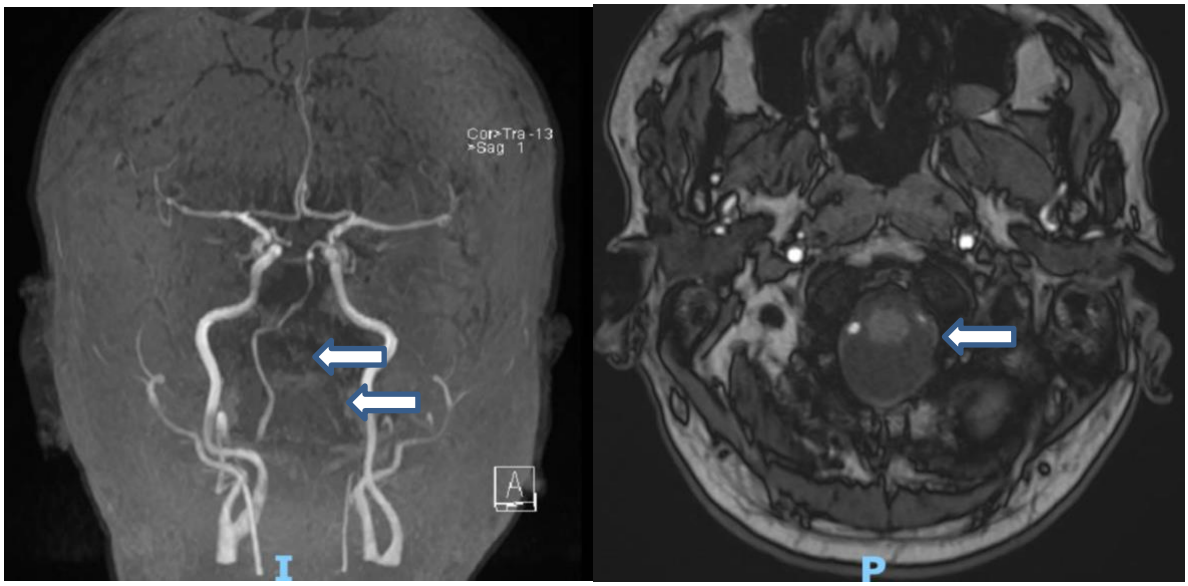

Figure 1.2: A time of flight MRA showing stenosis in the left vertebral artery (white arrows), coronal plane (left), axial plane (right)

A 48-year-old male, known hypertensive, non-smoker with occasional alcohol intake presented 12 hours prior to admission with dizziness and dysphagia. On examination, he had torsional nystagmus, contralateral central facial paralysis, weak gag reflex ipsilaterally, tongue deviation ipsilaterally, motor strength of 4/5 in the left extremities, tremors, ipsilateral dysmetria; and impaired joint and position sense bilaterally. MRI revealed the characteristic heart-shaped sign of hyperintensity on DWI and a corresponding drop on apparent diffusion coefficient (ADC) indicating an acute stroke. Time of flight images revealed stenosis of the left vertebral artery. He was managed with Enoxaparin 1mg/kg subcutaneously every 12 hours for 7 days and Cilostazol 100mg tablet twice a day. On the second hospital day, the patient became dysarthric and noted to have bilateral lateral rectus palsy thus Aspirin 80mg tablet once daily was added to the regimen. He was eventually discharged after 14 days of hospitalization with residual deficits of resolving central facial paralysis, dysarthria, weak gag and tongue, motor strength of 4/5 in all extremities, and impaired vibratory and position sense. A nasogastric tube was kept in place.

3. Case 2

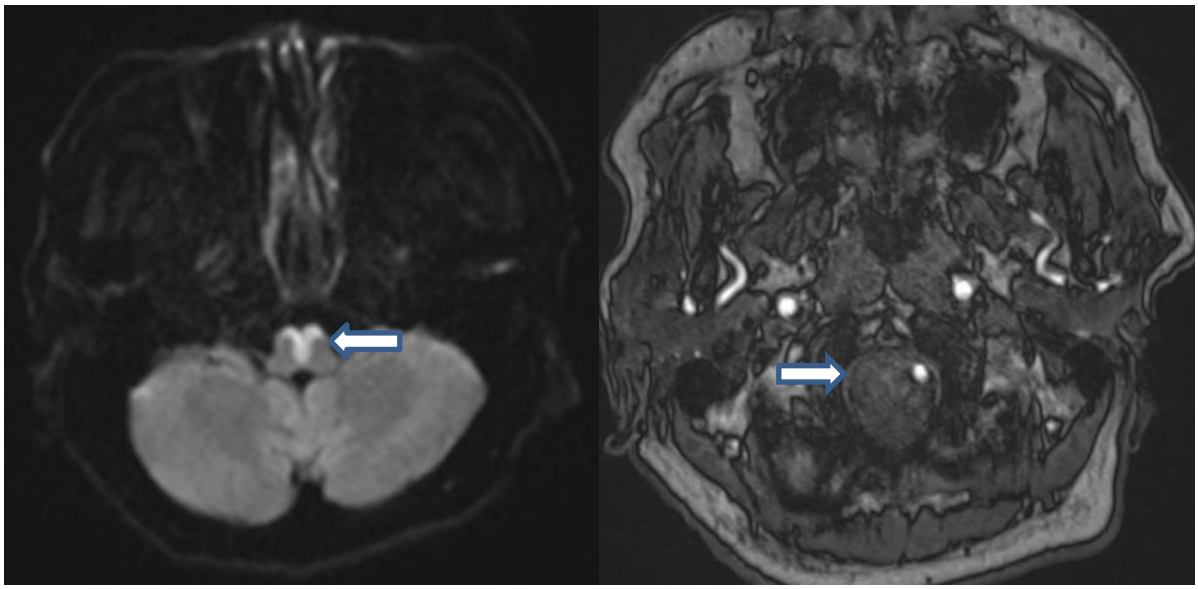

Figure 2.1: A heart-shaped hyperintense lesion on DWI affecting the bilateral medial medulla (white arrow). The time of flight image on the right shows a non visualized right vertebral artery (white arrow).

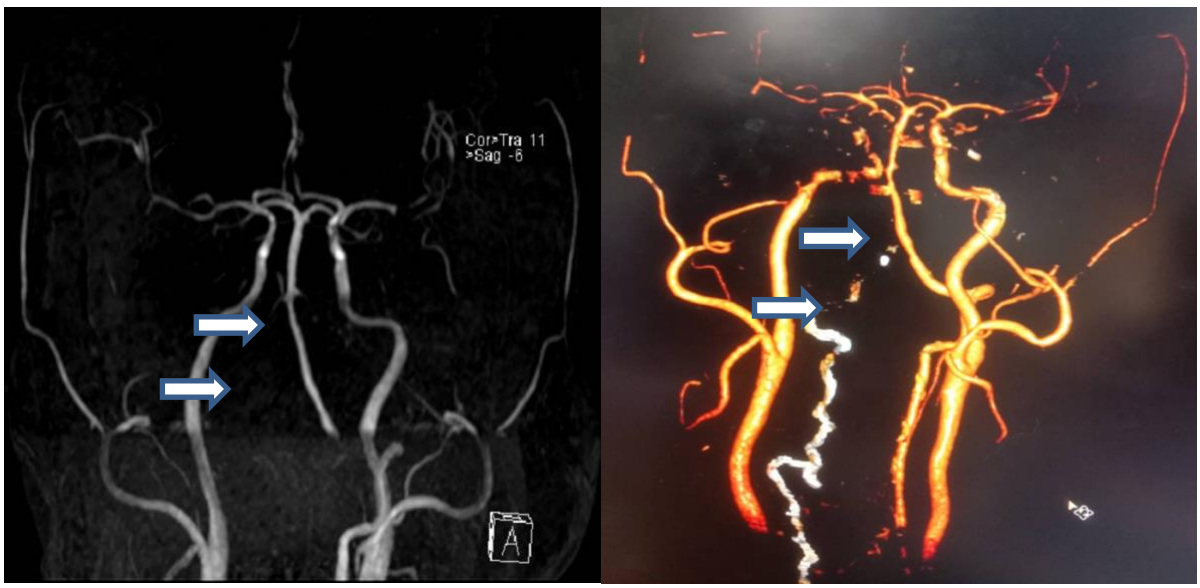

Figure 2.2: The non-visualized right vertebral artery on the right is more evident here in this reconstructed time of flight image on the left (white arrows). On the right is the CT angiogram study of the head and neck of the

same patient. There was non-opacification of the right vertebral artery after it takes off from the right subclavian artery up to the intracranial segment just before it joins the left vertebral artery (white arrows).

A 64-year-old male, hypertensive, 30-pack year smoker who binge drank just prior to admission came in with a chief complaint of right-sided weakness 4 hours prior. He was complaining of a bifrontal headache, moderate with episodes of vomiting prior to the weakness and dizziness. On assessment he only had motor symptoms such as central facial palsy on the right, dysarthria, motor strength of 2/5 in the right upper extremity and 4/5 in the lower extremity, hyperreflexia on the right and Babinski, right. He was within the window for thrombolysis thus a cranial CT scan was done which did not show any acute infarct or hemorrhage. He was given 0.6mg/kg of Alteplase. Less than 24 hours post thrombolysis, there was noted worsening of the right leg weakness to 1/5 and a new leg weakness on the left, 3/5 with hyperreflexia and bilateral Babinski signs. There was new onset sensory deficit to pain and temperature on the right extremities. MRI cranial stroke protocol done showed a bilateral medial medullary infarct with flow void in the right vertebral artery probably secondary to severe stenosis. Aspirin and Cilostazol were started. CTA done showed long stenosis of the right vertebral artery from the aorta. He was eventually discharged home after 12 days with residual deficits of resolving central facial paralysis, motor strength of 0/5 in right extremities, 4/5 in the left upper extremity, 3/5 in the left lower extremity, impaired vibratory and position sense, hyperreflexia and bilateral Babinski. He was discharged without needing a feeding tube.

4. Case 3

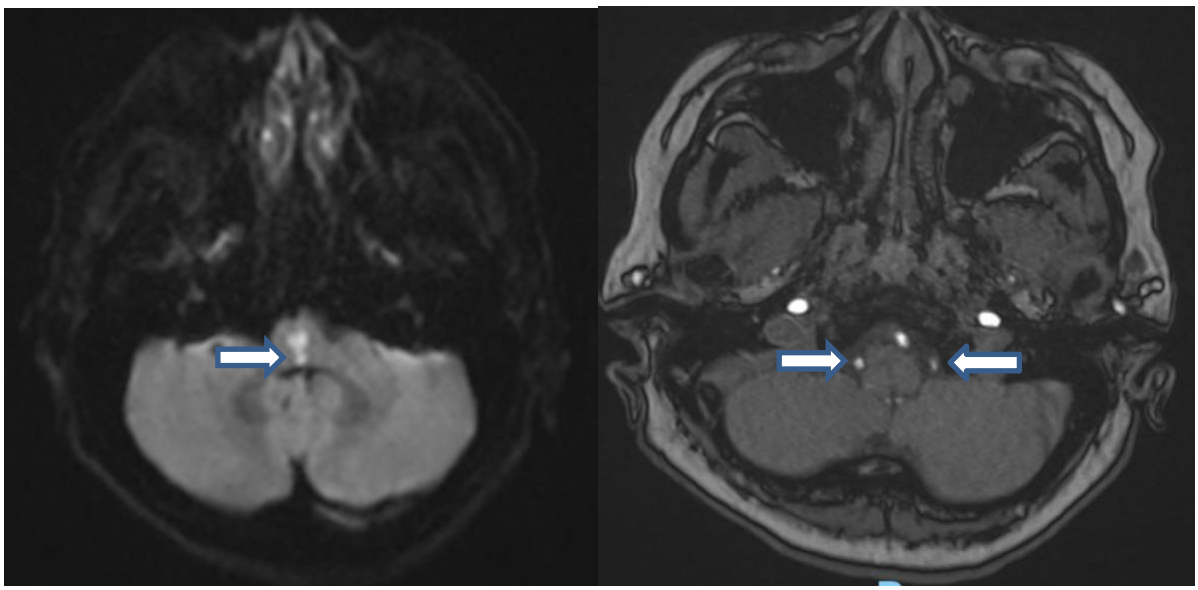

Figure 3.1: A key-like hyperintense lesion in the medial bilateral medulla (white arrow) can be seen on this DWI sequence on the left. On the right, both the vertebral arteries are visible and almost the same in caliber in this cut.

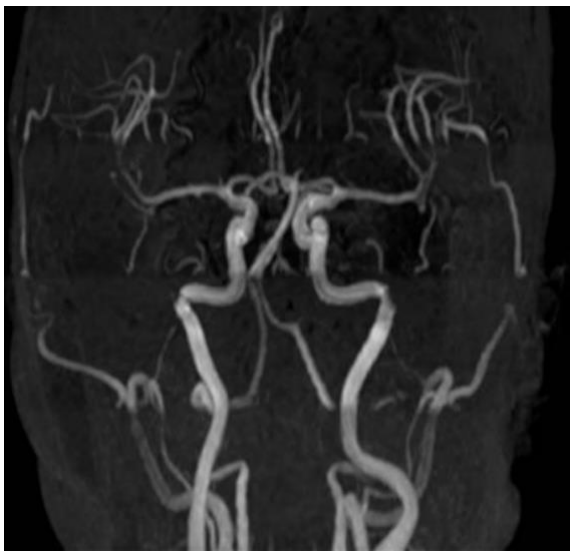

Figure 3.2: The time of flight image did not show any focal narrowing or flow void.

A 35-year-old female, hypertensive, with chronic kidney disease on maintenance hemodialysis, non-smoker, non-alcoholic came in with dizziness and a sense of imbalance when ambulating one day prior to admission. It was associated with binocular blurring of vision. On the 7th day of hospital stay she was referred due to persistence of dizziness, vertiginous in character, had bidirectional nystagmus with horizontal and vertical component, truncal ataxia veering to the right and dysmetria on the right. MRI showed an isolated lesion in the bilateral medial medulla and an unremarkable time of flight vessel study. She was started on Aspirin and Cilostazol and was discharged home on the 9th day without progression of deficits.

5. Discussion

As mentioned earlier this rare presentation has an average target population of 60 years of age and usually affects males which is also the demographic profile of stroke cases in general. In our series, the two patients belong in the younger population with one patient considered a stroke in the young. Two out of three were males. The common risk factor among these three was hypertension. Two others were newly diagnosed with uncontrolled diabetes mellitus during the workup. A summary of the clinicodemographic profile of these three cases is appended in table format below.

As to the presentation, dizziness was the first symptom to appear in all cases followed most commonly by motor symptoms/signs (2 of 3) such as central facial paralysis, dysarthria, hemiparesis; and cerebellar symptoms (2 of 3) such as nystagmus, dysmetria; and impaired joint position sense (2 out of 3). Only one patient presented with dysphagia and had to be fed via a nasogastric tube. The neurologic deficits matched the extent of infarction as seen on imaging judging by the size and shape of the lesions. Although we note here that stroke lesions on imaging appeared almost symmetrical despite findings of asymmetric neurologic signs on neurologic examination. In the first case, we see a heart-shaped lesion spanning the area of the dorsal to ventral bilateral medial medulla and reflected on the presenting symptom and the progression of deficits. The admitting complaint of dizziness with examination findings of ipsilateral tongue deviation, nystagmus, and limb ataxia pointed to involvement of the dorsal medullary structures starting from the CN XII nuclei and medial longitudinal fasciculus to the impaired joint position sense as the lesion spreads to include the medial lemniscus and moving forward to the ventral aspect to the medullary pyramids which caused the hemiparesis. The lesion then moves superiorly to the caudal pons and thus the patient presented with a bilateral lateral rectus palsy at the wards. The second case showed the same heart-shaped lesion advancing more ventrally into the medullary pyramids thus we see here a more severe motor deficit syndrome. The last case was a key-like lesion dorsal than ventral in location thus the presentation was more of dizziness, sense of imbalance and limb ataxia. This lesion location and corresponding deficit confirms the findings of Kim and Han (2009) in which they mapped the medulla and found that motor dysfunction was more common

in ventral lesions, sensory in the middle and vertigo and dizziness in the dorsal parts. The structures that control respiration are located more laterally hence none of our cases required airway support in any form.

The stroke mechanisms in our series showed severe stenosis of either vertebral artery with the occlusion extending into the proximal basilar artery and a probable small vessel etiology in the last case. Larger studies also showed large vessel atherosclerosis as the most common mechanism and that an atheromatous branch occlusion is more common in a bilateral lesion (Kim & Han, 2019; Hu et al., 2022; Pongmoragot et al., 2013).

Despite one case being given a low molecular weight heparin initially and another receiving reperfusion therapy with Alteplase, all three cases received a dual antiplatelet combination of Cilostazol and Aspirin. Other supportive therapies used were statin, permissive hypertension during the acute stroke phase and intravenous hydration with normal saline. Although available case reports vary in their secondary stroke prevention strategies depending on the possible stroke mechanism, using a dual antiplatelet regimen in this specific stroke was not commonly described.

As to the outcome, these patients were home discharged without further neurologic deterioration after staying 9 to 14 days in the hospital. This is in contrast to the case reports and larger reviews on similar cases which reported a poor prognosis requiring intubation and subsequent mechanical ventilatory support in some. Acute respiratory failure was also not a complication in this series. It is also worth noting that despite a very elevated glycosylated hemoglobin values in two of our patients, they did not suffer any more complications than the third patient who had no diabetes. This was also shown in the study by Fri et al. (2019) wherein diabetes is strongly associated with a posterior circulation stroke than anterior.

6. Conclusions

Our study has shown that a bilateral medial medullary infarct as a rare stroke syndrome can affect any age including the younger population. It can present with a combination of cranial nerve deficits, motor, sensory and cerebellar symptoms and may lead to difficulty swallowing depending on infarct size and extension into surrounding structures. An MRI and a vessel study like CTA and magnetic resonance angiography (MRA) help in confirming the lesion location and identify the site of possible occlusion. A combination of dual antiplatelet therapy seemed to confer a good secondary stroke prevention strategy in a bilateral medial medulla infarction. Despite its known severity in literature, our data showed that some people could have minimal disability and can be discharged with good outcome.

Table 1: Clinicodemographic profile

	CASE 1	**CASE 2**	**CASE 3**
Age (years)	48	64	35
Sex	M	M	F
Smoking history	No	Yes	No
Alcoholic beverage drinking history	Yes	Yes	No
COMORBIDITIES			
Hypertension	Yes	Yes	Yes
Diabetes	No	No	No
Cardiac pathology	No	No	No
Chronic Kidney Disease	No	No	Yes
COVID vaccination status	Fully vaccinated	Vaccinated x 1 dose	Unvaccinated
LENGTH OF HOSPITAL STAY (days)	14	12	9

Table 2: Ancillary Tests

DIAGNOSTICS	CASE 1	CASE 2	CASE 3
ECG 12L	Sinus tachycardia	Sinus rhythm Inferolateral wall ischemia	Sinus rhythm
CHEST XRAY	Unremarkable	Pneumonia, bilateral Atherosclerotic aorta	Cardiomegaly
COVID RT-PCR ASSAY	Negative	Negative	Negative
HbA1c (%)	13	13.6	-
FBS (mg/dL)	309.19	212.07	86.31
LDL (mg/dL)	298.84	125.48	155.21
TRIGLYCERIDES (mg/dL)	175.22	114.16	225.66
TOTAL CHOLESTEROL (mg/dL)	303.47	169.11	223. 55
SERUM CREATININE (mg/dL)	1.20	0.83	9.05
ALT (U/L)	19.23	30.61	9.45
AST (U/L)	18.7	23.58	20.96

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Ketapang Leaf (*Terminalia Catappa L.*) Metabolite Profiling with Aquadest Fraction Ethanol Extract Using UPLC-MS

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Abstract
Ketapang leaves (*Terminalia catappa L.*) are known for its traditional medicinal function. Ketapang leaves contain saponins, alkaloids, tannins, flavonoids, and triterpenoids. In general, polar solvent can increase the production of Ketapang leaves' active compound. Utilization of a plant as herbal medicine is based on the presence of chemical compounds that have certain pharmacological effects. Therefore, metabolite profiling is needed. This is intended to understand the chemical compounds of Ketapang leaves. The objective of this study is to analyze the metabolite profile of chemical compounds and major compounds contained in the aquadest fraction ethanol extract using the UPLC-MS instrument. The results of the interpretation of the analysis of the compound content using UPLC-MS showed that there are 19 compounds in the ethanol extract of the aquadest fraction of Ketapang leaves. The major compound in the ethanol extract of the aqueous fraction of Ketapang leaves is Pelargonidin 3-O-glucoside with an iFit percentage of 97.56%.

Keywords: Ketapang, Metabolite, Aquadest, UPLC-MS

1. Introduction

Herbal extracts of Ketapang have anti-inflammatory effect on its isoflavones for the periodontal disease. The main compounds that play a role in the blood clotting process are tannins and flavonoids (Marcińczyk et al., 2022). The process happens through their inhibitory effects on inflammatory cytokine production and inhibition of mitogen-activated. (Telrandhe et al., 2021). People in developing countries reaching 80% use traditional medicine for health maintenance (Valizadeh et al., 2021). Medicine made from plants potential healing is also used in periodontal disease, to support the emerging global traditional medicine with antimicrobial resistance (Milovanova-Palmer & Pendry, 2018).

Ketapang leaves (*Terminalia catappa L.*) are known for its nutrient for curing people sickness. However, the current management of periodontal disease problem arises from the antibiotic and antimicrobial resistance (Serwecińska, 2020). The highest flavonoid content is found in Chinese ketapang leaves (*Cassia alata L*) (Chuah & Pisar, 2010). Research on the degumming process and the type of catalyst on the physiochemical and biodiesel properties in tropical almond (*Terminalia catappa*) seed oil was conducted (Punwong et al., 2017). The phytochemical and anthelmintic activities of Katapang leaves were similar to standard drugs meanwhile the lowest inhibition of

95.77% was detected from the methanol extract (Sani et al., 2019).

Ketapang leaves *(Terminalia catappa L.*) contain saponins, alkaloids, tannins, flavonoids, and triterpenoids (Allyn et al., 2018; Praptiwi et al., 2020; Olukotun et al., 2018; Tampemawa et al., 2016), triterpenoids (Dembitsky, 2021; Nugroho et al., 2016), tannins (Ola et al., 2020), alkaloids (Katiki et al., 2017), steroids (Ladele et al., 2016), and fatty acids (Janporn et al., 2015).

Ketapang leaves need to be analyzed for their metabolite content to find out what compounds are contained therein. One of the analysis techniques that can be used is metabolite profiling analysis. The use of metabolite profiles can provide a comparative view of gene function. Metabolite profiles have both the potential to the complex regulatory processes by providing deeper insight and also directly determine the phenotypes. The metabolite profile of a plant can be identified with the help of the UPLC-MS instrument. UPLC-MS is among the analysis techniques from the LC-MS technique which can be used to analyze the metabolite profile of a sample (Attwa et al., 2023). This analytical technique provides several advantages, namely high-resolution, robust, reliable chromatogram results, accurate measurement of mass and structural information, and allows the detection of a wide range of metabolites from plant samples (Zhao & Lin, 2014).

This study is intended to perform the metabolite profile of chemical compounds and major compounds contained in the ethanol extract of the aquadest fraction of Ketapang leaves using the UPLC-MS instrument. Analysis of this profile of metabolite compounds will provide data on what compounds are contained in Ketapang leaves which will then be identified whether these compounds can be used as medicinal ingredients, especially drugs to control bleeding in the teeth.

2. Method

2.1 Instruments and Location of Study

The material used in this research is Ketapang leaves. The solvents used for the extraction and fractionation of the extract are ethanol, aquadest, n-hexane, ethyl acetate. The chemicals used for UPLC-MS testing include methanol (hyper grade for LC-MS), formic acid (ultrapure for UPLC-MS), acetonitrile (hyper grade for LC-MS), and 0.05% water injection for UPLC-MS.

The equipment used in the study was a set of maceration tools and separatory funnel, blender, knife, scissors, sifter, analytical balance, Erlenmeyer Pyrex, Schott beaker, stir bar, IWAKI CTE33 volumetric flask, Pyrex volume pipette, dropper pipette, micro pipette, paper. filter Whatman No.1, Vacuum Rotary Evaporator (Buchi, Sweden). Extract preparation and fractionation were carried out at the Laboratory. Analysis using the UPLC-MS instrument is carried out at the Forensic Laboratory, Research and Criminal Agency of the Republic of Indonesia Police, East Jakarta.

2.2 Research Procedure

2.2.1 Simplicia

Mature dark green Ketapang leaves were chosen as the mature leaves will have effect on the secondary metabolites content. All the leaves were washed under running water. Then the leaves are washed under running water, and chopped into pieces. The following process is drying under 500 °C for 24 hours using oven. After the leaves are dry, ketapang leaf simplicia is made by blending the dry Ketapang leaves. The blended Ketapang leaves are then sieved using a 60-mesh sieve.

2.2.2 Ethanol Extract and Fractionation

Maceration of Ketapang leaves powder with ethanol was performed in a ratio of 1:5 for 2 days (24 hours) at room temperature (20–25) °C. Filtering process was performed using Whatman No.1 filter paper. The drugs obtained were then going through second maceration with 1000 mL of ethanol two times. The filtrates obtained were combined and then evaporated using a vacuum foam evaporator (Buchi, Sweden) at 400C. The result of evaporation was obtained crude extract of ethanol Ketapang leaves.

The ethanol condensed extract of Ketapang leaves was partitioned using distilled water and hexane. A total of 4 mg of crude extract and 200 ml of distilled water and 200 mL of hexane. The process is as follows: First, shaking the mixture in a separatory funnel to make it evenly shaken. Then let it stand for a while until you can see the separation between the aquadest phase and the hexane phase. The two phases were separated and the solvent for each phase was evaporated in a vacuum rotary evaporator to obtain an extract of the distilled water phase. The ethanol extract, the aquadest fraction of ketapang leaves obtained was tested by LCMS.

2.2.3 Metabolite Profiling

Weigh carefully 10.00 mg of the extract sample and then dissolve it with methanol into a 10 ml volumetric flask. Extract in methanol was taken with a microsyringe as much as 5 µl to then be injected into the sample and into the UPLC-MS column. Replication was carried out 4 times. The sample in the form of a liquid will be converted into droplets through a needle that has been given a positive (+) ESI charge. The ions that have been produced by the detector will then be separated by the Q-ToF analyzer. The eluent used was a mixture of (A) water: formic acid (99.9:0.1) and (B) acetonitrile: formic acid (99.9: 0.1) with a gradient elution system as listed in table 1 with a flow rate eluent 0.2 ml/min. The results of polar compounds chromatograms will appear first, followed by compounds with lower polarity. The results of the separation are then read by the QToF-MS detector to produce a chromatogram peak. The interpretation of chromatogram peaks was performed using the Masslynx application.

Table 1: The ratio of solvent used in the gradient elution system

Time (Minute)	Mixture A (%)	Mixture B (%)
0.00	95.0	5.00
2.00	75.0	25.0
3.00	75.0	25.0
14.00	0.00	100.0
15.00	0.00	100.0
19.00	95.0	5.0
23.00	95.0	5.0

3. Results

The chromatogram is processed using the Masslynx 4.1 application so that the molecular formula of each compound can be known and predicted. The chromatogram of the results of the analysis of the metabolite profile of the ethanol extract of the aquades fraction of ketapang leaves can be seen in Figure 1. Each one peak of the chromatogram indicates one compound. Based on the measured mass and calculated mass values in the spectra, it is possible to predict the molecular formula from the spectra. The value of the measured mass and calculated mass must also be reduced by the mass of 1 H atom, namely 1.0078, because when the separation using a column occurs the addition of H atoms comes from the firing of ESI (+) ions. The predicted molecular formula that appears in the data is then chosen, which is the difference between the measured mass and the calculated mass of ± 0.0005. The predicted molecular formula that has been selected is then searched with the help of the chemspider.com website.

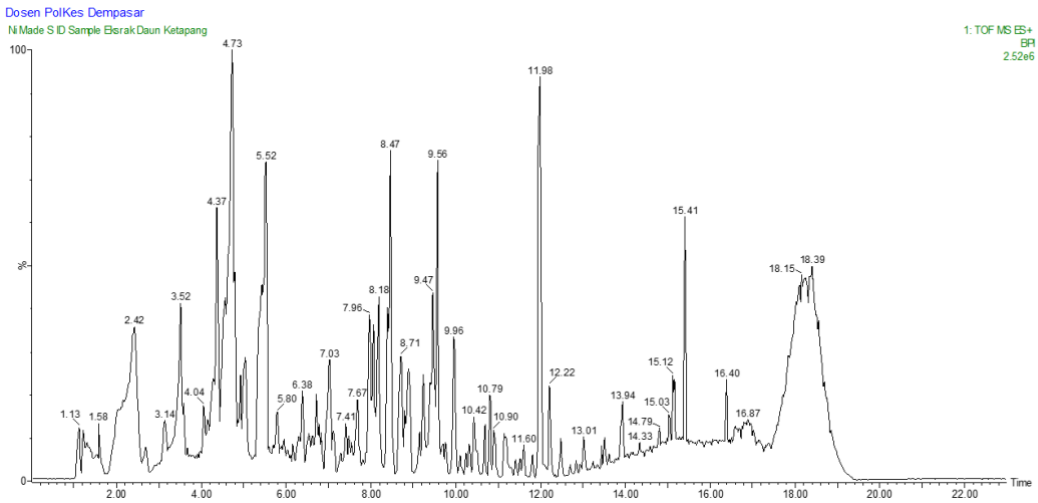

Figure 1: UPLC-MS chromatogram of the ethanol extract of the aquadest fraction of ketapang leaves

The results of the interpretation of the analysis of the compound content using the UPLC-QToFMS showed that there were 19 compounds in the ethanol extract of the aquadest fraction of Ketapang leaves (Table 2).

Table 2: Interpretation of data on metabolite profiling of the ethanol extract of the aquadest fraction of Ketapang leaves

Retention Time	Measured Mass	Calculated Mass	Formula	Compound
1.13	151.0352	151.0395	C_8H7O_3	Mandelate
1.58	130.0873	130.0868	$C_6H_{12}NO_2$	6-Aminohexanoate
2.42	120.0814	120.0813	$C_8H_{10}N$	1-Allylpyridinium

3.14	1102.1033	1102.1029	$C_{40}H_{16}N_{25}O_{14}S$	Unknwon
3.52	188.0720	188.0745	$C_8H_{14}NO_2S$	2-methoxy-1-(2-methyl-4H-thiazol-5-yl)propan-1-ol
4.37	449.1087	449.1084	$C_{21}H_{21}O_{11}$	Cyanidin-3-glucoside
4.73	433.1144	433.1135	$C_{21}H_{21}O_{10}$	**Pelargonidin 3-O-glucoside**
5.52	585.1256	585.1244	$C_{28}H_{25}O_{14}$	Unkown
5.80	197.1178	197.1178	$C_{11}H_{17}O_3$	3-Hydroxy-4,7,7-trimethylbicyclo[2.2.1]heptane-1-carboxylate
6.38	261.1128	261.1127	$C_{15}H_{17}O_4$	7-Hydroxy-4-(methoxycarbonyl)-2-(2-methyl-2-propanyl)chromenium
7.03	309.0872	309.0875	$C_{17}H_{13}N_2O_4$	3-Carbamoyl-1-[2-oxo-2-(2-oxo-2H-chromen-3-yl)ethyl]pyridinium
7.41	570.2218	570.2187	$C_{26}H_{36}NO_{13}$	1-[(4-methoxyphenyl)methyl]-2-methyl-1,2,3,4,5,6,7,8-octahydroisoquinolin-2-ium;(2R,3R)-2,3,4-trihydroxy-4-oxo-butanoate
7.67	648.4308	648.4345	$C_{35}H_{62}N_5O_2S_2$	Unknown
7.96	275.2017	275.2011	$C_{18}H_{27}O_2$	(9E,11E,13E,15E)-9,11,13,15-Octadecatetraenoate
8.18	645.2926	645.2924	$C_{35}H_{41}N_4O_8$	Unknown
8.47	345.0617	345.0610	$C_{17}H_{13}O_8$	5,7-Dihydroxy-2-(4-hydroxy-3,5-dimethoxyphenyl)-4-oxo-4H-chromen-3-olate
8.71	181.1230	181.1229	$C_{11}H_{17}O_2$	2-(5-Hexen-1-yl)-5-hydroxy-3,4-dihydropyranium
9.47	343.0454	343.0454	$C_{17}H_{11}O_8$	Unknown
9.56	343.1188	343.1188	$C_{19}H_{19}O_6$	(3R)-3-(2,3-Dihydro-1,4-benzodioxin-6-yl)-3-(3,4-dimethoxyphenyl)propanoate
9.96	345.1337	345.1338	$C_{19}H_{21}O_6$	(1R,2R,5S,8S,9S,10R,11S,12S)-5,12-Dihydroxy-11-methyl-6-methylene-16-oxo-15-oxapentacyclo[9.3.2.$1^{5,8}$.$0^{1,10}$.$0^{2,8}$]heptadec-13-ene-9-carboxylate
10.42	214.2535	214.2535	$C_{14}H_{32}N$	tetradecylammonium
10.79	627.2828	627.2819	$C_{35}H_{39}N_4O_7$	3-{(3S,4S)-5-{2-[(3-Ethyl-5-formyl-4-methyl-1H-pyrrol-2-yl)methyl]-5-(methoxycarbonyl)-3-methyl-4-oxo-1,4-dihydrocyclopenta[b]pyrrol-6-yl}-3-methyl-2-[(3-methyl-5-oxo-4-vinyl-2,5-dihydro-1H-pyrrol-2-y l)methyl]-3,4-dihydro-2H-pyrrol-4-yl}propanoate
10.90	271.1692	271.1692	$C_{18}H_{23}O_2$	(17β)-17-Hydroxyestra-1(10),2,4-trien-3-olate
11.60	277.2166	277.2166	$C_{18}H_{29}O_2$	linolenate
11.98	601.5199	601.5148	$C_{22}H_{65}N_{16}OS$	unknown
12.22	425.3632	425.3632	$C_{27}H_{45}N_4$	unknown
13.01	425.3607	425.3644	$C_{27}H_{45}N_4$	unknown
13.94	423.3973	423.3991	$C_{31}H_{51}$	unknown
14.33	423.3975	423.3991	$C_{31}H_{51}$	unknown
14.79	423.3984	423.3991	$C_{31}H_{51}$	unknown
15.03	419.3139	419.3140	$C_{27}H_{39}N_4$	5-Ethyl-2-methyl-1-[3-({4-[(E)-phenyldiazenyl]-5,6,7,8-tetrahydro-1-naphthalenyl}amino)propyl]piperidinium (Jenis Alkaloid piperidin)
15.12	423.3979	423.3991	$C_{31}H_{51}$	unknown
15.41	423.3986	423.3957	$C_{19}H_{51}N_8S$	unknown
16.40	423.3958	423.3991	$C_{31}H_{51}$	unknown
16.87	423.3968	423.3991	$C_{31}H_{51}$	unknown

Based on the results of the interpretation of the data that has been obtained, several major compounds can be identified, namely compounds that have a higher area percentage compared to other compounds. The major compound in the ethanol extract of the aqueous fraction of Ketapang leaves is Pelargonidin 3-O-glucoside with an iFit percentage of 97.56%. Pelargonidin 3-O-glucoside is a type of anthocyanin belonging to the flavonoin compound (Ergün, 2022). Spectra and chemical structures of the compounds are portrayed in Figure 2.

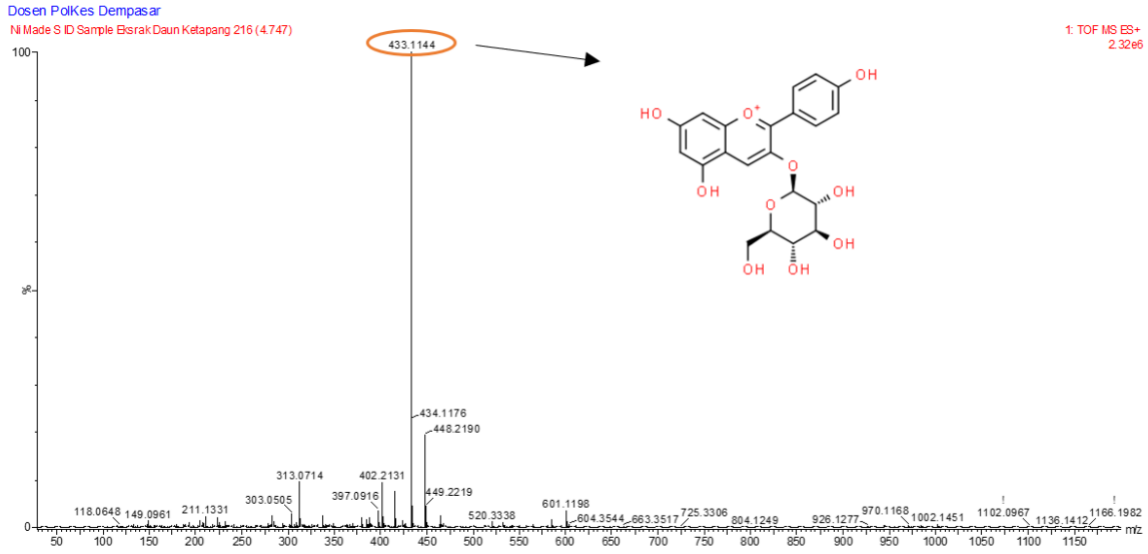

Figure 2: Spectra and chemical structures of major compounds

4. Discussion

Analysis of the metabolite profile of the ethanol extract of the aquades fraction of ketapang leaves in this study used UPLC-MS. UPLC is among the developmental techniques of liquid chromatography which is used for segregation of different components in a mixture with a molecular level of up to two microns of analyte particles. The analytical method using UPLC can reduce the consumption of the mobile phase by up to 80% in a relatively shorter time of about 1.5 minutes than using HPLC. The UPLC-MS used in this study uses an MS detector with an ESI (+) ion source and an MS analyzer in the form of Q-ToF. This instrument has several advantages, namely selective and sensitive with high resolution performance and fast so that the analysis time is faster (Chawla & Ranjan, 2016). Analysis of the metabolite profile of the ethanol extract of the aquades fraction of Ketapang leaves begins with injecting the sample, then the sample will enter the column resulting in the process of separating the metabolite components. In this study the stationary phase used was C18 column or octadecyl silica. The advantage of octadecyl silica as the stationary phase is that this phase is able to separate compounds ranging from low, medium, to high polarity (Dembek & Bocian, 2022).

The ethanol extract of the aquades fraction of ketapang leaves is known to contain many secondary metabolites that are beneficial to health. The ethanol extract of the distilled water fraction is known to contain saponins, alkaloids, tannins, flavonoids, triterpenoids, and phenols based on phytochemical screening tests. The ethanol extract of the distilled water fraction contained saponins of 3787.80 mg/100 g, alkaloid content of 1798.57 mg/100g, tannin content of 53140.72 mg/100g, flavonoid content of 12935.37 mg/100g and phenol content of 29968.05 mg/100g (Muthulakshmi & Neelanarayanan, 2021). According to the test results with UPLC-MS, the ethanol extract of the aquades fraction of ketapang leaves was detected to contain several secondary metabolites such as alkaloids, namely 1-Allylpyridinium and 5-Ethyl-2-methyl-1-[3-({4-[(E)- phenyldiazenyl]-5,6,7,8-tetrahydro-1-naphthalenyl} amino) propyl] piperidinium and the flavonoid group, namely Cyanidin-3-glucoside and Pelargonidin 3-O-glucoside. Therefore, the ethanol extract of the aqudes fraction of ketapang leaves can be used as a drug in controlling bleeding, one of which is bleeding during tooth extraction. In addition to suppression,

the use of topical hemostatic is one step to control bleeding (Milovanova-Palmer & Pendry, 2018). One of the compounds that play a role in the blood clotting process is flavonoids (Ullah et al., 2020). The presence of flavonoids in the ethanol extract of the aquades fraction of ketapang leaves can be used as a solution to reduce bleeding.

The results of the interpretation of the analysis of the compound content using the UPLC-QToFMS showed that there were 19 compounds in the ethanol extract of the aquades fraction of ketapang leaves. The major compound in the ethanol extract of the aqueous fraction of ketapang leaves is Pelargonidin 3-O-glucoside with an iFit percentage of 97.56%. The ethanol extract of the distilled water fraction of ketapang leaves was detected to contain several secondary metabolites such as alkaloids, namely 1-Allylpyridinium and 5-Ethyl-2-methyl-1-[3-({4-[(E)-phenyldiazenyl]-5,6,7) ,8-tetrahydro-1-naphthalenyl} amino) propyl] piperidinium and the flavonoid group, namely Cyanidin-3-glucoside and Pelargonidin 3-O-glucoside.

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Exclusive Breastfeeding Coverage Increase Using Breastfeeding Readiness Scale

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Abstract
Exclusive breastfeeding is an indispensable need for baby. However, the coverage of exclusive breastfeeding still becomes an issue. This study aims to develop self-efficacy measurement tools for breastfeeding mothers in Central Bangka Regency, Indonesia. This study was a mixed method research with a total of 72 test respondents. The research was started from June to November 2021. The process and analysis used alpha Cronbach and SPSS application version 24. Based on the results of the CVR (Content Validity Ratio) test, all 20 items are considered to have a CVR above 0.8. The results of the item discrimination test on the breastfeeding readiness scale show 19 items had good discriminatory power and 1 item failed. The reliability coefficient on the prosocial behavior scale has high value consistency and stability. The early breastfeeding readiness scale can be used to assess the level of readiness of mothers in the breastfeeding process. This scale is practicable for all mothers, both those who have had children/given birth and those who are still in the pregnancy.

Keywords: Breastfeeding Readiness Scale, Exclusive Breastfeeding, Self-Efficacy

1. Introduction

Exclusive breastfeeding coverage in Indonesia has become a prolonged problem (Gayatri, 2021; Qurniyawati & Syahrul, 2022). In general, the number of babies get exclusive breastfeeding are still low, both at the provincial and district or city levels. At the provincial level, it only reached 58.33%, an increase compared to the coverage in 2014 of 56.6%, and in 2013 of 46.9%. This achievement is still far below the target set by both the province (67%) and the national target (70%). The highest coverage was achieved by Bangka Regency at 67.84%, while the lowest coverage was West Bangka Regency at 43.88% and Central Bangka Regency (45.10%). Meanwhile the tendency for exclusive breastfeeding coverage in the last seven years has tended to increase, from 21.9% in 2009, to 35.7% in 2012, in 2014 it was 56.6% and it increased in 2015 by 58.33% (Provincial Head Office of Bangka Belitung, 2015). Self-efficacy in breastfeeding mothers has been shown to be a supporting factor for exclusive

breastfeeding, while postpartum depression is a risk factor for exclusive breastfeeding (Ferraro & Vieira, 2010; Marshall et al., 2022a; Tuthill et al., 2020).

Exclusive breastfeeding is influenced by many factors, one of which is the mother's readiness to breastfeed(Maharlouei et al., 2018; Primo et al., 2016). However, exclusive breastfeeding can provide benefits not only physically (nutritionally), but also socially and psychologically for babies. Pregnant adolescents are at risk of giving birth prematurely so that with exclusive breastfeeding it is expected that the baby's growth and development can run optimally (Marshall et al., 2022b; Talbert et al., 2020).

There is a significantly positive correlation between the basic value of self-efficacy in breastfeeding mothers and the duration of breastfeeding at 6 months postpartum, which means that the higher the self-efficacy, the longer breastfeeding will be (Hartati & Hakim, 2021). Zheng's research stated that from 6 - 12 weeks of postpartum, the level of self-efficacy and social support is statistically increased, and the risk of postpartum is statistically decreased (Zheng et al., 2018). Meanwhile, according to Dennis (2010) develops Bandura's theory of several sources that can influence self-efficacy in breastfeeding (Breastfeeding Self-Efficacy), namely: experience of success (previous breastfeeding experience), experience of others (seeing other people breastfeeding), and husband's support in breast-feed (Jacobzon et al., 2022), experience of success in this case breastfeeding experience in the past. A mother who has successfully breastfed can increase her self-confidence and can develop a strong desire for herself to carry out the act or habit of breastfeeding (Li et al., 2021).

2. Method

This research is descriptive research which was conducted in Central Bangka district. The data collection was carried out in June - November 2021. The population used in this study were mothers who gave birth in the Central Bangka Regency Region. Meanwhile the sample were mothers who gave birth in Central Bangka district and were able to take part in Focus Group Discussions (FGD). The total number of respondents who participated in the FGD was 40 people.

The steps of the research are as follows: Survey, FGD, validity test (CVR), data collection, discrimination test and reliability test. The inclusion criteria in the FGD group were: postpartum women and midwives in Central Bangka. The research was conducted qualitatively to obtain the items and dimensions of maternal readiness and then was carried out quantitatively to test the items obtained.

The processing and analysis were performed using alpha Cronbach carried out with SPSS 24 statistical program tool. This research has passed the ethical test from KEPK Poltekkes Pangkalpinang no 07/EC/KEPK-PKP/V/2021. The preparations made to carry out the research consisted of preparing a measuring tool in the form of a breastfeeding readiness questionnaire consisting of 20 statement items, 17 favorable items and 3 unfavorable items.

This research began by conducting an online survey to find out what factors form the readiness to breastfeed in women in Bangka. The researcher conducted this survey and got 114 respondents. This data collection was carried out in May – June 2021.

After processing the survey data, the results were obtained regarding the factors shaping breastfeeding readiness. The results of this survey were then tested again in FGD to see whether the existing survey results were in accordance with the community's understanding. This activity was carried out in 4 Central Bangka regions, namely the Pangkalan Baru Health Center, Sungai Selan Health Center, Koba Health Center and Namang Health Center in June 2021 involving 10-12 respondents from each region. The results of the FGD showed that the survey results are in accordance with the understanding and opinion of postpartum mothers. Next, a design for measuring readiness for breastfeeding was created.

The survey results that were discussed in the FGD were then coded to obtain the aspects that emerged based on the responses from the research respondents. Based on the results of the data grouping, there are 5 aspects that

make up breastfeeding readiness and their indicators. Furthermore, these aspects and indicators are developed into statement items.

Questionnaires were distributed using online media, Google form and 72 respondents were willing to fill out the questionnaire. Of the 72 respondents who filled in, the data that could be processed were as many as 60 respondents, the remaining 12 respondents did not fill in completely so they could not be analyzed.

3. Results

The results of the survey with 114 respondents obtained the detail as shown in Table 1.

Table 1: Respondent's Characteristics

Respondent's characteristics	Total	Percentage (%)
Age		
< 35 years old	78	68
> 35 years old	36	32
Educational background		
Elementary school	7	6
Junior High School	6	5
Senior High School	47	41
Bachelor	44	39
Master	10	9

Table 1 shows that most of the survey respondents (78 respondents) were less than 35 years old and 47 of them had high school education. In testing the questionnaire, there were 72 respondents who filled out a questionnaire with the following characteristics (Table 2):

Table 2: Respondent's Characteristics for Questionnaire Test

Respondent's Characteristics	Total	Percentage (%)
Age		
<35 years old	55	76
>35 years old	17	24
Educational background		
Elementary school	1	1
Junior High School	1	1
Senior High School	40	55
Bachelor	27	37
Master	5	6
Working status		
Yes	44	61
No	28	39

4. Discussion

4.1 Validity test

In this study, the item validity test used was content validity shown in Table 3. Content validity is the validity that is estimated through testing the feasibility or relevance through an analysis of judgment by expert. The validity of this study was obtained from expert judgment made by eight panelists. Based on the results of the CVR (Content Validity Ratio) test, it is known that all 20 items are considered to have a CVR number above 0.8. This means that all items can be used for testing.

Table 3: Item Validity Test

Dimension	Indicator	Weight
Breastfeeding knowledge	a. information from Internet b. information from health practitioners c. hereditary information	20%
Environment support	a. Husband b. Parents c. Health practitioners	20%
Past experience	a. Past pregnancy b. Experience of close people	20%
Emotional	a. Proud of being mother b. Proud of giving breastfeeding	20%
Responsibility	a. Fulfilling the task of taking care of children b. Giving children's rights	20%
Total		100%

4.2 Item Discrimination Test

The item discrimination power test on the breastfeeding readiness scale is expected to have a coefficient of ≥ 0.30 so that it can be considered satisfactory (Azwar, 2016). The discriminating power of an item is the extent to which an item is able to distinguish between individuals or groups of individuals who have and do not have the attributes being measured. The reliability test on this scale was carried out using the Alpha Cronbach technique. Empirically high and low reliability are shown by a number called the reliability coefficient, where theoretically the reliability coefficient ranges from 0 to 1. The reliability coefficient standard used by researchers in this study is ≥ 0.70. In this study, the validity and reliability tests were carried out using SPSS version 22 for windows.

4.3 Item Reliability Test

Testing the reliability of this measuring instrument was carried out by testing Alpha Cronbach analysis with the help of SPSS. Based on the results of this reliability test, the reliability coefficient shows 0.881. This shows the reliability coefficient on the scale of prosocial behavior has a high value consistency and stability. The distribution of item can be seen in Table 4 below:

Table 4: BFSE Scale Item Distribution (Run 1)

Dimension	Indicator	Item
Breastfeeding knowledge	a. information from Internet	3
	b. information from health practitioners	1, 7
	c. hereditary information	9
Environment support	a. Husband	4, 10(*)
	b. Parents	2
	c. Health practitioners	6
Past experience	a. Past pregnancy	12
	b. Experience of close people	14, 5, 13(*)
Emotional	a. Proud of being mother	8, 15
	b. Proud of giving breastfeeding	16, 19(*, **)

Responsibility	a. Fulfilling the task of taking care of children	11, 20
	b. Giving children's rights	17, 18
Total		20

Remark:
*item unfavorable
** the discrimination test item failed

Table 5: BFSE Scale Item Distribution (Run 2)

Dimension	Indicator	Item
Breastfeeding knowledge	a. information from Internet	3
	b. information from health practitioners	1, 7
	c. hereditary information	9
Environment support	a. Husband	4, 10(*)
	b. Parents	2
	c. Health practitioners	6
Past experience	a. Past pregnancy	12
	b. Experience of close people	5, 13(*),14
Emotional	a. Proud of being mother	8, 15
	b. Proud of giving breastfeeding	16
Responsibility	a. Fulfilling the task of taking care of children	11, 20
	b. Giving children's rights	17, 18
Total		19

Remark: * item unfavorable

The early breastfeeding readiness scale can be used to assess the level of readiness of mothers in the breastfeeding process. This scale can be used by all mothers, both those who have had children/given birth and those who are still in the process of pregnancy.

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Nutritional Knowledge and Dietary Diversity of Post-menopausal Women in Rural Areas of Bangladesh

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Abstract
Background: Nutrition has a significant impact on the health of post-menopausal women. An appropriate dietary plan provides women with the necessary nutrients to maximize their activity and help minimize chronic diseases that may arise after menopause. The objective of the study was to assess the nutritional knowledge and dietary diversity of post-menopausal women in the rural area of Bangladesh. Materials and methods: A cross-sectional study was conducted among post-menopausal women aged 45 to 60. A sampling frame of 167 post-menopausal women was created by visiting each household, and 101 participants were chosen randomly from this frame. Face-to-face interviews were used to gather data. The body mass index (BMI) was used to evaluate nutritional status. To gather dietary data and calculate dietary diversity scores, a 24-hour dietary recall questionnaire was used. Knowledge score was used to gauge nutrition-related knowledge. Result: The average nutrition knowledge score was 8.55 out of 13. Knowledge has a statistically significant effect on the dietary diversity of post-menopausal women ($P< 0.015$). In this study, BMI was 41 percent, within the normal range, 35 percent were overweight, and 22 percent were obese. Around 45 percent of the respondents had a low dietary diversity score. There was a weak association between BMI and dietary diversity ($P> 0.077$). Almost 90 percent of women experienced menopausal problems, and 25 percent had inadequate knowledge about menopause. Conclusion: Knowledge of nutrition is associated with post-menopausal women's dietary diversity. Nutrition knowledge can improve the dietary diversity of post-menopausal women.

Keywords: Dietary Diversity, Dietary Diversity Score (DDS), Nutritional Knowledge, Post-Menopausal Women

1. Background

Menopause is a significant turning point in a woman's life that marks the end of her reproductive years (Kashyap & Chhabra, 2019). Many women-entering in menopause are unprepared to deal with the changes and lack an understanding of dietary habits and diversity, which can lead to nutritional excess or deficiency (Tursunović et al., 2014). Postmenopausal women have poor nutrition knowledge (Mamgain & Lakhawat, 2019; Sirivole & Eturi,

2014). The causes include poor eating habits, heredity, and a lifestyle that provides for frequent use of betel leaf and cigarettes among other things (Tursunović et al., 2014). Inadequate nutrition and dietary diversity knowledge affect women's quality of life (Anjali & Pankaj, 2019).

Dietary diversity refers to the number of individual food items or groups consumed over time (Ruel, 2003). 26.8% of postmenopausal Korean women have poor dietary behaviors (Ra & Kim, 2021). Staple foods are a significant source of carbohydrates in the Asian diet, and around 94% consume food made of cereal (Khamis et al., 2021). Studies found that individuals with high consumption of staples had lower Dietary Diversity Score (DDS) scores. A positive association exists between nutrition knowledge and dietary intake (Spronk et al., 2014). Healthy eating habits and nutrient deficiencies contribute to various nutritional disorders (Lambrinoudaki et al., 2010).

Insufficient knowledge about nutrition leads to the poor nutritional status of post-menopausal women in Bangladesh (Harris-Fry et al., 2016). This poor knowledge makes Bangladeshi women vulnerable to choosing appropriate food for good health, ultimately hindering food diversification (Harun et al., 2020; Sheema et al., 2016). So, postmenopausal women must understand their nutritional knowledge and dietary pattern, especially those in rural Bangladesh. The present study aims to assess the nutrition and menopause-related knowledge of postmenopausal women and examine the nutrition knowledge with their food intake.

2. Materials and methods

A household cross-sectional survey was carried out among postmenopausal women in the Mirzapur subdistrict of the Tangail district. Two wards (Ward no two and Ward no 6) were selected around Mirzapur Union Health and Family Welfare Centre (UH&FWC). We communicated with the Family Welfare Assistant (FWA). Through them, we got the information from the registered book of the Family Welfare Centre, which helped us to get accurate information on postmenopausal women. Household lists of 167 respondents were prepared with the help of FWA, and 101 were randomly selected out of the list from the list. Participants aged 45 to 60 years, whose last menstrual period was more than twelve months, and who were willing to participate were recruited to the study. Ethical clearance was taken from the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU).

A semi-structured pre-tested questionnaire was used to collect data. Questions assessed thirteen questions on nutrition knowledge, and knowledge scores were calculated by adding the questions where the correct response was coded as one and the incorrect answer coded as 0 (Parmenter & Wardle, 1999). The questions were prepared following a dietary guideline for Bangladesh (Nahar et al., 2014). The height and weight of the respondents were measured by measuring tape and weighing machine to compute the Body Mass Index (BMI). The BMI of the respondents was calculated and classified according to World Health Organization (WHO) guidelines (World Health Organisation, 2010). A dietary recall for 24 – hours were used to obtain dietary information by dietary diversity score using Guidelines for Measuring Household and Individual Dietary Diversity (Kennedy et al., 2010). Based on food items consumed in the past 24 hours, respondents were assigned the number of food groups they consumed, ranging from 0 to 9, and the Dietary Diversity Scores (DDSs) were measured using these nine food group indicators where food group ≤ 3 Considered as having the lowest dietary diversity, the 4-5 food group has medium dietary diversity, and ≥ 6 has high dietary diversity (Kennedy et al., 2010). The nine food groups included starchy staples (e.g., rice, etc.), legumes and nuts, dairy, organ meats, eggs, flesh foods (meat, fish, or poultry), vitamin A-rich dark green leafy vegetables, other vitamin A-rich fruits and vegetables, and other fruits and vegetables.

SPSS software version 23 was used for the statistical analysis (Gouda, 2015). Descriptive data were given as percentages and frequencies for categorical variables, whereas for continuous variables, the mean and standard deviation were used to analyze data. A chi-square test was done to measure the association between variables, and ANOVA was used to compare means between more than two groups of subjects. Statistical significance was considered at $p<0.05$.

3. Result

Most participants were 49–52-year (38%). The majority of them was married (83%), housewife (88%), and Muslim (85%), and had no formal education (57%). Around 58% spouses of respondents were employed, and 11% were unemployed during the study (Table-1).

Table 1: Socio-demographic characteristics of the respondents

Variables	(%) *n*	Variables	(%) *n*
Age		**Occupation**	
45-48	(12.9) 13	Housewife	(88.1) 89
49-52	(37.6) 38	Government service	(5.9) 6
53-56	(29.7) 30	Teacher	(3.0) 3
57-60	(19.8) 20	Others	(3.0) 3
Religion		**Spouse's occupation**	
Islam	(85.1) 86	Service	(27.7) 28
Hindu	(14.9) 15	Business	(29.7) 30
Marital status		Unemployed	(10.9) 11
Married	(83.2) 84	Others*	(14.9) 15
Widow	(16.8) 17	Deceased	(16.8) 17
Educational status			
No formal education	(57.4) 58		
Secondary education	(31.7) 32		
≥ Higher Secondary	(10.9) 11		

*Others: Factory workers, Farmer, and Day Laborer

In Table 2 among 101 respondents 60.4% thought fruits should be eaten daily followed by 76.2% respondents think eating vegetables daily, 49.5% think fish should be eaten every day. Around 43% respondents think carbohydrates rich foods are rice, bread, potato etc., 46% think fish, meat, egg, legume contain rich amounts of protein, and 40% were not aware of any protein rich food. 70.3% admitted fiber is highly present in green and yellow leafy vegetables and fruits.

Table 2: Distribution of knowledge on dietary intake and disease prevention among respondents

knowledge of dietary intake		knowledge of disease prevention	
Variables	**(%) *n***	**Variables**	**(%) *n***
Minimum fruits intake per week		**Dietary fibre can prevent colon cancer.**	
≤3 days	(12.9) 13	Yes	(61.4) 62
> 3 days	(8.9) 9	No	(7.9) 8
Everyday	(60.4) 61	Do not know	(30.7) 31
Do not know	(17.8) 18	**Disease related to low intake of dietary fibre**	
Minimum vegetables intake per week		Bowel disorder	(64.4) 65
≤4 days	(12.9) 13	Anaemia	(8.9) 9
≥5 days	(5.0) 5	Tooth decay	(4.0) 4
Everyday	(76.2) 77	Do not know	(22.8) 23
Do not know	(5.9) 6	**Disease related to eating sugar**	
Minimum fish intake per week		High blood pressure	(1.0) 1
1-2 times per week	(7.9) 8	Diabetes mellitus	(94.1) 95
3-4 times per week	(32.7) 33	Do not know	(5.0) 5
Everyday	(49.5) 50	**Disease related to eating salt**	
Do not know	(9.9) 10	Diabetes mellitus	(4.0) 4
Carbohydrate rich food		High blood pressure	(82.2) 83
Rice, bread, potato	(42.6) 43	Do not know	(13.9) 14

Fish, meat, egg, legume	(25.7) 26	**Foods increase risk of cardiac disease**	
Vegetables, milk, fruits	(19.8) 20	Eating oily fish	(5.0) 5
Do not know	(11.9) 12	Eating fatty food	(84.2) 85
Protein-rich food		Do not know	(10.9) 11
Rice, bread, potato	(3.0) 3	**Foods raise blood cholesterol**	
Fish, meat, egg, legume	(46.5) 47	Egg	(2.0) 2
Vegetables, milk, fruits	(10.9) 11	Vegetable oil	(3.0) 3
Do not know	(39.6) 40	Animal fat	(85.1) 86
Fibered foods		Do not know	(9.9) 10
Fish, meat, egg, legume	(5.0) 5		
Green and yellow leafy vegetables, fruits	(70.3) 71		
Do not know	(24.8) 25		
Dietary fibre can maintain body weight			
Yes	(77.2) 78		
No	(3.0) 3		
Do not know	(19.8) 20		

Furthermore, 77% said dietary fibre helps maintain body weight, and 61% said dietary fibre could prevent colon cancer (Table-2). 64.4% of respondents stated that bowel disorder occurs due to low dietary fiber intake. 94.1% of respondents said diabetes mellitus is related to eating sugar, 82.2% said high blood pressure is related to eating salt, 84.2% said eating fatty food can increase risk of cardiac disease, and 85.1% respondents said animal fat is associated with increased blood cholesterol levels.

Sixty-eight percent of rural postmenopausal women experienced sleep disturbance, and fatigue was the most common symptom. The mean menopausal symptoms score was 9.77, and the standard deviation was 5.6. The maximum menopausal symptoms score was 18, and the minimum score was 0 out of 18.

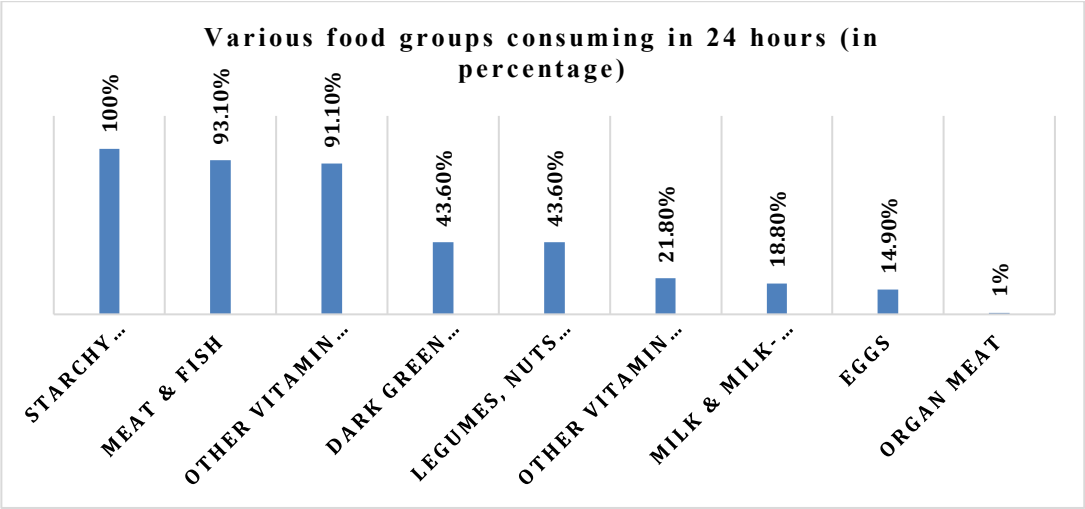

Figure 1: Food groups consumed in 24 hours

Figure 1, the data on the food intake of the respondents showed that within all food groups, every respondent consumed starchy staples, and organ meat consumption was only one percent. This diversity of food intake revealed the Women Dietary Diversity Score (WDDS), where only 7.9% of women consumed six or more than six food groups, and 44.6% finished three or less than three food groups, and they had the lowest dietary diversity.

Table 3: Pair-wise comparison among the mean of knowledge score (KS) and Women's Dietary Diversity Score (WDDS) among respondents

WDDS category	Comparison between WDDS category	Mean Difference of WDDDS category	Standard error	P value	95% confidence interval	
					Lower bound	Upper bound
Lowest WDDS	Medium WDDS	-0.942	0.509	0.202	-2.18	0.30
	High WDDS	-2.567	0.941	0.023*	-4.86	-0.27
Medium WDDS	Lowest WDDS	0.942	0.509	0.202	-0.30	2.18
	High WDDS	-1.625	0.937	0.258	-3.91	0.66
High WDDS	Lowest WDDS	2.567	0.941	0.023*	0.27	4.86
	Medium WDDS	1.625	0.937	0.258	-0.66	3.91

*The mean difference is significant at the 0.02 level.

A significant association was found between the Women's Dietary Diversity Score (WDDS) and the knowledge score (KS) (p-value 0.015). Since the ANOVA test was significant, a post-hoc (Bonferroni) test was done to determine which groups had significantly different means. The posthoc (Bonferroni) test in Table 3 shows a significant difference in mean knowledge score between the high and lowest women dietary diversity groups. It indicates a statistically significant effect of knowledge on the dietary diversity of post-menopausal women.

4. Discussion

This study revealed a statistically significant association (p-value 0.015) between knowledge and dietary diversity of post-menopausal women. Several studies found a significant association between nutrition knowledge and dietary intake or pattern (Mohamed & Tayel, 2012; Williams et al., 2012; Vriendt et al., 2009). Only 7.9% of women consumed six or more six food groups. The food groups considered in the score for the WDDS put more emphasis on micronutrient intake (Kennedy et al., 2010). Balancing micronutrients is a challenge for rural post-menopausal women. Since it requires a reasonable degree of knowledge of micronutrients (Nemati & Baghi, 2008). Improving the nutritional knowledge and dietary diversity of post-menopausal women in rural Bangladesh has important implications for their health and well-being. One potential strategy for achieving this goal may be providing targeted nutrition education programs focusing on critical areas such as micronutrient intake, protein-rich foods, and the health benefits of consuming diverse food groups.

In addition to improving the nutritional knowledge of post-menopausal women, efforts to increase dietary diversity could also have significant health benefits. A more diverse diet can help to ensure adequate intake of all essential nutrients, reduce the risk of chronic diseases such as cardiovascular disease and diabetes, and improve the overall quality of life (Chalwe et al., 2021). Strategies for increasing dietary diversity include promoting the consumption of local, seasonal, and culturally appropriate foods and intrahousehold communication (Sinharoy et al., 2017).

This study found that most women did not know about protein-rich foods. This was a reflection of needing a formal education. Furthermore, participants believed eating fewer green and yellow vegetables and fruits (fiber-rich foods) might cause bowel-related diseases such as diarrhea, constipation, and other digestive issues. Studies reported a positive relationship between higher nutrition knowledge, a greater intake of vegetables and fruit, and a lower fat intake (Spronk et al., 2014; Williams et al., 2012). So, if we increase nutritional knowledge, the diversity of food groups will increase; this result is similar to another study (Spronk et al., 2014). The finding that most women did not know about protein-rich foods may be attributed to various cultural and social factors. In rural areas of Bangladesh, there may be a lack of emphasis on protein-rich foods in the traditional diet, which may lead to a lack of awareness about the importance of these foods.

Furthermore, cultural and social norms may also play a role in limiting women's knowledge about protein-rich foods. This study revealed that more than half of the women needed formal education. Women in rural areas of Bangladesh may have limited educational opportunities and may need access to information about nutrition and healthy eating habits. Additionally, social norms may dictate that women's roles are primarily domestic, with little emphasis on learning about nutrition and food preparation outside of the home. These root causes of the lack of knowledge about protein-rich foods highlight the need for targeted interventions that address these cultural and social factors. Strategies such as community-based nutrition education programs, culturally appropriate messaging about the importance of protein-rich food and diversifying foods, and efforts to increase access to affordable protein sources may improve nutritional knowledge and dietary diversity post-menopausal women in rural areas of Bangladesh. By understanding the root causes of the lack of knowledge about diversifying foods, we can design interventions tailored to this population's specific needs and are more likely to improve their health outcomes.

On the other hand, this study figured that the prevalence of overweight among women was 35.6%. Notably, a higher proportion of rural women (21.8%) were classified as obese compared to their urban counterparts. This finding is consistent with a study conducted in Bangladesh (Hoque et al., 2015). Poor nutrition, lack of physical exercise, and symptoms of menopause were identified as possible factors contributing to the higher BMI observed among the study population (Dasgupta & Ray, 2009). These results suggest that targeted interventions aimed at improving diet, promoting physical activity, and addressing menopausal symptoms may be needed to prevent and manage overweight and obesity in this population.

Moreover, in the current study, of the women who reported menopausal symptoms, 68% experienced sleep disturbance and feeling tired/fatigued as the most common symptoms which significantly impact their overall health and well-being. This is comparable to the results conducted by other studies (Bashar et al., 2017; Singh & Pradhan, 2014; Dasgupta & Ray, 2009). However, this study also found that rural women in Bangladesh have lower knowledge about menopause and may feel uncomfortable discussing the topic due to social stigma and shame (Harun et al., 2020). By addressing these issues, we can help improve the overall health and well-being of post-menopausal women in rural Bangladesh, ultimately leading to better health outcomes for this vulnerable population.

Ultimately, improving the nutritional knowledge and dietary diversity of post-menopausal women in rural areas of Bangladesh requires a multifaceted approach that addresses individual and structural factors. This may include initiatives to increase access to fresh and healthy foods, promote physical activity, and address social and cultural barriers that limit women's ability to make healthy dietary choices. By taking a holistic approach to address the nutritional needs of post-menopausal women, we can help to improve their health outcomes and overall quality of life.

One limitation of our study is that it was conducted in one community, which may limit the generalizability of our findings to other rural areas in Bangladesh. While we took steps to ensure a random selection of households and a diverse sample of postmenopausal women, our findings may differ from other communities with different socio-demographic characteristics. Another potential limitation of our study is the possibility of bias in our results. For example, participants may have over-reported or under-reported their dietary intake due to social desirability or recall bias. Additionally, our study relied on self-reported data on menopausal symptoms, which may be subject to reporting bias. Despite these limitations, our study provides valuable insights into the nutritional knowledge and dietary diversity of post-menopausal women in rural Bangladesh. Future studies aim to replicate our findings in other communities and address potential sources of bias to strengthen further our understanding of this population's nutritional needs and health outcomes.

5. Conclusion

This study proves a significant association between nutritional knowledge and dietary diversity during post-menopause - a state of health maintenance for a healthy passage of the end of life. The diversity of food consumption among post-menopausal women in rural Bangladesh is inappropriate. Poor knowledge of nutrition and menopause and lack of awareness can lead to disease progresses, thus advancing the clinical illness. To

maintain good health and better quality of life, regular nutrition, exercise, and knowledge about menopause and nutrition are therefore necessary.

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Conflicts of interest

There are no conflicts of interest.

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Evaluation of the Cost of Hygiene and Asepsis in the Dental Consultation and Treatment Center

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Abstract
Our study's main goal is to assess the overall cost of asepsis and hygiene procedures across all divisions of the dental consultation and treatment center. A descriptive cross-sectional study was conducted to meet this goal, and data were gathered using a questionnaire customized for the investigation. Software called SPSS was used for the data analysis. The findings of our survey have drawn attention to the significant expense incurred by the Casablanca Dental Consultation and Treatment Center (CDCT) in order to adhere to the various asepsis and hygiene recommendations. Each CDCT department is equipped with various methods for patient protection, consumables they will need, pre-disinfection, packaging, and sterilization equipment. When compared to other departments, some, like conservative dentistry and assistant and joint prosthesis, use more gloves than others. The CDCT can continue to improve the standard and cost of hygiene by applying recommendations, being organized rigorously, respecting the asepsis chain, and having management expertise.

Keywords: Cost of Hygiene Procedures, Consultation and Dental Treatment Center

1. Introduction

Dental work involves exposure to a septic environment, blood exposure, and cross-contamination for the dentist, medical personnel, and patients. (Upendran 2023) It is one of the occupations most vulnerable to respiratory illnesses like COVID-19. These dangers are actual and present at all times. (Williams-Wiles, 2019) To ensure the safety of both the patient and the medical staff, it is crucial to implement hygiene and asepsis measures. (Williams-Wiles, 2019)

Regarding the security of both patients and the medical staff, hospital hygiene is crucial. Reducing cross-contamination is the goal of these measures. Dentists are required by law to take all necessary precautions to prevent the transmission of infections in their offices, according to the U.S. Infection Control Guidelines published

by the Centers for Disease Control and Prevention, a collaborator of the International Association of National Institutes of Public Health. (Villani, 2019)(Amazian, 2006)

Due to all of these factors, implementing hygiene and asepsis measures is an ethical requirement that comes at a cost to waste management, depreciable equipment (such as an autoclave), consumable materials (such as gloves), and maintenance. A sizable financial impact results from raising the standard of care provided to the public in all healthcare facilities generally and in the CDCT specifically. Our project's objective is to calculate the total cost of hygiene and asepsis procedures at the level of the various CDCT departments.

2. Materials and Methods

Various departments of the Casablanca Dental Consultation and Treatment Center (CDCT) of University Hassan II, Morocco, participated in a descriptive cross-sectional study. We included in our survey all departments (periodontology, oral surgery, prosthodontics, orthodontics, pediatrics, endodontics, emergency) that have a sterilization room in addition to the central sterilization. Departments like the radiology department, laboratory, and reception were not included because they lacked a sterilization room and had no direct contact with patients' oral cavities. The quantity and price of personal protective equipment (PPE), consumables for dental staff and patients, medical device processing and traceability, and cleaning service outsourcing were all gathered using a questionnaire. Additionally, the questionnaire asked about the annual maintenance and waste management costs. The Community Health Epidemiology and Biostatistics Laboratory of the Casablanca Faculty of Dentistry conducted the data analysis.

3. Results

After contacting each department on the list, we found that our survey had a 100% response rate. - Personal protection equipment Dental uniforms: Information on the price and quantity of uniforms for routine tasks and surgical procedures is shown in table I. Personal protective equipment had an annual cost of 4,800 dinars and was used more frequently in operating rooms and departments dealing with oral surgery. (26,31%) Paper hand towels and solution dispensers, with global costs of 18240 dirhams and 8000 dirhams, respectively, were available in all departments. Similar to this, Departments have 779 trash cans that cost a total of 33,750 dirhams.

3.1. The patients' essential consumables

Table II shows the quantity and price of drapes, dental saliva ejectors, and dental drinking cups.
Only a small number of departments, including Emergency, Pediatrics, and Endodontics, use rubber dams. A higher rate (66,66%) of 360 boxes were consumed annually in the endodontics department. 14 400 dhs were the estimated cost per year.
-Traceability and processing of medical devices

3.2. Pre-disinfection

All departments had 5L containers of pre-disinfection liquid, with an annual consumption of 240 cans, in order to respect the hygiene and asepsis chains.
The department of emergency recorded the highest consumption rate. The price per year is 72,000 dirhams.
Table shows the number and price of pre-disinfection containers in various departments**.**

3.3. Cleaning

Brushes are used to clean dental instruments that can be used again and again. The central sterilization only has one thermal disinfector, which costs 453 000 Dhs.

3.4. Packaging

Sterilization pouches in the following sizes are used to package instruments for sterilization: (100X200), (150X200), (200X200), and (250X200). The department of endodontics recorded the highest consumption. The sterilization pouches (200x200) were the most popular and cost a total of 204 504 Dhs per year.

3.5. Sterilization

Two autoclaves that each cost 3200000 Dhs are used in the sterilization process at the central sterilization facility. Water distillers are needed for the sterilization process; our building has one for a cost of 3000 DHS. -Traceability The annual cost of the physical and chemical indicators used in the central sterilization is 1920 Dhs, and 720 packs of the Bowie-Dick test are consumed. Registers are also used for traceability, and they cost 192 DHS per year.

3.6. Rotary instruments

Each of the departments of emergency, endodontics, surgical dentistry, pediatrics, and periodontology has a DAC autoclave for rotating instruments. The cost of lubricants for rotary instruments was estimated to be 132 600 Dhs per year, with conservative dentistry accounting for a sizable portion of that cost (30.77%).

3.7. Surface treatment and biocleaning

The annual cost to the CCTD of outsourcing biocleaning is Dhs 116,832.

3.8. The Waste management

The annual cost of outsourcing waste to the CCTD is Dhs 36,924.

3.9. The cost of the Annual maintenance

The cost of the annual maintenance is 89 124 Dhs per year

Table I: consumption of professional clothing according to the services

Department	**Clothing**	**Quantity needed /year**	**The cost /year (Dhs)**	**Percentage**
		n	**n**	**%**
Endodontics	Coats	15	1350	8,77
	Scrubs	15	1875	24,19
Orthopedics	Coats	17	1530	9,94
	Scrubs	0	0	0
Removable prosthodontics	Coats	17	1530	9,94
	Scrubs	0	0	0
Fixed prosthodontics	Coats	20	1800	11,7
	Scrubs	0	0	0
Pediatrics	Coats	32	2880	18,72
	Scrubs	2	250	3,22
Emergency	Coats	8	720	4,68
	Scrubs	3	375	4,84

	Sterile disposable gowns	12	420	0,8
	Reusable gowns	0	0	0
Oral surgery: Department and surgery room	Coats	23	2070	13,45
	Scrubs	23	2875	37,1
	Sterile disposable gowns	1440	50400	96
	Reusable gowns	360	43200	48
Periodontology Department and surgery room	Coats	39	3510	22,80
	Scrubs	19	2375	30,65
	Sterile disposable gowns	48	1680	3,2
	Reusable gowns	384	46080	52

NB : n : Numbe

Table II: quantity and cost of annual personal protection consumables according to the services

	Quantity needed /year					The cost /year (Dhs)					Percentage
Department	Mask	Gloves	Hair caps	Disinfecting wipes	Hand towel	Mask	Gloves	Charlottes	Disinfecting wipes	Hand towel	
Emergencies	144	1488	48	288	144	2880	41232	8148	15840	7920	12,32
Endodontics	360	1212	120	240	120	7200	3604	20376	13200	6600	8,26
orthopedics	240	1008	12	144	216	4800	27840	2037.6	7920	11880	8,5
Fixed prosthodontics	240	1452	24	240	120	4800	40440	4075.2	13200	6600	3,21
Removable prosthodontics	480	1440	120	120	144	9600	40176	20376	6600	7920	13,72
Surgical dentistry	192	1452	48	144	240	3840	21984	8148	7920	13200	16,93
Pediatrics	240	30396	84	120	144	4800	3984	14268	13200	7920	7,16
Periodontology	192	900	96	240	216	3840	21972	16308	13200	11880	10,89
Operating room of oral surgery department	36	1212	48	36	96	720	9132	8148	1980	5280	18,06
Operating room of Periodontology department	36	312	24	36	12	720	2484	4075.2	1980	660	0,95
Total	2160	40872	624	1728	1452	43200	212848	105960	95040	79860	100%

Table III: consumable necessary for the care of the patients according to the services

	Quantity needed /year			The cost /year (Dhs)			Pecentage
Department	Drapes	Salivary cannula	Cups	Drapes	Salivary cannula	Cups	%
Emergencies	144	96	144	9024	1824	2448	9,22
Endodontics	264	120	120	16760	2280	2040	14,62
Orthopedics	180	120	72	12190	2280	1224	10,9
Fixed prosthodontics	156	24	36	5112	456	612	4,28
Removable prosthodontics	480	120	156	10536	2280	2652	10,72
Oral surgery	876	96	192	14136	1824	3264	13,34
Pediatrics	156	120	144	10536	2280	2448	10,58
Periodontology	372	144	144	17304	2736	2448	15,59
Operating room of oral surgery department	1476	48	48	9456	912	816	7,76
Operating room of periodontology department	276	24	24	3456	456	408	2,99
Total	4380	912	1080	108510	17328	18360	100

Table IV: Distribution of pre-disinfection and costs according to the services

	Department	The quantity needed		The cost (Dhs)	
		n	%	n	%
Pre disinfection container (5L)	Removable prosthodontics	1	25,00	600	25,00
	Endodontics	1	25,00	600	25,00
	Pediatrics	2	50,00	1200	50,00
Pre disinfection container (10L)	Emergencies	1	11,11	790	11,11
	Oral surgery	3	33,34	2370	33,34
	Oral surgery and Periodontology operating rooms	2	22,22	1580	22,22
	Periodontology	2	22,22	1580	22,22
	Pediatrics	1	11,11	790	11,11
Pre disinfection container (15L)	Orthopedics	2	33,33	1580	33,33
	Removable prosthodontics	1	16,67	790	16,67
	Oral surgery	2	33,33	1580	33,33
	Endodontics	1	16,67	790	16,67
Pre disinfection container 20L)	Periodontology	1	100	850	100

NB : n : Number, L : liters

4. Discussion

The price of hygiene and asepsis practices within the CCTD Casablanca departments has been made clear by this work. The response rate was 100%, demonstrating the willingness of all departments to improve resource management and utilisation. Infections called "cross infections" can develop during dental procedures. They are a significant patient health issue as well as an all-encompassing public health issue (Cali,2016). Lack of infrastructure, inadequate equipment, poor hygiene conditions, failure to follow hygiene protocols, and inadequate knowledge of health professionals are risk factors for cross infection (Allagher 2020),(Abalkhail, 2022).

The standard of care we offer to the population in all healthcare facilities in general and at the CCTD in particular requires the prevention of cross-infection. However, after every procedure, non-disposable instruments, the dental unit, and work surfaces must be cleaned and sterilized (Alhumaid,2021). We found some results in our survey that, for the most part, seem reasonable and proportionate to the number of patients and the needs of the departments. A better financial management of hygiene and asepsis measures is necessary as a result of some results being absurd.

Our findings are discussed using the SWOT analysis (Strengths - Weaknesses - Opportunities - Threats): the strict adherence to asepsis and hygiene regulations, which were applied uniformly across all departments. **Our study's strengths** are the strict adherence to asepsis and hygiene regulations that apply to all departments. All dental healthcare professionals receive coats every year, and 55% of departments had eye protection. The UK's findings, which showed that 31% of departments use goggles when the risk of infection is high, are consistent with these findings, confirming the CCTD's role in personal protection.

Hand drying is necessary for good hand hygiene. According to our findings, every department at CCTD has both solution and paper hand dispensers. These outcomes surpass those of a study conducted in Algeria at the Mustapha

University Hospital, where only 5% of departments have single-use hand towel dispensers and dispensers for paper towels. In the Mediterranean region, a multicenter study found that hand towel dispensers were present in 2.8% of cases and single-use towels were present in 16.7% of cases (Amazian, 2006). The CDTC spends 79,860 Dhs on hand towels every year. In Morocco, research conducted in a classroom setting at the HASSAN II University Hospital in Fez reveals that every 50 patients require an annual hand towel expenditure of Dhs 2,250. (Sumba,2018). An identical study done at the Ibnou Rochd University Hospital in Casablanca's intensive care unit over a period of six months revealed that the hospital spends 4,500 Dhs (10 on hand towels for every ten patients. (Obtel,2011)

The CDTC has hydroalcoholic solution dispensers in every department. Our surpass those of the multicenter study on hand hygiene tools and practices in the Mediterranean Region, which was carried out in 22 hospitals and found that only 9.5% of hospitals had dispensers for hydroalcoholic solution (Amazian, 2006). Since many departments' activities are shorter and more frequent, which calls for more hand towels, the CDTC's expenditures are justifiable.

All departments have functional and accessible trash cans. Our findings outperform those of the Nosomed Network's multicentric study (Amazian, 2006), which found that trash cans are present in 58.2% of hospitals. Predisinfection is the initial procedure used on items and materials contaminated by organic matter in order to lessen microorganisms, make it easier to clean them later, and protect people and the environment (Hassan 2017), (Aque,2018). In our building, this act is carried out using a variety of tools, including brushes and disinfectant. Only two out of Mali's four hospitals pre-disinfect surgical supplies (Traoré,2016). In Senegal, one-third of hospitals routinely predisinfect surgical supplies before sterilizing them (Traoré,2016).

Through Bowie Dick tests, sterilization quality control is carried out. The CDTC uses 720 boxes annually. In the Dakar main hospital's sterilization unit, the Bowie Dick test was routinely carried out before using the steam sterilisers each morning (Traoré,2016).

Outsourcing helped to lower the cost of the cleaning service; it cost 9736 Dhs per month, or 116832 Dhs annually. In France, the cost of hospital building maintenance is 16% less expensive than managing it internally (77 euros/m2 versus 92 euros), but this effectiveness is dependent on how well staff is utilized and how well monitoring and control are carried out (HISM,2008). A study at the Mahalapye Hospital in Botswana revealed that outsourcing cleaning costs 18 million Botswana pula (BWP), or 13.51 million Dirhams over three years (Cali,2016). According to a study done at the IBN ALKHATIB hospital in Fez, Morocco, the annual budget for cleaning services is 547,000.00 Dhs (Choubani,2010). These outcomes are better than those in the CCTD.

5. The Weaknesses

Our study's findings point to an uneven distribution of consumption and activity within some CDTC departments. For instance, some departments, particularly prosthodontic departments, use a lot of gloves relative to the number of procedures they perform (40 176 Dhs/year). The procedures in these departments require multiple sessions to complete a single act, which results in additional glove consumption. In contrast, procedures in the emergency department are completed in a single session. According to a study at the Multidisciplinary University Hospital in Turkey, non-sterile glove costs exceed 468,163 DHS annually (YIGIT,2016).

The Ministry of Health covers the cost of the CDTC staff's annual hepatitis B vaccination.The prevalence of vaccination against viral hepatitis B is approximately 94% in developed nations (Cantineau,2002). Based on voluntary participation, 62% of medical professionals in our nation have received the covid vaccine (Khalis,2021), and 64% have received the hepatitis B and C vaccine (Laraqui,2009). At 94% among nurses and 71% among doctors at the Marseille Regional Hospital (Laraqui,2009), this rate is higher than that seen in Nigeria (5%), but much lower than that reported in nations where vaccination is required. (Laraqui,2009)

6. Threats

The results of our survey can be attributed to students' inexperience and lack of instruction in the management of consumable materials. These findings suggested that in order to optimize the use of resources in the CCTD, management training programs should be implemented among the medical and paramedical staff.

A study of 100 dental students found that only 8 had a good understanding of hand hygiene practices, while 77 had a moderate understanding and 15 had a poor understanding (POOJA,2016). According to Khairun Nisa et al., while 25.4% of students had moderate knowledge of hand hygiene, 74.6% of students had good knowledge. 100% of respondents practiced good hand hygiene, and 50% of them followed the suggested guidelines (Khairun,2023).

The medical care plan system (MCPS), which causes an imbalance between the hospital's expenses and revenues, should also be taken into account. This is so because more and more patients are receiving benefits from the MCPS, while all patients—paying or not—are subject to the same application of hygiene measures.

7. Conclusion

The results of our survey showed how costly it is for the CCTD to adhere to various asepsis and hygiene recommendations around the world. You can't Put a Price on Health has become the guiding principle for everyone, including patients, practitioners, health organizations, and the medical community. The following recommendations have been made in light of our findings: - Recognize professional management and management weaknesses, and hire management experts to improve the management of various CCTD resources. - Identify opportunities and long-term strategic directions for the development of the CCTD. - A change in and improvement of work practices. This transformation is only possible with the support of ongoing training for both students and medical staff, as well as widespread participation because it affects everyone.

To ensure the long-term upkeep of the CCTD, cultivate a sense of ownership among the instructors, practitioners, students, and personnel assigned to various posts and departments. Involving professionals in seminars on the economy of consumables to educate them on how to use resources more wisely and cut back on consumption while also raising awareness of costs. - Trying to educate sterilization personnel to improve stock management

Conflicts of Interest

The authors declare no conflicts of interest.

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The Effectiveness of Education Through "Pregnant Mother Family Class" on the Selection of Birth Attendants

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Abstract
As many as 20% to 50% of maternal deaths occur during labor. In Indonesia, in 2015, 62% of deliveries were attended by a traditional birth attendant. Many teenage pregnant women have not been educated and bestows decision-making of birth attendants for baby delivery to their families. This study aimed to analyze the effectiveness of family classes in selecting a birth attendant. The study was held in July-October 2019 in Bogor; phase I used a cross-sectional design involving 90 pregnant women, analyzed using the model logistic regression test. Phase II: quasi-experimental design, a sample of 34 people for each intervention and control group, chosen not randomly. The intervention group provides education about pregnancy, childbirth, and the selection of birth attendants. The statistical test used Wilcoxon and Chi-square tests. The mother will select a health officer as a birth attendant if the perceived value of the birth cost is cheap, she has adequate family support, and she has a family with better knowledge. Factors that influence the selection of birth attendants are cost, family support, and knowledge. The family classes effectively improve the selection of health officers as birth attendants. Implementation of health education should involve the family.

Keywords: Class Family, Support Childbirth, Birth Attendant

1. Introduction

Indonesia has the highest Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) in Asia, number three and four in ASEAN. In 2015, MMR reached 305 per 100,000 live births. At the same time, IMR got 22.23 per 1,000 live births. The data shows that MMR and IMR in Indonesia are still far from the SDG target set, which in 2030 must be 70/ 100,000 live births for MMR and 25/ 1,000 live births for IMR (Kemenkes RI, 2019). For this reason, we need serious efforts to achieve these targets through childbirth by health officers. In Indonesia, health officers' delivery assistance decreased from 90.88% in 2013 to 88.55% in 2015, whereas the national target of delivery assistance by health officers was 95% (Sutardji et al., 2017). The aim of delivery assistance by health officers is to make complications in pregnancy, childbirth, and childbirth able to be identified and referred to quickly and accurately (Kemenkes RI, 2018).

According to the results of Amalia's research, there is an influence between the mother's education, the mother's knowledge, distance to the place of health care, social culture, and family income with the selection of birth attendants (Amalia, 2013). Meanwhile, according to Simanjuntak, attitude and culture were the factors that most influenced the choice of the behavior of birth attendants (Simanjuntak et al., 2013). Notoatmodjo also stated that the factors that influence health behavior include knowledge, and the most dominant are environmental factors (Notoatmodjo, 2012). Based on this, we should increase maternal knowledge to increase the delivery of assistance by health officers. According to the West Java Provincial Office report, in 2018, 98.96% of Primary Health Centers implemented maternal classes to increase the knowledge of pregnant women. Still, the participation of pregnant women in joining the class was low at 37.59% (Jabar, 2017). Whereas for the Bogor district, the proportion of participants of pregnant women in that class is only about 18% (Bogor, 2018).

Many pregnant women in their teens have not been exposed and leave decision-making about childbirth assistance to their mothers and their in-laws. Based on data from the West Java Provincial Health Office, more than 50% of marriage ages occur at less than 20 years, at risk of pregnancy (Bogor, 2018). Besides, in that age range, there is no independence and readiness to deal with pregnancy, childbirth decision-making, and infant nutrition. So that decision-making is taken over by parents or family. The research's novelty is the education provided to the family based on analysis in the first phase.

2. Method

This research was held in Bogor District, involved in Kemang and Cijeruk Districts, in August-December 2019. The interventions provided were education about pregnancy, childbirth, and birth attendant selection. The intervention took place for three consecutive days. The time needed in each class is 60 minutes; the class schedule depends on local conditions. The control group was given a pre-test in trimester III and a post-test after baby delivery. The research location is In Kemang and Cijeruk sub-districts, Bogor district; there is still a traditional birth attendance active in helping childbirth. Some people there still believe in traditional birth attendance, commonly called "Paraji." Marriage under 20 is also typical, increasing the risk of maternal and infant morbidity and mortality. This study population is the mother in the third trimester and lives near or with family (biological parents, in-laws, or husbands) in Bogor District.

Phase I: The sample was 90 respondents. Sampling was done by purposive sampling in select sub-district where there are still TBA active in helping childbirth. With inclusion criteria:

1. Third-trimester pregnant women
2. Living near or with mothers-in-law/ biological mother/ husband

Phase II: The sample was 68 respondents. The sampling technique was done by purposive sampling, with inclusion criteria:

1. Husband/parents/in-laws who have children
2. Have a pregnant family member in third-trimester
3. Family members usually play a role as decision-makers in family health
4. The subject can read and write and participate in activities for three days.

The study is divided into two phases. The first phase aims to analyze the factors contributing to the choice of labor behavior, cross-sectional. Independent variables include age, parity, education, knowledge, occupation, distance, labor costs, family support, and health officers' support. The dependent variable is the choice of birth attendant. The determinant factors for selecting birth attendants are used as variables to intervene in the second phase of the research class family class. The second phase aims to analyze the effect of family class on the choice of birth attendance. The study's design is a quasi-experiment; research subjects divide into two groups; the intervention and the control group are chosen non-randomize. Phase II research aims to analyze the effect of family class on the choice of labor. The design of the study *experimental* with the non-approach-*equivalent group design,* research subjects were grouped into two groups, namely the intervention group and the control group chosen not randomly. In the intervention group in the form of a family class, education was given about pregnancy, childbirth and the selection of labor.

	Pretest	Family Class	Post test
groupFamily Class (P-1)	01	X	02
Control Group (P-2)			03-04

Description:
1. pretest family
2. classes:Post-test class
3. family:pretest
4. control:Post-test control

x: Intervention

The interventions provided were in the form of education about pregnancy, childbirth and labor force selection. The intervention took place for 3 consecutive days. The material provided is about pregnancy, childbirth and the selection of labor. The time needed in each meeting is 60 minutes, the implementation schedule is adjusted to local conditions. For the control group, it was given 1 test at the beginning of the activity and 1 time at the end of the activity. This research was conducted in the Districts of Kemang and Cijeruk, Bogor Regency. This research was conducted from April to December 2019

The questionnaire's validity-reliability test in this study provides to 30 pregnant women at the midwife clinic in Bogor district. The results of the data validity test were r> 0.3 and p> 0.05. Phase I was analyzed by the Logistic Regression Model. Phase II was analyzed by a non-parametric test with the Wilcoxon test. Meanwhile, to determine the family class's effectiveness with the selection of birth attendants tested with chi-square.

The study was conducted after obtaining ethical clearance from the Health Research Ethics Committee of the Ministry of Health of Bandung on July 29, 2019, with letter number 27/KEPK/PE/VII/2019. Subsequently, participants were informed about the purpose of the study, and they had the right to discontinue or refuse to participate. In this study, the researchers obtained written consent from respondents. Researchers guarantee the confidentiality of research data.

3. Results

Based on Table 1, from 90 respondents, 75,5% of respondents aged 20- 35, with last education in a junior high school (37,7%), have an income above the minimum wage (84,4%). Most respondents get excellent support from family (60%) and health officers (80%) and experience deliveries assisted by TBA (56,7%). In District Bogor, Traditional Birth Attendance-TBA is called Paraji. Most respondents house near health facilities (56,6%) and perceived that health officers' healthcare costs are cheap (74,4%). Respondents also have excellent knowledge (68,8%) and attitude (86,7%). Besides, most respondents plan to select health officers as birth attendants in the next delivery.

Table 1: Bivariable Test Results

No	Variable of		Birth Attendance		Total	P
			TBA	Health Worker		
1	Education	Elementary School	23	20	33	0.373 *
		Junior High School	18	16	34	
		Senior High School	10	9	19	
		University	0	4	4	
2	Age	<20	1	4	5	0.998 *
		20-35	42	26	68	
3	Family income	<UMR	8	6	14	0.969 **
		> UMR	43	33	76	
4	Distance to Health Facilities	Far	27	12	39	0.029 **

No	Variable of		Birth Attendance		Total	P
			TBA	Health Worker		
		Near	24	27	51	
5	Family Support	Poor	28	8	36	0.001 **
		Excellent	23	31	54	
6	Health Care Support	Poor	16	2	18	0.002 **
		Excellent	35	37	72	
7	Perceptions of Cost of Labor by Health Workers	Expensive	20	3	23	0.001 **
		Cheap	31	36	67	
8	Knowledge	Less	8	20	28	0,000 **
		Excellent	19	43	62	
9	Attitude	Poor	12	0	12	0.001 **
		Excellent	39	39	78	
Total			51	39		

Note: * Kolmogorov Smirnov Test ** Chi Square Test

Analyzed data by Kolmogorov Smirnov and the chi-square test show that variables with p-value <0.25 are the variable perception of distance, family support, health support, perception of the cost, and knowledge and attitude towards health officers as labor assistants. These variables included multivariable analysis.

Table 2: Multivariable Analysis

Variable		Coefficient	P	OR (IK95%)	
1	Family Support	.006		.193	1,645(0.060-0.625)
2	Knowledge	.025		3,859	1,350(1.180-12.614)
3	Perceptions of health officer's Labor Costs	-1 671	.028	.188	(0042-0836)
4	Constant	.641	.121	1897	

*logistic regression

From the logistic regression test (Table 2), results in the variables that influence the selection of birth attendants are family support, knowledge, and perceptions of labor costs by health officers. From that can make the equation:
Y = 0641-1671 (fee) +1645 (family support) + 1.350 (knowledge)
Variable fees, family support, and knowledge improve health officers' selection of birth attendants. In the family class, we can increase knowledge about the importance of pregnancy and its risks because the assistance for delivery by the health officer can minimize mortality and morbidity.

3.1. Phase II

3.1.1. Characteristics of the Research Subjects

In Phase II, from 54 respondents (each group 27 respondents), most respondents old more than 35 years (67,6%), had the last elementary school education (67,6%), and they have families who had just given birth in the "Paraji" (41,2%). From chi-square test results shows that age and family education do not affect the choice of delivery of pregnant women with a p-value of more than 0.05 each.

3.1.2. The Changes of Knowledge and Attitude After Family Class

There was a decrease in the post-test mean score of 0.41 compared to the pre-score of knowledge in the control group. There was an increase in the mean value of 3.94 points from the pre-test value in the intervention group on the post-test score. Table 2 shows that family class significantly influences increasing family knowledge with a value of p <0.05.

Table 3: Change of Knowledge and Attitude in Each Group

No.	Group		N	Median (min-max)	Mean±SB	p
Knowledge						
1	Control	Pre-test	34	18 (11-24)	18.41 ± 4,445	0,900
		Post-test	34	18 (10-24)	18.00 ± 4,005	
2	Interventions	Pre-test	34	20 (13-23)	18.71 ± 3,636	0.003
		Post-test	34	23 (16-25)	21.94 ± 3.071	
Attitude						
1	Controls	Pre-test	34		17 6 (5-8) 6.47 + 0,800	
		Post-test	34	6 (5-8)	6.87± 0.800	
2	Interventions	Pre-test	34	7 (6-10)	7.53± 1,463	0.001
		Post-test	34	10 (7-12)	9.29 ± 1,312	

* Wilcoxon Test

In the control group, the average post-test attitude increased by 0.40 compared to the p-value. Whereas in the intervention group, the post-test attitude value increased by 1.76 points from the pre-test value. Table 3 informs us that the class of family class has a significant influence on improving family attitudes with a value of $p < 0.05$.

3.1.3. The Influence of Family Classes on Family Knowledge and Attitude

Based on Table 3, the average post-test knowledge values between groups intervention and control amounted to 3.94, with a $p < 0.05$, so there is a significant influence between the family class with changes in family knowledge.

Table 4: Effect of Family Class on Knowledge and Attitude

No	Group	N	MedianKnowledge	Average±SB	P
Knowledge					
1	Control	34	18	18.00 ± 4,005	0.014
2	Intervention	34	23	21.94 ± 3.071	
Attitude					
1	Control	34	6	6.87± 0800	0.000
2	Interventions	34	10	9.29 ± 1,312	

* Mann Whitney Test

Table 4 describes the mean post-test attitude values between the intervention and control groups were 2.42, with a $p < 0.05$, so there was a significant influence between the families of pregnant women and the changes in family attitudes towards health officers at birth assistants.

3.1.4. Effect of Family Class on The Selection of Birth Assistance

Table 5: Effect of Family Class on The Selection of Birth Attendance

No	Variable	Birth Attendance		Number	p
		TBA	health officers		
1	Control	15	19	34	0.038 *
2	Intervention	7	27	34	

* Chi-square

Table 5 shows that 15 pregnant women in the control group whose families did not attend the Family Class still chose traditional birth attendants. In the intervention group, of the 7 subjects, as many as 27 people had selected

health officers as birth assistants. The family class significantly affects the selection of birth attendance with a p-value <0.05.

4. Discussion

4.1. Phase I

From the equation of logistic regression analysis, the selection of birth attendance depends on the perception of birth cost, family support, and knowledge. The mother will choose health officers as birth attendants if the mother perceives that cost is cheap; family support and knowledge are excellent.

According to Ghazi's research, socio-cultural and familial reasons influence some women to choose childbirth at home and hesitate to seek professional emergency care for complications (Ghazi Tabatabaie et al., 2012). This opinion is also consistent with the results of Moyer's research, which states that the characteristics, immediate social circle, the community, the closest facilities, and the context of the country in which pregnant women live influenced their healthcare choice for childbirth (Moyer & Mustafa, 2013). Where one of the immediate social circles is a family. So, one effort to improve maternal health status is through family education. Health workers should provide understanding, information, and counseling to patients and create a support system that supports patients to change their behavior, for example, by involving family as one of the factors influencing a person's health behavior.

In this study, the cost is one factor that influences the selection of birth attendants. Cost is closely related to economic factors. This study's results are consistent with Fotso's study, which states that economic factors hinder pregnant women from accessing health services (Fotso et al., 2009). The same was also expressed by O'Brien, who stated that pregnant women chose labor by traditional birth attendance rather than health officers because of considerations to save more costs (O'brien et al., 2010). For people with middle to lower economic status, the price of childbirth assistance by paraji is much more affordable. So sometimes they forget about the risks due to this choice.

In this study, knowledge also affects the choice of birth attendants. This condition follows the results of research obtained by Siswanto et al. Stating that the higher the mother's level of knowledge, the more likely she is to choose labor by health officers. Kabakyenga also stated that maternal knowledge about the danger signs of childbirth would improve maternal preparation in the face of childbirth (Kabakyenga et al., 2012). The preparation includes costs, equipment for delivery, contact health personnel who assist in childbirth, and transportation to reach health facilities (Juliwanto, 2009).

In addition to cost and knowledge, family support is also an influential variable in selecting birth attendants. So health officers need to increase family support through family classes of pregnant women. The results of this study are consistent with Alhidayati's study, which states that the behavior of mothers choosing health officers is related to knowledge, attitudes, socio-cultural aspects, access to health facilities, and family support (Alhidayati & Asmuliyanti, 2016; Nurfurqoni & Nuryati, 2020).

According to the research of Astuti et al. in 2014, childbirth by traditional birth attendance costs is affordable because they are voluntary and can be in the form of goods, so mothers choose TBA. Besides, the support of the husband and family is quite strong in the selection of birth attendants (Astuti et al., 2014). So it is crucial to increase family support for births assisted by health officers. This statement is consistent with Kabaknyenga's research, which states that the spouse/family makes 56% of decisions regarding location/birth attendants.

This phase 1 study will be the basis for phase 2 research. In phase 2, research increases family knowledge regarding pregnancy, childbirth, and the benefits of childbirth. It is assisted by health officers and emphasizes that the more expensive delivery costs for health officers are comparable to the benefits of mothers in the delivery process. Especially now, they can use universal insurance coverage, "BPJS," to finance the baby delivery process.

4.2. Phase II

Coverage of delivery assistance by health officers must be optimal to identify cases of high-risk pregnancies and delivery complications quickly and accurately (Notoatmodjo, 2012). Theory Lawrence Green reveals behavior related to the utilization of health services which is determined by three factors, namely: predisposing factors manifested in knowledge, attitudes, perceptions, beliefs, socioeconomic, and education level; enabling factors such as a person's ability to obtain health facilities both from the ability to pay financially and from the availability of health facilities; and reinforcing factors that manifest in the attitudes and behaviors of people closest such as family/relatives (Notoatmodjo, 2012).

According to Kabaknyenga's research, age and education influence knowledge and childbirth preparation (Kabakyenga et al., 2011). Education aims to increase knowledge, where education, both formal and non-formal such as Family Classes. The expectation is that families who have attended the Family Class have excellent knowledge in making health decisions, especially in supporting mothers in choosing the proper birth attendants. Family Classes are held, paying attention to andragogy principles, participant-oriented, and learning by doing (RI & Pokjanal Posyandu Pusat, 2011).

It empowers the community through the Family Class to support the selection of birth attendants. This Family Class consists of a series of activities aimed at giving the family the ability to support mothers choosing health officers as birth attendants and also postnatal care. This activity consists of 3 meetings.

In this study, one person in the intervention group still chose TBA as a laborer. The interview results revealed that the mother decided to be accompanied by paraji because it was her fifth pregnancy, and the baby was born before she had time for the midwife. In the control group, nine people still chose Paraji as birth attendants. They decided on Paraji because Paraji helped their family from generation to generation, and there had never been any complications. They are more comfortable giving birth in Paraji because they are more patient than health officers (Nurfurqoni & Nuryati, 2020). The reason for choosing TBA as birth assistance is that many families still trust the TBA (Nuryati & Nurfurqoni, 2021). Based on Rochayah's research in 2012, they have assumption that TBA services are more comprehensive, friendly, and can pay less. TBA is hereditary, authorized by the community to help with childbirth, and charismatic and respected. Besides that, TBA is also willing to provide services or treatments before-after giving birth to local customs and culture. Paraji, who helps as a childbirth assistant at home, is paid by the family according to ability, not necessarily in the form of money but can also use chicken, rice, or other agricultural products voluntarily (Rochayah, 2012). Selection of the birth attendant is crucial. Not only in the delivery phase but also continues in the health of the mother in the postpartum period. Research results in Bogor Regency show a relationship between traditional birth attendant assistance and culture on maternal independence and self-care during the early postpartum period (Nurfurqoni & Nuryati, 2020).

For this reason, midwives should duplicate paraji in terms of patience, while for cost constraints, there is universal coverage, "BPJS," for childbirth. As for the problems, people in the village usually did not have an identity or family card and did not register their marriage, making it challenging to administer BPJS. Even though midwives at the Primary Health Care (Puskesmas) and the clinic usually remind mothers to administer identity, family, and BPJS cards from the first contact with pregnant women.

Austin's research states that they may contribute to the first delay (seeking care) if women lose the confidence that they will receive needed obstetric services in a timely fashion by attending a facility (Austin et al., 2012). Likewise, with Prastiwi's research results, the decision to choose TBA was made by family members of the laboring woman, and TBA's charisma influenced this choice (Prastiwi et al., 2016). As a developing country with various geographical conditions, Indonesia must educate families as a support system for maternal and child health decision-making. Other variables that have a significant relationship with the choice of delivery attendant behavior are knowledge, health officers' role, and class support of pregnant women (Rochayah, 2012). For this reason, increasing group support, such as family support, in selecting birth attendants is urgent.

In the Cijeruk sub-district, there are still several Paraji who are active in helping with childbirth. Most of the respondents who live in Cijeruk give birth, assisted by Paraji. The reason is that the TBA has helped their families down. This reasoning is consistent with Adatara's research, which states that these women's cultural beliefs greatly affected their decision to deliver at home (Adatara et al., 2019). Besides, their place of residence is closer to the TBA. They also assume that if there are no problems during pregnancy, childbirth is naturally helped by Paraji because of more familial and cheaper financing. Based on the Triratnawati study, the socio-cultural aspect of pregnancy and delivery practices still exists in developing countries. The TBA's render different services to fulfill their social obligation rather than for economic gain (Triratnawati et al., 2016). In Indonesia, there was a partnership program between midwives and paraji. This program aims to solve the problem of the number of Paraji-helped childbirth. In this partnership, midwives and paraji work together to help with deliveries. Paraji accompanies the mother and the midwife to help with the delivery. Nevertheless, there are still many paraji who still help with childbirth.

According to Titaley's research, some mothers choose to be assisted by TBA and home delivery compared to midwives in the village because there are two leading causes: physical distance and financial limitations (Titaley et al., 2010). Thus, it is crucial to continue to form supporting systems in the form of educated families. Pregnant women cannot make their own decisions correctly if there is no support from the family, especially husbands, mothers, or mothers-in-law. Moreover, there is a culture of "pamali" that may not refute parents'/husbands' words or instructions.

4. Conclusion

The factors that influence the selection of birth attendants are cost, family support, and knowledge. There are differences in the knowledge and attitude before and after the implementation of the family class. Family class is effective in improving the right selection of birth attendants.

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‘European Intelligence’ From the Perspectives of Cognitive Psychology-Neurobiology: Why are the Europeans what they are Today?

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Abstract
Black women and Black men gave birth to white children who suppose to be brothers to Black children. But over thousands of years in isolation, white people developed fictitious theories to make themselves look different and distinct. The Neanderthals they tend to associate themselves with through sexual contact left no civilization, so it is difficult to judge the outcome of this sexual relationship. While the paintings in the caves in modern France look suspicious, Black people, on the other hand, built civilizations all over the planet: Ancient Egyptians, Nubians, the Incas, Ancient Rome, Mesopotamia, Indian Dravidians, etc. Evidence from history through the Roman Empire shows that White people were human beings like all others and, therefore, they did not treat them differently. The investigation used cognitive psychology and neurobiology perspectives to explain the successful experiences of Germanic tribes and the Slavs in Central Asia. The theoretical investigation uses existing data and argues that they are not distinct though there had been a mixture of genes with some tribes in Central Asia. Europeans' use of their local languages and the employment of scientific theories and methods of inquiry have something to do with their intelligence and overall success in the world. The relegation of the religion's authority and the replacement with reason and science methods has enabled Europeans to become successful with cognitive intelligence. Intelligence has something to do with knowledge acquisition with the blood language and sciences in imbibing knowledge. Where human beings use their local languages and the addition of the methods of scientific inquiry, there will be marginal differences in intelligence acquisition. The discoveries the researchers Paul Broca and Carl Wernicke made with neurobiology show that language speaking is a complex human phenomenon that human beings should take seriously in daily discourses. No wonder it gave the Europeans unique problems when they had to depend on Latin to imbibe knowledge and use it to carry out responsibilities. Intelligence has something to do with the blood language, local language, or culturally provided language in imbibing knowledge in the physical world. Scientific theories and appropriate scientific methods should be driven by the use of Mathematics and logic. Emerging technological societies, such as China, Malaysia, Singapore, etc., testify to these modern methods of reaching progress in education.

Keywords: Barbarian Archetype, Broca's Area, Cognitive Psychology, Collective Unconscious, Europeans, Genetic, Handicap, Injuries, Neurobiology, Neurological Disorders, Psychedelic Drugs, War Neanderthals, Wernicke Area

1. Preamble

Recent studies have established that the Europeans (commonly known as Homo sapiens, which means ‘wisdom’ or ‘uses thinking to solve problems’) originated and migrated from Africa and certain parts of India to stay in the

Asian prairies for several thousands of years (around 40 000)[1]. During their nomadic lives, Europeans accumulated enormous experiences that had something to do with their success in the present world. We can explain some important events of these experiences from Cognitive Psychology and Neurobiology perspectives.

The genetic hypothesis that they mated with Neanderthals, an ancient archaic species in the primordial period, and, as a result, acquired their favorable genes have not been disputed. But even these experiential contacts that resulted consequently in sexual intercourse could not explain their success and adaptation in the world because the Neanderthals, as archaic species, left no civilizations that could aid us in deciding the positive outcome of the experience of the contact[2]. Earlier, some renowned authors noted that the Europeans had not shown any 'superior intelligence' when they emerged from their thousands of years in isolation in central Asia. Because they could scarcely read or write when they encountered the Romans, their masters, who had built superb civilization in Europe. This was later to help tame them from their brute behaviors and cultural practices, which they had acquired from encountering the Nomadic tribes of Central Asia and Europe.

In this paper, we shall set forth the different hypotheses which will help us explain why the Europeans, specifically the Germanic tribes and the Slavs, who were known as the barbarians, have achieved remarkable success in the present world. These explanations will encourage us to assert that though they had encountered different nomadic tribes such as the Huns, the Ancient Romans, and other less well-known tribes as they moved back to Europe (formerly North Africa), none of these aided them to adapt more than the scientific-blood language hypothesis, which opened doors and other avenues such as imbibing and "stealing" of ideas and technologies from the East and West that comprise the modern world. The Religious Reformation in Germany that later spread across Europe and the scientific revolutions capacitated modern Europeans during the last 600 years ago to make strides and invest in efficient scientific institutions and innovative banking systems, which have yielded stupendous outcomes for these adventurous human beings.

2. A Neurobiology Theory: The Handicap Theory

Despite their insistence on having mated with the archaic tribes, such as the Neanderthals, the Europeans were primitive and engaged in all manner of evil practices that were practiced in Africa and other cultures around the globe. In this context, they could not have regarded themselves as more civilized than all others. They were in gutters like all other human beings that sacrificed humans to their petty gods and depended on the same gods for their survival against misfortunes. But it seems they had one disadvantage that later turned out to become an advantage in disguise. This had been inherent in them due to their genetic makeup, which we consider to be statistical rather than deterministic law. Genetically, they lacked melanin. This is a broad term for a group of natural pigments found in most organisms. Melanin pigments are produced in a specialized group of cells known as melanocytes.

There are five basic types of melanin: eumelanin, pheomelanin, neuromelanin, all melanin, and pheomelanin. The most common type is eumelanin, of which there are two types— brown eumelanin and black eumelanin. Eumelanin is produced through a multistage chemical process known as melanogenesis, where the oxidation of the amino acid tyrosine is followed by polymerization. Pheomelanin, which is produced when melanocytes are malfunctioning due to the derivation of the gene to its recessive format is a cysteine-derivative that contains polybenzothiazine portions that are largely responsible for the red or yellow tint given to some skin or hair colors. Neuromelanin is found in the brain. Research has been undertaken to investigate its efficacy in treating neurodegenerative disorders such as Parkinson's [3].

Europeans lacked black melanin which meant that they were not naturally strong as all others that had the black pigment in them. Their bone is understood to be about roughly 20% weaker than the normal African or those other human beings that possess the black pigment. We are tempted to hypothesize that due to this lack, their strength had to be compensated with the good use of their brains in thinking and making small decisions that need the use of strength. Here, we could take a case from the female organ called 'the Clitoris' as an example.'

The Clitoris hypothesis states that when this organ which has the most important role as a sensitive organ that gives the woman apex sexual stimulation and satisfaction is cut or severed by doctors through circumcision, the sexual sensitiveness does not go away. The sensitive feelings escape to other parts of the female body, such as within her thighs, around her labia, around her neck, or deep inside the vagina. Thus, though this woman could no longer experience her g-point at the severed clitoris, compensation is gained, which does not make her lose the sexual stimulation and the enjoyment she receives as a functioning woman [4].

The bigger brain hypothesis is attached to the handicapped hypothesis. Here, it is surmised that due to the migration experiences, the Europeans ingeniously had access to good food in the form of assortments of vegetables that were nutritious and abundant meat, which furnished them with proteins and other essential mineral sources for their development of intelligence. Dairy products helped them to obtain milk and cheese, which yielded them bone strength because of the calcium contents they gained regularly. Scientists have confirmed the bigger brain hypothesis many years ago as authentic which is estimated to be the right source of European intelligence rather than any form of mutation that occurred in their genes. But still, others disagree with it. Recently, the Chinese and Japanese heads have undermined this theory, so now they speak of white or grey matter. Einstein and a few other geniuses had more of these substances than the average head [5, 6].

Same As the All Others Hypothesis. This is additional research that has shown that t*he genetic makeup of all human beings is the same. It was conducted by international researchers and later reported publicly in the White House, Washington DC, AD 2000 found this important information. That "all human beings are 99.99% the same at the DNA level and the remaining 0.1% genetic variations that exist seldom segregate in a manner that conforms to the racial boundaries constructed by social political means" (White House, June 2000)* [7, 8].

It, therefore, does not seem complicated to employ the *Clitoris hypothesis* in the context of the handicapped theory as some studies among ordinary handicapped in general have shown to provide them minor advantages in making careful decisions about anything they accomplish as they are always conscious of this disadvantage when they have to embark on carrying out any function that pertains to their survival or existence.

3. Cognition and the Nomadic Tribe Hypothesis

Europeans in Central Asia found themselves among diverse tribes whose way of life was primitive and barbaric. These Asian tribes were Mongols, Kazaks, Uzbekistanis, Afghans, Pakistanis, Tajiks, Chechenia, Kyrgyzstan, and some minor Chinese tribes. They received immense distractions because of the confusion they experienced in the environments. These hindrances did not help the Europeans to develop any proper civilization when they sojourned among these barbaric nomadic tribes in the central part of Asia. Except for the Chinese tribes that were more civilized, these nomadic tribes were cruel and primitive, and constantly used barbaric wars, domination, and kidnapping to distract them from either learning writing or developing civilized culture. The lifestyles of these diverse tribes were extreme barbarism and toughness, which the Europeans had to endure constantly in this hectic milieu.

Presently, the dominant behavioral characteristics of the Russian tribes allow us to visualize what happened in those periods as we witness the modern wars between the Russians and its neighboring tribes/countries, such as Ukrainians, Georgians, and Chechenia people. History has recorded a clear picture of what it looked like in Central Asia. Several tribes knew no civilized way of living; they had to move from one place to another with their cattle herds, and while not planting for food, they performed other chores that prevented other people to live and to develop a stable cultural life. In short, Central Asia saw later the emergence of the Huns, Mongols, Kazaks, etc., who exhibited cruel manners with dealing with their kidnaped tribes, toughness and barbarism, lacking civilization and civic manners, brute, etc. These different groups of people that one can describe as living in hordes gave no peace and tranquility minds to the Europeans. So, in the end, the latter imbibed their way of life, which did not help them as a people [9].

This manner helped them to acquire cognition, that is, mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. But this form of cognition was primitive like all other groups of people because it was not advanced and it was without science and its special method of inquiry.

4. Transformation Period: The Roman Empire Hypothesis

The Germanic Tribes and some Slavs' migration to Europe (formerly North Africa) have been described to be the result of wars between some of these dominant tribes in Central Asia. In particular, the names of the Mongols and Attila the Hun had been mentioned. Their appearance in Europe brought with them these same tribes who were out there to fight for booty and material things. They continued to exhibit cruelty, barbarity, toughness, and domination characters. Some authors have described their appearance in Europe as extreme hunger due to famine. Because of their nomadic life, they hardly planted and cultivated crops and vegetables of different sorts, so it was not our place that they were looking for a place to plunder and satisfy their thirst and hunger because of the prolonged famine that occurred in Central Asia due to drought.

Meanwhile, in Europe and North Africa, the Mediterranean Regions right unto Spain and the Atlantic Coast, the Romans, the Civilized Masters of Europe, had conquered many tribes and subjugated them into vassal states. The emergence of the Germanic Tribes and the Slavs brought an influx into the Empire and commenced to cause chaos to this well-developed civilization. The Romans began to fight these different tribes whom they called “Barbarians” due to their uncultured manners and the cruel manners they dealt with their captors as they waged their copious wars. The Europeans mimicked the same manners Central Asian Tribes did to their captors or slaves, so the Romans could not see any way of amalgamating them into their Empire. They regarded them as outsiders and did not allow them to enter these orderly-mannered societies in the civilized Roman Empire.

Notable Roman authors and generals have described the entrance of these Germanic tribes and some Slavs into the Roman Empire. Centuries passed after another while successive conquests of the tribes occurred in Europe. These tribes were named as follows. The western German tribes consisted of the Marcomanni, Alamanni, Franks, Angles, and Saxons; while the Eastern tribes that inhabited the north of the Danube consisted of the Vandals, Gepids, Ostrogoths, and Visigoths. The Alans, Burgundians, and Lombards are less easy to be identified. As a linguistic group, modern Germanic peoples include the Afrikaners, Austrians, Danes, Dutch, English, Flemish, Frisians, Germans, Icelanders, Lowland Scots, Norwegians, Swedes, and others (including diaspora populations, such as some groups of European Americans). The Vikings are also a Germanic tribe. The Vikings were one of many different Germanic peoples. There are three major branches of Germanic languages: East Germanic, West Germanic, and North Germanic. The most violent Germanic tribe was the Chatti. It was the Germanic tribe that became one of the most powerful opponents of the Romans during the 1st century AD of the Roman Empire. During that period the Chatti expanded from their homeland near the upper Visurgis (Weser) River, across the Taunus highlands in the Moenus (Main) River valley, defeating the Cherusci and other neighboring tribes [10].

But during Emperor-Philosopher, Marcus Aurelius, who is known as the most educated and polished emperor Rome ever had, the Germanic tribes were finally accepted officially into the society of ***the civilized Roman people***, and so they had the opportunity to learn the Roman Civic Education, Roman Laws, and Institutions, Roman Mannerism, Taming to desist from being barbaric and cruel, Settling down, they learned strategic War techniques and Weapon Building, positive Behavioral Characteristics, and unique amalgamation.

The **Pax Romana** (Latin for 'Roman peace') is a roughly 200-year-long timespan of Roman history which is identified as a period and as a golden age of increased as well as sustained Roman imperialism, relative peace and order, prosperous stability, hegemonial power, and regional expansion, despite several revolts and wars, and continuing competition with Parthia. It dates traditionally as commencing with the accession of Augustus, founder of the Roman principate, in 27 BC and concluding in 180 AD with the death of Marcus Aurelius, the last of the "Five Good Emperors." [11]

The most important legacy of the Roman civilization is still felt today in Western culture in areas such as government, law, language, architecture, engineering, and religion. Many modern-day governments are modeled

after the Roman Republic. Others talk of the five legacies of the Roman Empire and the Roman civilization as were made in art and architecture, technology and science, medicine, literature, language, religion, and law.

5. Science and Blood Language Hypothesis

5.1. Languages and Reading

Europeans became assimilated into the emerging cultures of Europe, but as a rule, the Latin language was used in academic circles and other major centers of learning. The Christian Church, which had power in these learning centers required that this Latin language was the one they used in imbibing knowledge and carrying out responsibilities. So, in the Ecclesiastical Church and the Universities, only a few people could read, write, and comprehend. This condition resulted in major problems concerning illiteracy and indescribable ignorance in the European centers of culture. A change from the Latin language to their various languages as tools or instruments in imbibing knowledge helped the European citizens to spearhead the Enlightenment that banished ignorance and illiteracy from among the mass population.

In *The Establishment of the Select Society for Promoting the Reading and Speaking of the English Language in Scotland, 1761* an Extract from a periodical (NLS shelfmark: Sc. Mag, July 1761), [12] we find important information on the British use of the native language. The Select Society, an Edinburgh debating society, was founded in 1754 by the painter Allan Ramsay. Its stated aims were the 'pursuit of philosophical inquiry and the improvement of members in the art of speaking.' The membership included many of the outstanding figures of the Scottish Enlightenment, among them Adam Smith, David Hume, and Hugh Blair. These giants Enlightenment scholars promoted the 'English tongue' in reading, writing, and making philosophical inquiries. 'Following a course of lectures on spoken English, given in Edinburgh by the Irish actor Thomas Sheridan in June 1761, there was an increased enthusiasm for studying and promoting the 'English tongue.' In July 1761, 'Scots Magazine' reported that the plan of creating a new establishment' for this purpose was to be put before the committee of the Select Society [13].

5.2. Religious Reformation

The Reformation was the work of religious scholars that were against the manner of teachings in the Church and the vice of corruption that was taking place in the Roman Catholic Church. Those Biblical scholars, such as Dr. Martin Luther, a German Cleric, opposed the Church leadership by nailing down his 95 theses that challenged the abuses in the Holy Roman Church [14]. The results were the great schism that led to the divisions in the World Wide Church of God. Those who followed these scholars and demanded separate denominations were known as the Protestants. In England, John Wesley and his brother translated the Bible into English for their Methodist denomination. The importance of the Reformation was that it led to the priesthood of all church members, and it later pushed ahead freedom of worship and the ability to read the Bible in one's language. The protestant ethic was capable of making individuals hard working and initiating missionary work into the world that spread Enlightenment to the people of other continents of the world. *The Protestant Ethic and the Spirit of Capitalism* (German: *Die protestantische Ethik und der Geist des Kapitalismus*), which was authored by Max Weber, a German sociologist, economist, and politician, informed us about the magic of this ideology[15]. They were a series of essays, which the original German text was composed in 1904 and 1905 and was translated into English for the first time by American sociologist Talcott Parsons in 1930. It is considered a founding text in economic sociology and a milestone contribution to sociological thought.

Weber's scholarly discussion on capitalism in Northern Europe began when the Protestant (particularly Calvinist) ethic influenced large numbers of people to work in the secular world, developing their enterprises and engaging in trade and wealth accumulation for investment. The Protestant work ethic was the energy behind the unplanned and uncoordinated emergence of social forms of capitalism in modern Europe. Apart from Calvinists, Weber also debated (especially Pietisms) Methodists, Baptists, Quakers, and Moravians (specifically, referring to the Herrnhut-based community under Count von Zinzendorf's spiritual lead).

5.3. Scientific Revolution and the Age of Enlightenment

The Age of Enlightenment concomitantly coincided with the scientific revolution; here, knowledge from the Ancient Roman philosophers and Arabic scholars helped European academics to make inventions. These were the works of other civilizations, which they copied and built upon their work. They were not originators of them.

The Scientific Revolution commenced a drastic change in scientific thought that emerged during the 16th and 17th centuries, especially in Europe. A new comprehension of nature transpired during the Scientific Revolution, substituting the Greek interpretation of the world that had controlled science for almost 2,000 years. The Scientific discipline became an autonomous discipline, apparently distinct from philosophy and technology, and these possessed utilitarian objectives. Science, consequently, superseded Christianity as the principal point of European civilization.

The Scientific Revolution commenced with astronomy. Although there had been earlier theories of the possibility of Earth's motion, the Polish astronomer Nicolaus Copernicus was the first to theorize a comprehensive heliocentric theory. This was equal in scope and predictive power to Ptolemy's geocentric system. Encouraged by the desire to satisfy Plato's dictum, the Polish priest's theory overthrew traditional astronomy because of its alleged violation of the principle of uniform circular motion and its lack of unity and harmony as a system of the world. Utilizing the same data as Ptolemy, Copernicus turned the world inside out, putting the Sun at the center and setting Earth into motion around it. The Astronomer Priest's theory, published in 1543, retained a qualitative straightforwardness that Ptolemaic astronomy appeared not to have fulfilled.

It appears **t**he scientific revolution laid the foundations for the Age of Enlightenment, which centered on *reason as the principal foundation of authority and legitimacy* and emphasized the importance of the scientific method. This took place in the 18th century when the Enlightenment thrived. Here, scientific authority commenced to dislodge the authority of religion, and its related disciplines until then seen as legitimately scientific (e.g., alchemy and astrology). Religious authority lost scientific credibility.

Science came to play a leading role in Enlightenment discourse and thought. Many Enlightenment philosophers, writers, and thinkers had backgrounds in the sciences, and associated scientific advancement with the overthrow of religion and traditional authority in favor of the development of free speech and thought [16].

5.4. Scientific Institutions

As the scientific revolution became successful, Europeans established scientific institutions which utilized sciences to conduct research seriously. This was not possible before the reformation when science was not considered an authority. Later, there was an emphasis on STEM.

5.4.1. Types of scientific institutions

Scientists received support from at least three institutions: research institutions, funding institutions, and professional societies.

Research institutions physically house scientists and provide research facilities; they include many colleges and universities, government organizations like the US Geological Survey, and corporations like DuPont or Exxon-Mobil.
Professional societies facilitate the communication of the results of scientific research and foster the development of scientific communities, hosting meetings like conferences and workshops. These societies may be specific to a discipline, such as the Society of Vertebrate Paleontology, or broad and all-encompassing, such as the American Association for the Advancement of Science.
Funding institutions, like the National Science Foundation and the National Institutes of Health, provide grant money to scientists through a competitive process so that they can conduct research.

An individual scientist may work at one or more research institutions, belong to several professional societies, and receive funding from multiple sources. These contacts can influence a scientist's research positively. Likewise, the institutions received influences from the communities of scientists that make up their membership [17].

5.5. Investment in Banking and Acquisition of Wealth

By far, what helped the Europeans to seize and dominate the world was their financial acquisition and investment in banking industries. Some powerful writers such as the Scottish philosopher Adam Smith and his book, *The Wealth of Nations*, published in 1776, and John Maynard Keynes**,** an English economist, and philosopher whose ideas fundamentally changed the theory and practice of macroeconomics and the economic policies of governments. *The Wealth of Nations* was the product of seventeen years of notes and earlier studies, and an observation of conversation among economists of the time [18]. While *The General Theory of Employment, Interest, and Money*, published in late 1936, was the theory and practice of macroeconomics and the economic policies that helped governments [19]. We shall not spend too much time delving into this as any attempt to discuss it in length could easily lead us astray. But, let us leave the banking industry as a whole and briefly discuss investment banking and how through research Europeans gained wealth that solidified their power and wealth. What Is Investment Banking?

Investment banking is a variant of banking that systematizes large, complex financial transactions such as mergers or initial public offering (IPO) underwriting. These are the banks that raise money for companies which include underwriting the issuance of new securities for a corporation, municipality, or other institution. They manage a corporation's Initial Public Offering. These banks also issue advice in mergers, acquisitions, and reorganizations. Investment bankers 'experts usually have the bulk of information on the pulse of the current investment climate. They at the same time support their clients to navigate the complex world of high finance.

5.6. Investment Banking, Power and Fundamentals in Research

Like all other fields of studies, investment banking received tremendous research and innovation which gave the Europeans a greater footing in the financial centers of the world which expanded from London, New York, and Hong Kong. Investment Research helped them in their analyzing the performance of various financial instruments like stocks, mutual funds, bonds, debentures, etc. It also helped to provide an investor with a perspective on how the company is performing. These researchers in investment banks advise companies on acquiring, selling, or merging with other companies and issuing debt and equity. The research analysts assist the bank in proposing these decisions by researching industries and markets, building financial models, and giving investment presentations.

Investment banking offers financial services to companies seeking to raise capital, while equity research professionals analyze publicly traded companies and make investment recommendations. An investment banking analyst prepares pitch books and information memorandums [20].

5.6.1. The IMF

The IMF is one of the two institutions that give permanent power to the Europeans in the world. It determines the sort of development that should be undertaken by the poor developing countries in the world. The IMF promotes global macroeconomic and financial stability and provides policy advice and capacity development support to help countries build and maintain strong economies. The IMF gives short- and medium-term loans to help countries that are going through the balance of payments problems and difficulty meeting international payment obligations. The loans of the IMF are given to struggling nations mainly by quota contributions from its members. The organization has staff who are fundamentally economists with enormous experience in macroeconomic and financial policies [21].

5.6.2. The World Bank

The second of the two most powerful institutions in the world that Europeans control is The World Bank. The bank promotes long-term economic development and poverty reduction by providing technical and financial support to help member countries implement reforms or projects, such as building schools, providing water and electricity, fighting disease, and protecting the environment. Its financial assistance is long-term and is funded by member country contributions through bond issuance. Its staff is also specialists on specific issues, such as education sectors and climate issues [22].

5.6.3. Summary

The IMF and The World Bank are the two most powerful financial organizations that Europeans use to control the world and other interest groups. These enable them to dictate measures to developed as well as developing nations concerning how they perform in the economic and modern market. Some scholars also add the power of the dollar as a currency. The American dollar commands respect and power in the whole world. Investment banking handles principally sourcing funds for governments, companies, and other financial units. Its operations consist of guaranteeing fresh debt and equity securities for all types of businesses and corporations. These banks work to facilitate mergers and acquisitions, reorganizations, and broker trades for institutions as well as private potential investors. The businessmen who work with Investment bank function among governments, corporations, and other groups. These men plan and manage the financial aspects of large projects. In the United States, for example, Investment banks were legally separated from other types of commercial banks from 1933 to 1999 when the Glass-Steagall Act that segregated them was abolished.

6. Conquest—Domination and Manipulative Behavior Hypothesis

Science has shown that it has the power to unravel the mystery that exists in the physical world. It has capacitated human beings to understand the world that surpasses all other disciplines. What makes science the apex source of knowledge is that it does not concern itself with the explanation that pertains to supernatural beings. God does not come into the equation. Objective manner to the study of any object in space becomes the concern of man. Man depends on his brain and other sophisticated instruments to deal with problems and predicaments that confront him.

As the local tongue and science facilitated reading and comprehension, scholars in various scientific fields increased. This concomitantly happened as the division of labor made specialization possible, and scholars could devote themselves to minute objects and problems with care. The philosopher David Hume asserted that in the 1500s the number of people who could read and write was not up to 200000 in the United Kingdom. The local language was one of the main reasons the English came together as a nation to conquer the world.

The introduction of the local tongue thus helped with mass education in the European countries that equipped them with knowledge, power, unity, and patriotism. Due to incessant wars, research in weapons and arms dealing increased among Europeans. The results led to expansionism, where a nation that felt strong because of the weapon acquisition could walk or enter another's land and confiscate it. These happened among the naive, ignorant, and illiterate tribes in South America, North America, Africa, and Asia Pacific islands. The scrambled for Africa was possible because access to weapons made Europeans divide the continent among themselves.

Domination was in the form of slavery, colonies, confiscation, and trade malpractices. These made it possible to confiscate many valuable lands, mineral resources, and favorable habitable parts of the rest of the nations around the world. The bad practices used in Central Asia and later North Africa (Europe) admonished them to continue to utilize it to take whatever they wanted in another part of the world. Moreover, they gained recognition and attention for employing the same things the naive pioneers had described in the religious texts as a legitimate manner of acquiring what one wanted. In the Bible, the strength of a group of people could allow them to use war to claim that land from the owner. During these periods, colonists, businessmen, and missionaries agreed on the same approach to seize and enrich themselves with other groups/tribes' lands [23].

They employed manipulative behavior in the same manner that they managed smoothly to seize the world without the slighted hindrance from the poor and innocent inhabitants. This occurred in South and North America, including its neighboring islands. Africa and India, as well as the Asia Pacific islands' inhabitants, suffered.

This was the period when the scrupulous among them, mostly academicians, took advantage of this leniency among ignorant tribes who happened to be in the same situation as Europeans so many centuries ago and coined the term superiority and super race. Because of illiteracy and extreme ignorance, the citizens accepted these experiences. Since this was a false premise, the deductions following it had to be defended by the so-called scientists; they buttressed manipulation with fictitious developments of theories.

Currently, the repulsion made some honest scholars disbelieve it, though there exists the majority who adhere to this outdated principle through ignorance and literacy. What is more, some centers of learning stick to this manipulative behavior. They use money and influence to develop theories that support and nurture this ideology. Though they are aware that there is no truth in them, they still use all their power and influence to keep the status quo to maintain it.

The Romans took their precious time to study these Germanic tribes and Slavs who lacked physical stamina. They saw the difference between them and black men as resulting from the absence of melanin because black women gave birth to them in the first place. They could hardly perform strenuous work despite their outward appearances that looked admirable. They were quick to comprehend why they could not build any civilization on their own because they occupied themselves with frivolous chores and war as distractions. In Ancient Egypt during the early dynasty, these whites worked as servants. Some early kingdoms used them as serfs. The Roman citizens were mostly mulatto (Mulatto is a racial classification that refers to people of mixed African and European ancestry) and black men that never claimed that any tribe was more human than the other, even though they were aware of the sequence of events that occurred to another tribe to dominate the other [24].

7. Results of the Theoretical Discourse

7.1. Cognitive Psychology: European Aggressive Behavior and Development of Personality

The Clitoris hypothesis, the bigger brain hypothesis, the Nomadic Tribe hypothesis, and the entire Roman Empire hypothesis help in explaining the development of aggressive behavior by the European citizens. One can also explain to a large extent, the development of the personality of the Europeans. I state formally that the factors are numerous and powerful. Notwithstanding other minor conditions may underpin and strengthen the overall vindictive characteristics of the human being known as the "European." So where the Africans and all other human beings may see them as friends, acquaintances, and newcomers, the Europeans only see the foes, enemies, competitors, or adversaries.

These vindictive characteristics enshrine in what Sigmund Freud has called the "unconsciousness" or “collective unconscious "and what Carl Gustav Jung calls "the archetype" of the European mind such that wherever the European finds himself he becomes restless. This may have some additional implication that connotes what I call “existential anxiety.” “Existential anxiety is a feeling of dread or panic that arises when a person confronts the limitations of their existence. Thoughts of death, the meaningless of life, or the insignificance of self, can all trigger existential anxiety.” [25]

The concept of an archetype, from Ancient Greek ἄρχω 'to begin,' and τύπος ’sort, type' appears in areas relating to behavior, historical psychology, and literary analysis.

The following can be an archetype:

1. A statement, pattern of behavior, prototype, "first" form, or a main model that other statements, patterns of behavior, and objects copy, emulate, or "merge" into. Informal synonyms frequently used for this

definition include "standard example," "basic example," and the longer-form "archetypal example"; mathematical archetypes often appear as "canonical examples."

2. The Platonic concept of *the pure form* embodies the fundamental characteristics of a thing.
3. A collectively-inherited unconscious idea, a pattern of thought, image, etc. that is universally present, in individual psyches, as in Jungian psychology.
4. A constantly-recurring symbol or motif in literature, painting, or mythology. This definition refers to the recurrence of characters or ideas sharing similar traits throughout various, seemingly unrelated cases in classic storytelling, media, etc. This usage of the term draws from both comparative anthropology and Jungian archetypal theory.

Archetypes are also very close analogies to instincts in that long before any consciousness develops it is the impersonal and inherited traits of human beings that present and motivate human behavior. They also continue to influence feelings and behaviors even after some degree of consciousness develops later.

I refer to the number 1 and 3, which both Freud and Jung use to symbolize what I think is the “main model,” “pattern of behavior,” “A collectively-inherited unconscious idea,” or “ a pattern of thought.” [26, 27, & 28]

7.2. Social Perception and Cognition in War. European and the War Archetype

The Europeans have the barbarians' war archetype that compares to preparing long in advance even when the shadow of war was nowhere near them. They have restless spirits-- existential anxiety that admonish them to yearn for it. Ordinary smoke could rekindle the war spirit that would interpret the scent of gunpowder. Normal human beings would think about war and weapons, but Barbarians would make their plight to work all the time toward it because war was a hobby in the barbarian world.

The barbarian archetype is unpredictable and always seeking to dominate in power, building infrastructure and utilizing them toward ensuing war in the present and future. Later, I shall discuss the manipulative behavioral characteristics as the false premise of being “superior human beings.” The behavior attributed to the barbarian archetype is a hypothesis that needs support not only with reasons but with constant war-making that is regarded as a hobby in the barbarians' world.

7.3. War Stimulate Memories that Offer Compelling Therapy to Aggressive Europeans

While the people are perplexed at the knowledge of incoming war, the Europeans are more concerned about the increase in certain resources and the diminishment of some. In part, some resources can be scarce, which will allow the producer to make gains that will tilt the balance of power. That is all the more reason an enormous amount of time is devoted to the planning and execution of the war in the world. Thus there are wartime and peacetime. Each is legitimately respected in the world of European. War is like a psychedelic drug that the barbarians use to treat their existential anxiety. It is used in therapy just as opium kills pain in some patients in psychiatric hospitals.

7.4. Neurobiology and Language Development

Many people think less of the part that language plays in human intelligence acquisition. In our work, it has been stressed how the Europeans’ use of their local languages and, in the addition of scientific methods and theories, gained the upper hand in world affairs. It would be vital to narrate what scientists have discovered recently concerning the source of language as this would help to argue more about how language has helped the Europeans in their knowledge acquisition and, the obtaining of its advantages in learning.

The process of discovering which parts of the brain are involved in language commenced around 1861. It began when a neurosurgeon by the name of Paul Broca of French origin investigated the brain of a dead patient who had had a bizarre disorder. This patient could neither utter a complete sentence nor express his thoughts in writing, though he had been able to comprehend spoken language and did not have any motor impairments of the mouth

or tongue that might have affected his ability to speak. But he could make a sound of the syllable "tan," which came to be used as his name.

As Broca autopsied Tan's brain, he discovered a sizable lesion in the left inferior frontal cortex. Broca then examined eight other patients, all of whom had similar language deficits along with lesions in their left frontal hemisphere. He concluded later that human beings "speak with the left hemisphere" and to identify, for the first time, the existence of a "language center" in the posterior portion of the frontal lobe of this hemisphere. Broca's area became the first area of the brain to be connected with a specific function such as language [29].

Carl Wernicke was a German neurologist who discovered another part of the brain that was involved in understanding language. This lies in the posterior portion of the left temporal lobe. Individuals who had experienced a lesion at this location could speak, but their speech was often incoherent and made no sense.

Wernicke's observations have received confirmation many times from other researchers. Neuroscientists concur that running around the lateral sulcus (also called the fissure of Sylvius) in the left hemisphere of the brain, there is a sort of neural loop that is involved both in comprehension and in producing spoken language. At the frontal end of this loop lies Broca's area, which is usually associated with the production of language or language outputs. At the other end (specifically, in the superior posterior temporal lobe) lies Wernicke's area, which is associated with word processing that we hear being spoken, or language inputs. Broca's area and Wernicke's area are connected by a large bundle of nerve fibers called the arcuate fasciculus [30].

This language loop is in the left hemisphere in about 90% of right-handed persons and 70% of left-handed persons, language being one of the functions that are performed asymmetrically in the brain. Surprisingly, this loop is also found at the same location in deaf persons who use sign language. This loop would not appear to be specific to heard or spoken language, but rather to be more broadly associated with whatever the individual's primary language modality appear to be. Some studies have also suggested a third area to Broca's and Wernicke's areas, this is located in the parietal cortex.

7.5. Models of Spoken and Written Language Functions in the Brain

American neurologist Norman Geschwind in the 1960s and 1970s came out with the first model of the general organization of language functions in the brain. This "associations" model was built on the lesion studies conducted by Wernicke and his successors and is now known as the Geschwind-Wernicke model. In this model, the various characteristics of the language (perception, comprehension, production, etc.) are managed by a distinct functional module in the brain, and each of these modules is linked to the others by a very specific set of serial connections. The central hypothesis of this model is that language disorders arise from breakdowns in this network of connections between these modules.

According to this model, when you hear a word spoken, this auditory signal is processed first in your brain's primary auditory cortex, which then sends it on to the neighboring Wernicke's area. Wernicke's area associates the structure of this signal with the representation of a word stored in your memory, thus enabling you to retrieve the meaning of the particular word. In contrast, when you read a word out loud, the information is perceived first by your visual cortex, which then transfers it to the angular gyrus, from which it is sent to Wernicke's area [31].

The discoveries made by researchers Paul Broca and Carl Wernicke show that language speaking and writing are complex phenomena that must be taken seriously. No wonder it gave the Europeans unique problems when in the beginning they had to depend on Latin to imbibe knowledge and use it to carry out responsibilities. These same problems face the diverse cultures in Africa and other mainstream cultures today in North and South America. Complexities become less when the original languages are being used, it also makes human beings acquire certain characteristics which are possible the many years these languages are being employed by their forebears. These characteristics may be inherited. This knowledge advised many nations to revert to their local languages or use the dominant language among them to communicate. That is one of the reasons I think Europeans are capable of performing well in examinations than many African countries. There will be marginal differences in intelligence

as soon as this problem is removed by the various governments like it has been done in the Far East, especially China and Japan. The deficiencies connected with language are many such that there must be an attempt to cater to them like it is being done in many Western countries. Speech Disorders include Childhood Apraxia of Speech, Dysarthria, Orofacial Myofunctional Disorders, Speech Sound Disorders, Stuttering, Voice Disorders, Aphasia, Selective Mutism, and Childhood Speech Delays. A child who is significantly delayed in developing their language and speech skills might have a language disorder.

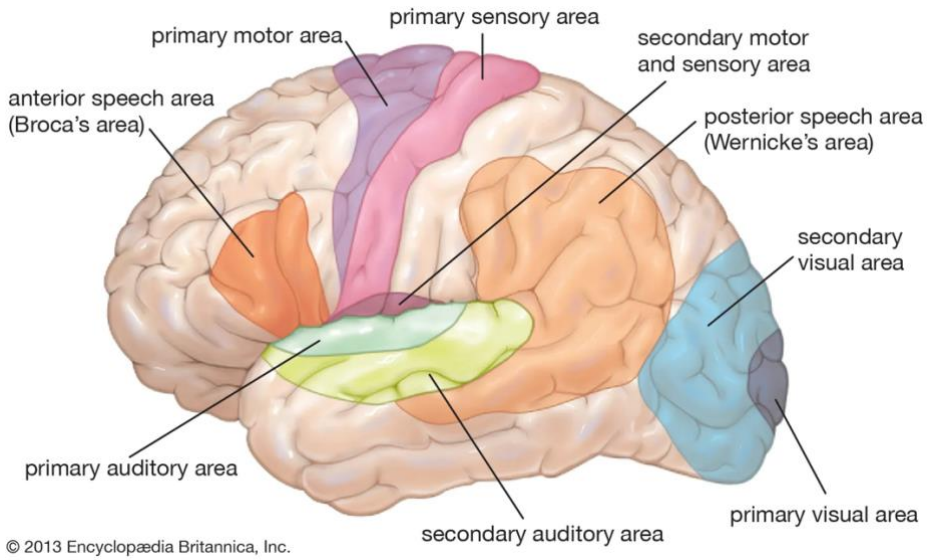

Figure 1: *Broca's area of the Brain (adapted from Encyclopedia Britannica Online; Retrieved 2023-04-20)*

8. Discussion and Concluding Remarks

Neurobiology is a scientific discipline in which researchers investigate the nervous system and how the brain functions. It embraces neuroscience and physiology. Here we encounter the central and peripheral nervous systems of the human organism. These consist of the brain, retina, and spinal cord which form the central nervous system. The peripheral nervous system, on the other hand, encompasses the nerves outside the central nervous system that connect it to the rest of the human body.

In its operations, basic neurobiology at the tissue level is made up of neurons, glial cells, and the extracellular matrix. Neurons are the nervous system's cells that manage information, while the glial cells provide nourishment, protection, and structural support to neurons. The extracellular matrix in the brain gives support on the molecular level for both neurons and glial cells. A specialized type of glial cell which is called the astrocyte still attracts considerable research interest. These cells and the extracellular matrix comprise nerves and the brain regions.

We know that Neurobiology and Cognitive Psychology affect how human beings behave. For example, concerning the former, it is understood that each region of the brain affects a different area of behavior, and neurobiology aims to comprehend these behaviors and their relationship to diverse brain segments. Scientists have, therefore, identified the function of the frontal lobe in contributing to personality, emotions, judgment, problem-solving, abstract thought, attention, and planning. A cardinal distinct role found in the frontal lobe is speech, which is situated in Broca's section. The parietal lobe and the occipital lobe deal with how the human performs interpretation. The parietal lobe contributes to the interpretation of language, visual signals, and spatial perception, while the occipital lobe hosts our visual cortices. The temporal lobe, which harbors the famous Wernicke's section, is a major section of the brain that aids in language understanding. Again, the temporal lobe hosts our auditory cortex and is a significant organ for hearing.

Neurotransmitters function as the body's chemical messengers. These substances convey messages from one nerve cell across a space to the next nerve. They perform one of three functions: exciting, inhibiting, or modulating neurons. Most neurobiological disorders are due to fluctuations in these levels of chemical substances. These

disorders can also be caused by issues in the ways that neurotransmitters are sent or received. Fluctuations can be caused by the over or under-production of neurotransmitters. They can also be caused by damage to the neurons themselves [32, 33 & 34].

Language, therefore, seems to be the work of neurons and in this study, it is found that the use of the blood language or local language played an important function to help the Europeans to carry out functions that led to their enormous success in science. In the first place, it made it easy to organize things through apex comprehension. This provided the ability to discern and enjoyed being mistake-free in a world filled with complex tasks. Citizens became sharpness which was devoid of naivety in dealing with problems. It enhanced creativity that lead to writing textbooks and fiction for the entire population. There was originality in accomplishing things which enabled many talented individuals to come out with something new/discoveries. Among the French, English, and later modern Germans, talented people worked with many inventions. In Germany, printing took precedence immediately after citizens decided to give up the French language and depended on their local Dutch language.

Science was the precursor that pushed the Europeans ahead of many nations. Its foundation was laid by the Greeks, the Romans, and the Arabs but it was the Europeans who worked on the principles and popularized them. The discipline consists of rudimentary Science laws, Science theories, Logic, Mathematics, Philosophy, and Ethics. These different disciplines with the local language made it easy to elevate the brain to a new higher level. Neurobiology helped us to stress that constant training aids the brain to make indescribable connections and relationships between events. Logic helped to generate the superior mind which was to reject religious propositions and replace them with objective truth that had been proved by Science.

In scientific terms, the deductive method presents a true statement that is termed a premise. From this general truth, the deductions are made to generate specific knowledge which is of superior quality. Where the premise is false, deductions lose their importance and become worthless which cannot be used for anything. To some extent, false claims will follow.

From a Cognitive psychology perspective, manipulation becomes the source of unstable characteristics that lead to the utilization of guns, intimidation, threats, discrimination, and all other vices.

The hypotheses we have assembled in this article have been observed meticulously by the researcher including the neurobiology ones. In this work, I followed the footstep of the renowned Physicist, James Clark Maxwell, in his experiment where he observed a little spark along the line that he named the letter (‘c’) when he was studying electricity and magnetism. This later became known as the speed of light. Albert Einstein was interested in examining how atoms behave in different circumstances such as liquid, which made him put pollen in water molecules. In the microscope, he observed how pollen atoms jingle side by side with water atoms allowing him to coin the term ‘Brownian motion.’ These experiments were recognized as entailing superb use of the method of observation which was highly emulated by later renowned research scientists around the world.

In the same vein, strict 40 years of observation are almost equal to the microscope and with the readings and research about genetics, I can present the results, which say that the question about ”superiority” and ”super race" has something to do with the Handicap theory. The theory of handicap, driven by an attempt to cover up some weakness results in the “superiority complex.” This has led men to push aside essential truth and instead propagate the opposite, which is associated with superiority. There is a common postulate which says that *“if something deviates from the normal, there is always something abnormal that is enshrined with it.”* The handicap theory has this conventional postulate as its premise.

8.1. Scientific Persuasion and Implication

This article has psychological implications. It is psychological research, and though it is scientific, one needs to utilize interpretation and meaning-making to bring out scientific implications for the study. The world must be careful not to make ideal everything that is suggested by Europeans. Whether it is morality, ethics, behavior principles, manners, conduct, or fabricated world perspectives which go contrary to a particular nation's approach.

Everything that is European should not be made a yardstick because of the lurking manipulation that is always enshrined in their overall behaviors and performances.

Intelligence has something to do with the use of the blood language, local language, or culturally provided language in imbibing knowledge in the physical world. This should be coupled with the use of scientific theories, and appropriate scientific methods which should be driven by the use of Mathematics and logic. The new emerging powerfully technologically economic societies such as China, Malaysia, Singapore, etc., testify to these modern methods of reaching progress in countries.

Declarations

Ethics Declarations

Ethics approval and consent to participate. Regent University Ethics Committee on Research permitted me. Therefore, I acquired the right permission. Furthermore, I tried to hide the identities of the individuals involved in the research.

Informed Consent and Anonymity complied.

Consent for Publication

Not applicable

Competing interests

The author declares no competing interests.

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Assessment of Immunity against Hepatitis B Virus among Children Aged 2-17 Years in Nnewi, Anambra State, South-East Nigeria: A Pilot Study

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Abstract
Background: Nigeria is one of the hyper-endemic countries for hepatitis B with national prevalence rate of 11%. No study has been done in Nigeria to the best of authors' knowledge to assess the level of immunity among children vaccinated against HBV. Objective: To assess prevalence of Hepatitis B surface antigen, determine the presence of antibodies to hepatitis B surface antigen (anti-HBs) and determine the titre levels of anti-HBs among those who have anti-HBs. Design: This was a pilot and a cross-sectional study. Methods: Consecutive children aged between 2 and 17 years seen at the outpatient clinic of NAUTH, Nnewi, Nigeria were recruited. Questionnaire was interviewer-administered. Venous blood was collected from each participant, analyzed for HBV serological markers and anti-HBs titre. Results: A total of sixty children were recruited. There was equal male and female distribution. 36.7% were aged 10-14 years. One child did not receive HBV vaccine. There was no incidental finding of HbsAg positivity. 15% of respondents had their immunity assessed after completing vaccination. There was presence of antibodies to HBsAg in19 children, and the anti-HBs titre was protective in 78.9% of those who had antibodies. Conclusion: After 18 years of introduction of the HBV vaccine into the NPI and routine infant immunization against hepatitis B virus in Nigeria, this pilot study has shown immunity against hepatitis B is not usually assessed after immunization and a significant proportion of children who were adequately immunized are not adequately protected against HBV. A large-scale study would be desirable for confirmation.

Keywords: HBV Immunity, Children, Nigeria

1. Background

Hepatitis B virus (HBV) is a preventable cause of liver diseases including liver cancer worldwide. It is a serious public health problem. Globally, about a billion individuals have been infected with HBV at some point in their lifetime and almost 296 million people are chronically infected with HBV. More than a million die annually from HBV related causes. In 2015, HBV resulted in an estimated 887 000 deaths, mostly from cirrhosis and hepatocellular carcinoma (Chang, 2007).

Nigeria is ranked as one of the hyper-endemic countries with a national prevalence rate of 11%. (Federal Ministry of Health. National strategic plan for the control of viral Hepatitis in Nigeria, 2016). In Nigeria, the prevalence rates vary from region to region; 7.6% in the East (Chukwuka et al., 2003) and 9.7 in the North (Ndako et al, 2010). The vaccine against HBV was introduced into the National Programme on immunization (NPI) in 2004 in a bid to reduce the prevalence of HBV infection (Thomas et al, 2021). However, there was a 1.3% prevalence of HBsAg among vaccinated children in a rural community in Edo State, Nigeria (Odunsaya eet al. 2005). In Yemen, 27.8% of the children had non-protective anti- HBs levels despite a good HBV vaccine coverage rate of 87.3% (Alssamei eet al. 2017). Hepatitis B vaccine coverage rate in Nigeria has ranged from 41% to 58% (Odunsaya, 2008). While the hepatitis B birth dose vaccine coverage is about 53% (Olakunde eet al. 2022).

The possible limitation in the level of vaccine coverage may include the place of birth as those delivered at home or in private health centres are likely not to be immunized unlike those delivered in the government hospitals (Olakunde et al., 2022). In Senegal, children aged between 6 months and 16 years who were vaccinated against HBV to access infection and level of immunity were studied. They found that 1.1% of the children had the infection while only 65.0% had sero-protective levels (Lô et al., 2019). In a study in Italy, titres of antibodies to hepatitis B surface antigen (Anti- HBs) of <10 IU/L (unprotective levels) were seen in 50.4% of the students (mean age was 25.4 years) studied who had received vaccine for HBV (Sernia et al, 2020).

The monovalent vaccine is used in Nigeria and the routine HBV immunization schedule for children is at birth, 6 weeks and 10 weeks. Several factors may affect the efficacy of the HBV vaccine such as the characteristics of the infectious agent (genetic variation), vaccine factors (type of vaccine, adjuvant, dose, and administration route and schedule), and the host factors (age, sex, genetics, nutritional status, gut microbiota, obesity, and immune history). Persons in whom the vaccine is not effective are referred to as 'non-responders.' They lack immunogenic memory and will require a repeat vaccination series to develop immunity (Zimmermann & Curtis, 2019) (Dhakal& Klein, 2019). Therefore, suggesting the need to access the immunity of HBV after vaccination.

In Nigeria, it is not a usual practice to access the achievement of immunity following vaccination. No study has been carried out in Nigeria to the best of authors' knowledge to assess the level of immunity among children vaccinated against HBV since its inclusion in the National program on immunization. Thus, this study has become necessary to ensure that even while treating already infected persons, the children growing up are adequately protected from this preventable carcinogen in order to achieve the WHO goal of eradicating the virus by 2030.

Anecdotal report has shown that there are some children as well as adults who have received the complete dose of the HBV vaccine and have shown no evidence of immunity against the virus and some others have reported completion of the vaccination schedule among individuals with HBV infection. This study was aimed at assessing the prevalence of HBsAg and the presence of anti-HBs among vaccinated children aged 2-17 years; in addition to assessing the titre levels of anti-HBS among those who have anti-HBS.

2. Method

2.1. Study Site/area

The study was conducted in the children outpatient of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nnewi North Local Government Area (LGA), Anambra State, in Nigeria. The LGA had a population of 155,443

in 2006 according to the National Population Census of 2006 and an extrapolated population of 193,987 in2020 (World population review, 2022).

The town is made up of four component parts namely Otolo, Nnewchi, Uruagu, andUmudim. The LGA is an emerging commercial and industrial city with a large proportion of the population engaged in trading, industrial work and civil service. The College of Health Sciences of the Nnamdi Azikiwe University Nnewi Campus and the Nnamdi Azikiwe University Teaching Hospital Nnewi are located within the town. The HBV vaccine is stored in standard conditions in the hospital and is always available to clients.

2.2. Study population

Children between the ages of 2 and 17 years constituted the study population. The age group 2 years was chosen to ensure complete waning of maternal antibody while 17 years was chosen to avoid using those born before the introduction of the HBV vaccine into the NPI program.
Inclusion criteria

- Children 2-17 years who were apparently healthy and with a parent to give required information

Exclusion criteria:

- Children with chronic illnesses eg HIV, Bone marrow disorders/ blood cancers
- Children who are known to have chronic HBV infection

2.3. Study design

This was a pilot study as well as a cross-sectional and descriptive study.

2.4. Sample size determination

This was a pilot study and the number of children obtained during 6 months duration was used

2.5. Sampling technique

Consecutive children aged between 2 and 17 years seen at the outpatient clinic of NAUTH, Nnewi were recruited over a period of 6 months.

2.6. Outcome measures

The outcome measures include panel test parameters and anti-HBS titre. The panel test includes qualitative (positive or negative) results of the following tests; HBsAg, (anti- HBs, HBeAg, HBeAb, HBcAb.

2.7. Sample collection and laboratory analysis

After administering the questionnaire to the parent(s) to obtain information concerning the child's immunization, five milliliters of venous blood was collected from each of the study participants into plain vacutainer tubes and transported to the NAUTH, Nnewi laboratory for processing. The samples were allowed to clot and retract before centrifugation at 1600 rpm for five minutes. The supernatant was separated into two cryovials and stored at -20°C if testing was not performed immediately.

The samples were analyzed by a medical laboratory scientist for HBV serological markers by a colloidal gold and membrane chromatography technology. HBsAg, anti-HBs, and HBeAg were measured in serum with the dual-antibody sandwich method, while HBeAb and HBcAb were measured by the competitive neutralization method (Biosino Biotech Company, China). The second sample aliquots were used to estimate Anti-HBs titer among those who were positive by Enzyme-Linked Immunosorbent Assay (ELISA) (Guangzhou Wondfo Biotech Co., Ltd., China).

2.8. Definition of hepatitis B seroprotection

Children with anti-HBs levels ≥ 10 international units per liter (IU/L) were considered as sero-protected against HBV while those with anti- HBs levels < 10 IU/L were non-sero-protected (unprotected) (Schillie et al., 2013).

2.9. Ethical consideration

Ethical approval for the study was obtained from Nnamdi Azikiwe University Teaching Hospital Ethics Committee (NAUTH/CS/66/Vol. 13/VER III/80/2020/023). Informed consent was also obtained from the parents and accenting children.

2.10. Data Management

The variables from the study consisted of the independent variables (socio-demographic, HBV vaccination status of subjects, and exposure to risk factors of HBV infection). The descriptive statistics of the subjects (mean, standard deviations and proportions of the variables were determined. The analysis for the outcome measures of the study (panel test and anti-HBS titre) qualitative (positive or negative), HBsAg, anti HBs, HBeAg, HBeAb, HBcAb were done. The proportions (percentage %) of subjects positive to the tests were determined. The quantitative results of HBs titre (for subjects with positive anti-HBs) were determined. The titre was further classified as sub-optimal and normal and the proportions of sub-optimal and normal were determined.

3. Results

Table 1 shows the socio-demographic characteristics of respondents. A total of 60 children were used for the study. There was equal male and female distribution (1:1). About one-third (36.7%) of the participants were between 10-14 years. There mean age was 8.7 ±4.3 years. About half of the participants (51.7%) were in secondary school. Approximately half of the fathers (46.7%) and mothers (51.7%) had tertiary education.

Table 1: Socio-demographic characteristics of respondents

Variables		Frequency (N=60)	Percentage (%)
Gender	Female	30	50.0
	Male	30	50.0
Age Category	0-4 years	13	21.7
	5-9 years	20	33.3
	10-14 years	22	36.7
	15-17 years	5	8.3
Age (Mean ± SD):	8.7 ± 4.3 years	Median age: 8.5 years	
Educational level of children	None	1	1.7
	Nursery	1	1.7
	Primary	5	8.3
	Secondary	31	51.7
	Tertiary	22	36.7
Educational level of fathers	None	5	8.3
	Primary	9	15.0
	Secondary	18	30.0
	Tertiary	28	46.7
Educational level of mothers			
	None	2	3.3
	Primary	4	6.7
	Secondary	23	38.3
	Tertiary	31	51.7

Table 2 shows the vaccination parameters of the respondents. They were 59 out of the 60 respondents (98.3%) that received at least one dose of the vaccine while only 1 respondent (1.7%) did not receive vaccine at all. Confirmation of vaccination status and number of doses received was mainly based on verbal reports from parents (78.3%). 57 of the 60 respondents received the complete 3 doses of the vaccine. Vaccination took place more in the public health institutions (37/60) than in the private health institutions (33/60)

Table 2: Vaccination parameter of the respondents

Variables		Frequency (N=60)	Percentage (%)
Received vaccine	No	1	1.7
	Yes	59	98.3
Verbal/Card	Card	13	21.7
	Verbal	47	78.3
Number of doses	Zero	1	1.7
	Two	2	3.3
	Three	57	95.0
Where did vaccination take place?	None	1	1.7
	Local Government	2	3.3
	Primary Centre	13	21.7
	Private Centre	22	36.7
	Tertiary Centre	22	36.7

Table 3 shows the distribution of the panel test results. Only 15% of the respondents had their immunity assessed following immunization using panel test. All the respondents were negative to HBsAg. Only 19 of the 60 (31.7%) children were positive to HBsAb. None of the children was positive to HBeAg, HBeAbor HBcAb.Anti-HBs titre was <10 IU/L in 56.7% of the children and ≥10IU/L in 43.3% of the respondents.

Table 3: Distribution of the panel tests

Variables		Frequency (N=60)	Percentage (%)
Was a panel test done after vaccination?	No	51	85.0
	Yes	9	15.0
HBsAg	Negative	60	100.0
	Positive	-	-
HBsAb	Negative	41	68.3
	Positive	19	31.7
HBeAg	Negative	60	100.0
	Positive	-	-
HBeAb	Negative	60	100.0
	Positive	-	-
HBcAb	Negative	60	100.0
	Positive	-	-

**Abrreviations- HBsAg= Hepatitis B surface antigen, HBSAb= Hepatitis B surface antibody, HBeAg= Hepatitis B envelope antigen, HBeAb= Hepatitis B envelope antibody, HBcAb= Hepatitis Bcore antibody, anti- HBs titre= antibody to Hepatitis B surface antibody titre*

Table 4 shows that out of the 19 children that had HBsAb, 15 (78.9%) had adequate antibody titre of ≥10IU/L.

Table 4: Antibody titre of the respondents

Variables	Titre level	Frequency (N=19)	Percentage (%)
Anti- HBs titre	<10	4	21.1
	≥10	15	78.9

4. Discussion

HBV infection has remained a global health challenge. The World Health Organization aims to eliminate the virus by 2030. This is probably the first study to determine the post vaccine immunity status among children following the inclusion of the HBV vaccine into the National Program of Immunization (NPI) in Nigeria. The study showed no incidental HBV infection among the respondents who were completely immunized. This may be an encouraging finding considering the 1.3% prevalence reported among vaccinated children (Odunsaya et al., 2005). It is also an encouraging finding considering the goal of WHO concerning HBV by 2030. There was no case suggestive of a previous infection among the study respondents as they all tested negative for HBeAg, HBeAb and HBcAb. The HBeAg test indicates infectivity. HBeAb reactive indicates that the body has a high level of antibodies against the hepatitis B virus. A "positive" or "reactive" anti-HBc (or HBcAb) test result indicates a past or current hepatitis B infection. (Hepatitis B Foundation: Hepatitis B Blood Tests (hepb.org).

Very few children (15%) had their immunity accessed using a panel test. This is quite poor. Assessment of HBV immunity is usually done with a panel test or an anti-HBs titre (Post-Vaccination Testing for Hepatitis B - Viral Hepatitis and Liver Disease) (Jack et al., 1999). These tests are not known to members of the public and even among health practitioners and are not usually available in most laboratories. The panel test is more affordable compared to the anti HBs titre which is not as common and which is more expensive in our environment. Studies are scarce in literature where panel test was used to access immunity post vaccination of HBV vaccine. However, anti-HBs titre was used in some studies in China to assess immunity in children (Jiang et al., 2021) (Li et al., 2018) (He et al., 2016). It is however not routinely done for all children in China. Data on its use to access immunity in Nigeria is not available.

Despite the fact that 78.9% (N= 15/19) of those who had anti-HBs (N=19/41) had protective antibody levels, it is interesting to note that 21.1% (N= 4/19) did not develop anti-HBs (N= 32/60). This figure of 21.1% is higher than the global rate of non-responsiveness of 5-15% (Wiedermann et al., 2016). It is similar to what was done in northern Nigeria where they had a non- response rate of 17.9% but it involved both children and adults. (Thomas et al, 2021). Higher non-response rates of 30% and 20% were seen in Rajasthan and Bulgaria respectively (Welker & Zeuzem, 2016). Also, among students in Italy, a non –response rate of 50.4% was seen (Sernia et al, 2015). These findings may suggest that age may play a role in the anti- HBs titre following complete immunization Therefore with increasing age, antibody titres fall and this is the reason for booster doses being recommended by certain groups every 10 years (Adults need booster vaccines every ten years - NIPH (fhi.no).

The sero-protective levels in this study of 78.9% differ from the study done in Iran among similar populations as employed in this study which showed a sero- protective level of 44% (Wiedermann et al, 2016). The reason for the difference could be because of the small sample size. Additionally, studies done in Yemen and Senegal showed sero-protective levels of 72.2% and 65%, respectively (Alssamei et al, 2017) (Odunsaya, 2008). These were also lower than the sero-protective levels in this study. This could be because both studies were nationwide studies or may be related to the immunogenetics of the population. In Poland, among paediatrics patients with inflammatory bowel disease, nearly half had protective antibody levels (53.2%) (Huang et al., 2013). A booster dose with one or three doses of vaccine increased the protective level to 92% and 100% respectively (Baranowska-Nowak et al., 2020). A study to assess post-vaccination immunity in Burkina Faso showed a high sero-protective level of 76.3%, however there was a significant reduction in anti HBs titre levels after three years (Kissou et al., 2018). This may

also be accounted for by differences in the genetics of the population or vaccine properties or the large size of the population used.

This study has some strengths. To the best of authors' knowledge, this study was the first study in Nigeria to assess the level of immunity among children vaccinated against HBV since HBV vaccine inclusion in the National Program on immunization in Nigeria. However, this study could be limited because of the small sample size which prevented us from carrying out further analysis such as relationship of anti HBs titre with increasing age and gender and therefore need for a large- scale study

5. Conclusion

After 18 years of introduction of the HBV vaccine into the National program of immunization, and subsequent routine infant immunization against hepatitis B virus in Nigeria, it has been found that it is not a usual practice to assess immunity of children. It has also been found that some children are not protected against HBV after completing three doses of the HBV vaccine though this is a pilot study. Hence, a larger scale multicentre study would be desirable to confirm this finding.

6. Contribution to knowledge

This study revealed that assessment of immunity following immunization is not usually done and should be done to check for non-responders. A significant proportion of those immunized who develop HBsAb also develop adequate anti HBs titre.

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Author contributions:
SNC, NNJ, GUE, SOK, CUO and CCI conceptualized and designed the study.
All authors contributed to implementation of the project and revision of the manuscript.
All authors were involved in the writing and revision of the manuscript.
The authors read, approved the final manuscript and agreed to be accountable for all aspects of the work.

Data availability
The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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Comparison of the Effectiveness in Nasopharyngeal, Throat, Saliva, and Nasal Swab Sample Media of Detection SARS-Cov-2 using RT-PCR

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Abstract
To evaluate effectivity results among Nasopharyngeal, Throat, Saliva, and Nasal Swab Sample Media for Detection of SARS-Cov-2 virus using RT-PCR. SARS-CoV-2 is a coronavirus microorganism found in humans. A known viral infection causes the covid-19 disease to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Covid-19 has confused the public because of the different places where the samples were taken. Sampling was taken from the Nasopharynx, Throat, Saliva, and nasal Swab. This study used mini-review journals from several leading search engine journals such as PubMed, Elsevier, Jama Network, BMJ, Cochrane, Wiley, medRXiv, Lancet, and others, as well as from government websites such as WHO selected between 2020 and 2021 in the English language. Each sampling place has its advantages and disadvantages. Any place that is used as the gold standard is the nasal swab and nasopharyngeal. This paper attempts to compare the efficacy of four sample media to find the best method for detecting the SARS-CoV-2 virus. It is hoped that repeating this paper can make us aware of every method that we can use to detect the SARS-CoV-2 virus and reduce the spread of this virus, which is increasingly widespread.

Keywords: SARS-CoV-2, RT-PCR, Covid-19

1. Introduction

SARS-CoV-2 is a microorganism of coronavirus found in humans. A known viral infection causes the covid-19 disease to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Viruses enter cells and begin infecting them by connecting to receptors on the cell surface that they recognize. The expression and distribution of viral invagination receptors influence their orientation and determine which tissue it infects and thus the pathogenesis of the disease. SARS-CoV-2 is the third human coronavirus to invade cells using the embryo peptidase angiotensin-converting enzyme 2 (ACE2). From early SARS-CoV-2 infection to severe coronavirus disease in 2019, the interaction between SARS-CoV-2 and ACE2 is critical for controlling tissue orientation and development (Matheson & Lehner, 2020). SARS-CoV-2 drew extreme attention to the world that originated in Wuhan, Hubei Province, China. SARS-CoV-2 is rapidly spreading, which causes all countries in the world to be

exposed to the SARS-CoV-2 (Astuti & Ysrafil, 2020; Chan et al., 2020; Yamayoshi et al., 2020). As of March 31, 2021, there were 128 million confirmed cases by WHO and roughly 2 million deaths [https://covid19.who.int/]. The standard gold method of detecting RNA viruses with reverse transcriptase-polymerase chain reaction test (RT-PCR) is used in detecting SARS-CoV-2 infection. The RT-PCR test is used to verify connections to minimize the chances of Covid-19 cases re-emerging (Dogan et al., 2020; Torres et al., 2020; Wikramaratna et al., 2020). RT-PCR is a method of detecting and measuring the expression of associated genes. Real-time polymerase chain reaction (RT-PCR) is conducted on nasopharyngeal, throat, saliva, and nasal swab sample media (Deepak et al., 2007).

In detecting saliva samples on SARS-CoV-2, most studies are equally Stable and open with nasopharyngeal samples. Saliva detected that there are viral nucleic acids found in the salivary gland ducts indicating infection of the glands. In saliva, we can find out that there are live viruses by the method of viral culture. From the data obtained on live viral infections, it is predicted that in the throat sample, harmful levels are incorrect from the SARS-CoV RT-PCR study (Medeiros da Silva et al., 2020). In the nasal swab sample, there is viral infection data. It is predicted that in the throat sample, harmful levels are incorrect from the SARS-CoV RT-PCR study (Xiao et al., 2020).

Therefore, each approach has benefits and drawbacks of its own. This paper seeks to compare the efficacy of the four-sample media to find the best method for detecting the SARS-COV-2 virus. It is hoped that with the best detection method, the dissemination of covid-19 will be reduced.

2. Research Method

We conducted a mini-review of scientific literature in the PubMed, Elsevier, Jama Network, BMJ, Cochrane, Wiley, medRXiv, Lancet, and others, as well as from government websites such as WHO selected between 2020 and 2021 in the English language databases about the experiences who survived COVID-19, with the following descriptors being used: COVID-19 AND Nasopharyngeal AND Throat AND Saliva AND Nasal Swab AND Detection SARS-Cov-2 AND RT-PCR.

The criteria for inclusion in this study comprised of primary research articles and reviews that were published within the past decade. Initially, the articles were selected based on their titles, followed by a thorough reading of the abstracts. Any duplicated articles were subsequently excluded from consideration. Following this, a comprehensive examination of the articles was conducted, with a focus on identifying those that satisfied the established criteria for inclusion. The authors conducted a qualitative thematic analysis of the texts and subsequently utilized data triangulation to identify three distinct categories.

3. Result and Discussion

RT-PCR is a technique that uses viral RNA to diagnose SARS-CoV-2 infection (la Marca et al., 2020). To imitate and persist in the SARS-CoV-2 genomic sequence, researchers employed RT-PCR. RT-PCR is a quantitative test that can determine an imitation of any sequence of genome forms, and the total copies of RNA obtained on PCR will increase and equal to the first material, the viral load. In this RT-PCR method, the viral RNA model will be replaced to form cDNA, which is complementary DNA through the DNA polymerase enzyme based on RNA or reverse transcriptase. Then the cDNA will be assisted by the PCR polymerase chain through stages, namely the condition of the double strand of template DNA, which is split into single strands at denaturation at 95°C. The next step is that the DNA double bonds are broken and become a single strand on each DNA template which will cool down to a temperature of 60°C, this is what makes a gap for the primary pair of the primary annealing, and the probe will attach to every single strand of DNA. Furthermore, the DNA polymerase primer, which operates at 72°C, will cause RNA extension. There will be an addition of 3' In the primer attached to the single strand of the template DNA (Afzal, 2020).

3.1. Mechanism of action of RT-PCR on nasopharyngeal, throat, saliva, and nasal swab sample.

3.1.1. Mechanism of action on nasopharyngeal samples

In the nasopharyngeal sample, it is precisely the lining of the nose that is the basis of infection and the basis of the spread of SARS-CoV-2. The receptor used by SARS-CoV-2 is ACE2 which can support the SARS-CoV-2 virus to enter host cells. These receptors make the SARS-Cov-2 virus have the power to move from one human to another. When infected, the SARS-CoV-2 virus enters, relying on the attachment of protein spikes due to cellular proteases (Pondaven-Letourmy et al., 2020).

3.1.2. Mechanism of action on saliva samples

SARS-CoV-2 in salivary gland duct epithelial cells can be infected in rhesus macaques. The appearance of Covid-19 in saliva causes infection of the salivary glands. Saliva comprises saliva generated by the central and minor salivary glands and secretions that descend from the nasopharynx or lungs via cilia activity on the airway. (To et al., 2020). The saliva samples were carried out using several methods, namely the standard heating inactivation of SARS-CoV-2 at a temperature of 60°C. In killing the virus, it was carried out by direct RT-qPCR, which did not involve the extraction of RNA when it was impaled at room temperature. For which no SARS-CoC-2 gene was observed (Ranoa et al., 2020).

3.1.3. Mechanism of action on throat samples and nasal swabs

Nasal and throat swab samples in immunosuppressed people on viral culture were carried out in the first seven days of the onset of indications with an increase in viral load. The virus could increase in the respiratory tract of people shown in the first week after the onset of symptoms (Perera et al., 2020; Rabaan et al., 2021; van Kampen et al., 2020). Then the chances of SARS-CoV-2 will decrease after seven days (Rabaan et al., 2021; Young et al., 2020). The nasal and throat swab samples were carried out by looking at the viral load that occurred. The increase in viral load will differ from the computed tomography (Ct) values observed after the onset of the disease. Using the increased viral load, it is more legible on the nose and throat. What occurs is that when viral nucleic acids are released, they become infected with SARS-CoV-2. The viral load can be found in asymptomatic people (Zou et al., 2020).

3.2. How to take sampling from all three sample media

3.2.1. How to take the nasopharyngeal sample

In the nasopharyngeal, sampling is carried out in a sitting position, and the head is upright by following the bridge of the nose perpendicular to the face. The head is placed on a holder on the head of the chair to ensure that the head performs the reflex movements. Look at the bridge of the nose to find out the right place. Then from the nasal space, it will be obtained right on the contact in the nasopharynx, precisely on the posterior wall, which will be rotated to take samples at about 8-10 cm for adults and 6-7 cm for children. The grip of the nasopharyngeal swab is mandatory for holding the pen (**Fig. 1**). After the swab has been taken, at the end of the swab, there will be a long mark that can be detected, but there is also no sign (Pondaven-Letourmy et al., 2020).

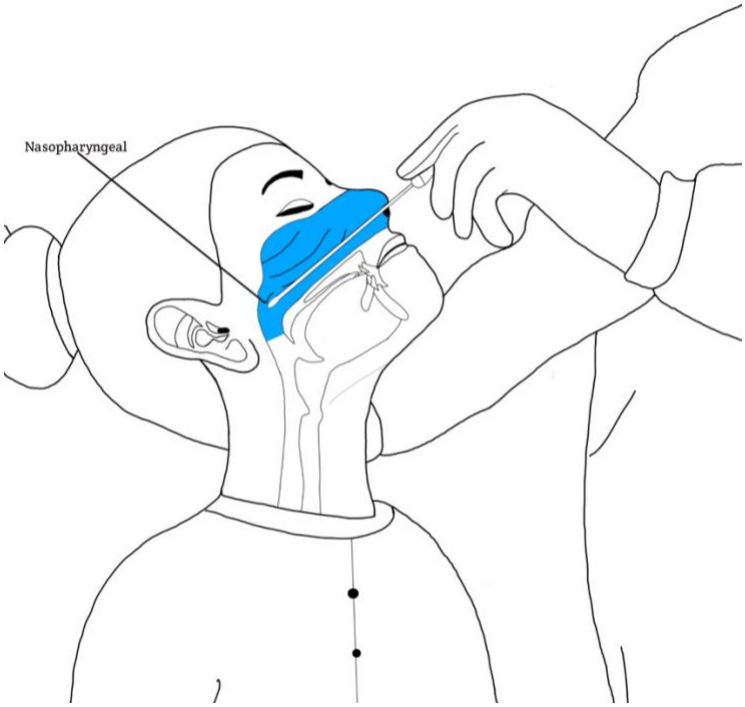

Figure 1. How to take the nasopharyngeal sample

3.2.2. How to take the throat sample

In the throat or oropharynx, the sample is taken by taking it on the edge of the back wall of the posterior pharynx just below the ovule and oropharynx (**Fig. 2**), then before removing it, turn the swab a maximum of 3 times (Berenger et al., 2020).

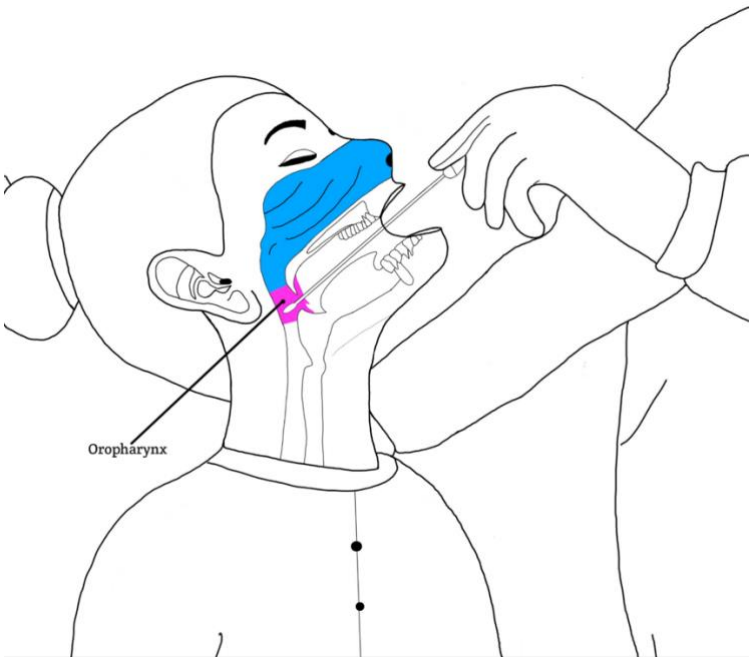

Figure 2. How to take the throat sample

3.2.3. How to collect saliva samples

In **fig. 3**, taking samples of saliva to take samples using a cotton swab that has been prepared then put under the tongue to keep away from contamination from breathing when put under the tongue directed not to cough (Tsujimoto et al., 2021).

Figure 3. How to collect saliva samples

3.2.4. How to collect nasal swab sample

In taking the sample, the nose swab (**Fig. 4**) is carried out with the head tilted 70° towards the back of the cotton or the swab that has been prepared is inserted and taken into the nostrils between 3 cm or until resistance occurs on the turbinate which is rotated at least three times (Berenger et al., 2020).

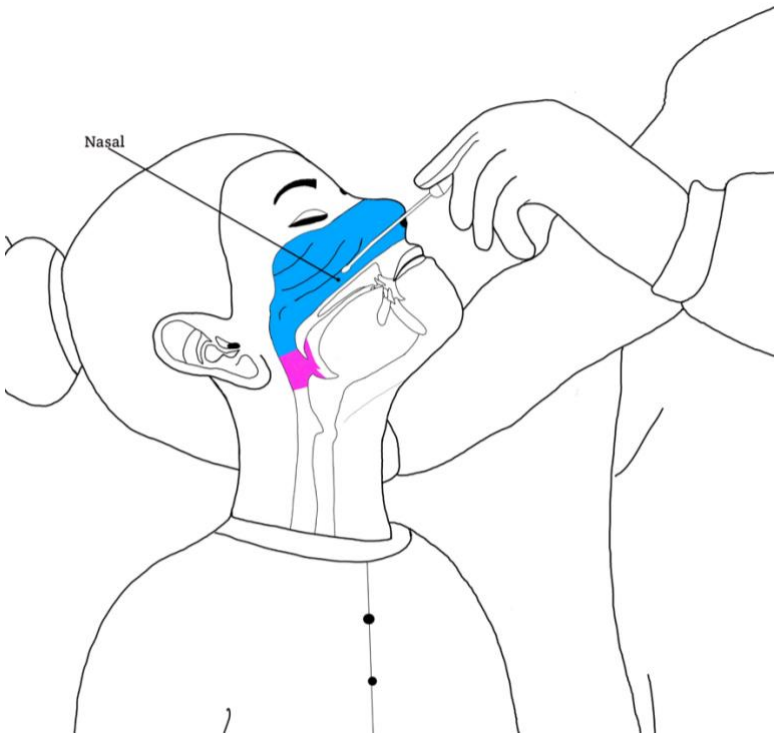

Figure 4: How to collect nasal swab sample

3.3. Comparison of samples

Based on the results data obtained from journals, there are no significant results from nasopharyngeal samples and saliva samples, which in practice saliva samples are more widely used, in the advantage that they can be easily

obtained and do not require more energy. However, it takes many saliva and nasopharyngeal samples to make comparisons and assess the presence of the SARS-CoV-2 virus, which is done using many techniques (Nasiri & Dimitrova, 2021).

In the combination of throat swab and nose swab, the sensitivity results are classified as the same in detecting SARS-CoV-2 as a nasopharyngeal swab, although on computed tomography (Ct), the nasopharyngeal smear is down. For nasal swab samples and nasopharyngeal samples have the same position, which is used as the gold standard in detecting SARS-CoV-2. The nasal swab samples showed great sensitivity and qualification (Péré et al., 2020).

4. Conclusion

Each approach has its benefits and drawbacks. This article compares the efficiency of four sample media to determine the most effective approach for identifying the SARS-CoV-2 virus. It is hoped that repeating this paper can make us aware of every method that we can use to detect the SARS-CoV-2 virus and reduce the spread of this virus, which is increasingly widespread.

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Analysis of Completeness of Filling in Medical Records in Inpatients of Orthopedic Surgery to Improve Quality Services at Hasan Sadikin Hospital Bandung, Indonesia

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Abstract
This study aimed to find out how to implement filling out the medical records for orthopedic surgery at Hasan Sadikin General Hospital, Bandung. The research was conducted using a qualitative descriptive method, namely analyzing and describing the data and explaining the results obtained in full on the completeness of the medical record. The results showed that filling out the medical record form was incomplete with a population of 139 Delinquent Medical Record (DMR) samples; 54 DMR were taken. The highest incomplete form in the Authentication Review, namely "Nursing Assessment," there were 12(22%) complete 42(78%) incomplete; the highest incomplete form in the Reporting Review, namely "Medication Notes," there were 13(24%) complete 41(76%) incomplete. Incomplete medical record filling includes (1) The level of understanding of nurses and doctors on the importance of filling out medical records, (2) Doctors' delays and limitations on practice time, (3) Doctors and nurses' busyness levels, (4) Doctors' dependence on nurses, (5) the lack of attention of doctors and nurses towards filling out medical records. Suggestions for assembling officers to be more focused and pay attention to their work so that medical record documents with incomplete contents can be controlled and controlled periodically so that medical record documents are better with lower DMR numbers on filling.

Keywords: Hospitalization, Medical records, Service Quality

1. Introduction

The hospital is a health service institution handling various types of health services, so in providing hospital services, it must be professional to provide optimal service to patients. The hospital is also a health service unit capable of producing data and information with high accuracy and speed in supporting services to the community by prioritizing the quality of health services (Manzoor et al., 2019).

According to the Decree of the Minister of Health of the Republic of Indonesia No. 340/MENKES/PER/III/2010, a hospital is a health service institution that provides comprehensive individual health services and inpatient, outpatient, and emergency services. In addition, the hospital, according to the Regulation of the Minister of Health

of the Republic of Indonesia No. 1204/Menkes/SK/X/2004 relating to Hospital Environmental Health Requirements, states that: "Hospitals as a health service facility, as a place for sick and healthy people, this can be a place of transmission of disease so that it can allow contamination to occur." environment and health problems (Haryanti, 2022). A medical record is a document relating to records or files regarding identity, anamnesis, examination, diagnosis, treatment, and actions and services performed on hospitalized patients in the outpatient, emergency, or inpatient units (Jim et al., 2020).

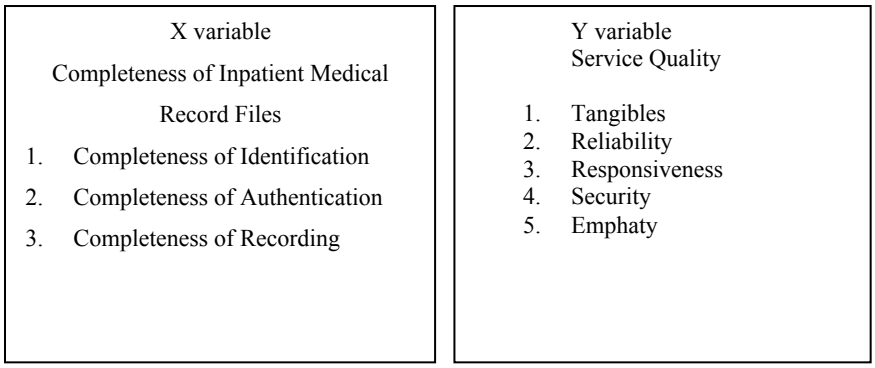
Complete medical record contents after the patient receives service must be made immediately and wholly completed following the provisions (Ministry of Health of the Republic of Indonesia, 1997) as follows: a) Every consultation action performed on a patient no later than 1 x 24 hours must be recorded in the medical record sheet. b) Each recording must be accompanied by a signature by a doctor or other health worker following the authority, and a statement of name and date must be written. c) Recording by students must be completed with a signature and is the treating doctor's or supervising doctor's responsibility. d) The supervising doctor must know the resident's record. e) The doctor who is responsible for treating can correct errors in the records and correct them at the same time and give signatures. Writing is not allowed in any way (Rumana et al., 2020).

Medical Record Quality According to Permenkes No.269/Menkes/Per/III/2008 concerning Medical Records, when conducting medical record analysis in carrying out quantitative, qualitative, or statistical analysis must notify the officer filling in the Medical Record if there are deficiencies that could result in The medical record becomes inaccurate and incomplete, then makes a report about the incompleteness so that it can be corrected and resolved so that the medical record becomes complete. There are also indicators of the completeness of the medical record: a) Completeness of contents in the medical record, filled in by a doctor within > 24 hours after the patient has been treated or after the patient has gone home. b) Filling accuracy in the medical record form, all patient data must be written carefully and precisely according to natural conditions. c) medical records must be filled in completely and returned on time according to established regulations. d) Fulfilling the legal aspects: 1. writing medical records without using a pencil 2. There is no deletion 3. Deleting must be done by crossing out without removing the corrected notes 4. There is a signature from a doctor, dentist, or particular health worker who provides services Direct health 5. There is a date and time of examination and action 6. There is an action approval sheet (Rumana et al., 2020).

The medical records field is one of the installations in charge of collecting and processing medical record data to provide services and information to patients. Still, with an increase in the number of inpatients so that the services offered are carried out on an increasing basis, this causes there still need to be completed filling of medical records, which can affect the quality of medical records. Incomplete medical record documents, either new or old hospitalization, outpatient care, and other incomplete medical records, such as not filling in address, name, gender, age, and doctor's signature, can affect medical record quality. Therefore, from the problem data above, the researcher is interested in conducting an "Analysis of Completeness of Filling in Medical Records Inpatient Orthopedic Surgery to Improve Service Quality at Hasan Sadikin Hospital Bandung, Indonesia.

2. Method

The conceptual framework or frame of mind is a logical combination of theoretical foundations and empirical studies. So the framework of thinking is a model related to how the relationship between theory and factors is defined as significant.



This research was conducted at Hasan Sadikin Hospital, Bandung. This study aims to analyze the completeness of medical records for inpatient orthopedic surgery to improve service quality. The population and samples taken, as well as the methods and data collection techniques used, are as follows:

1. **Population**
   The population is a generalized area consisting of objects/subjects. It has certain qualities and characteristics determined by researchers to be observed and researched to study (Campbell et al., 2020). The population in this study were medical record documents for Orthopedic Surgery, as many as 139 DMR.
2. **Sample**
   The sampling technique used in this study was cluster random sampling (Campbell et al., 2020). Sample random sampling is a technique used to obtain samples directly in the sampling unit. The samples taken in this study were 54 DMR from the 4th floor of the Kemuning room.
3. **Design**
   This type of research was carried out using a qualitative descriptive method, namely analyzing and describing the data and explaining the results obtained in full regarding the completeness of the Orthopedic Surgery Medical Record documents at Hasan Sadikin General Hospital, Bandung. The research was carried out descriptively by providing an overview and describing a situation objectively and in real terms according to the existing reality (Surucu & Maslakci, 2020).
4. **Sampling**
   This data collection was carried out using the direct observation method by looking at and observing the completeness of the documents and analyzing whether or not the documents were complete or not in the medical record unit and presented in the form of a checklist table regarding the completeness of medical record data so that it is easy to understand. and understood by readers. Observation is one way to assess employing direct and systematic Observation following the conditions in the field. The data obtained in the Observation is recorded in an observation note so that the Observation results can be analyzed. Then the data is processed using a checklist table to determine the completeness of medical record data (Campbell et al., 2020).

3. Results

3.1. Analysis of Identification Review Completeness

Table 1: Analysis of Completeness of Identification in Orthopedic Surgery at Hasan Sadikin General Hospital, Bandung

No	Medical Record Form	Identification Review				Incomplete Description
		Complete		Incomplete		
		Total	Percentage	Total	Percentage	

1	Entry And Exit Summary	19	35%	34	65%	No. Medical Record
2	DPJP Statement Letter	29	54%	24	46%	Date of birth
3	Education	27	50%	26	50%	Gender
4	Nursing Assessment	23	43%	30	57%	No. Medical Record
5	Treatment Notes	30	56%	21	44%	Date of birth
6	Observation sheet	31	57%	22	43%	Gender
7	Internal Transfers	35	65%	18	35%	Date of birth
8	Action Approval Letter	33	61%	20	39%	Gender
9	Action Report	11	20%	42	80%	Name, Date of Birth
10	Return Summary	31	57%	22	43%	Date of birth

Based on the results of Table 1 above from a sample of 54 DMR, it can be concluded that the results of incomplete identification reviews are primarily found in the medical record form "Action Report." There are 11 with a percentage of 20% complete and 42 incomplete with a percentage of 80%. In comparison, the highest completeness was in the internal transfer medical record form, with a total of 35 with a percentage of 65% complete and 18 with a percentage of 35% incomplete.

3.2. Authentication Review Completeness Analysis

Table 2: Analysis of Authentication Completeness in Orthopedic Surgery at Hasan Sadikin General Hospital, Bandung

No	Medical Record Form	Authentication Review				Incomplete Description
		Complete		Incomplete		
		Total	Percentage	Total	Percentage	
1	Entry And Exit Summary	31	57%	23	43%	Doctor's Name
2	DPJP Statement Letter	28	52%	26	48%	Doctor’s signed
3	Education	29	54%	25	46%	Signed Recipient of Education
4	Nursing Assessment	12	22%	42	78%	Nurse Name
5	Treatment Notes	16	30%	38	70%	Doctor’s signed
6	Observation sheet	32	59%	22	41%	Nurse Name
7	Internal Transfers	28	52%	26	48%	Name of Nurse
8	Action Approval Letter	30	55%	24	45%	Doctor's Name
9	Action Report	26	48%	28	52%	Doctor’s signed
10	Return Summary	18	33%	36	67%	Signed Patient/Family

Based on Table 2 above from a sample of 54 DMRs, it can be concluded that the results from incomplete authentication reviews are primarily found in the "Nursing Assessment" medical record form. There are 12, with a percentage of 22% complete, and 42 incomplete, with a percentage of 78%. In comparison, the highest completeness was in the observation sheet medical record form, with a total of 32 with a percentage of 59% complete and 22 with a percentage of 41% incomplete.

3.3. Analysis of Recording Review Completeness

Table 3: Completeness of Recording Analysis in Orthopedic Surgery at Hasan Sadikin General Hospital, Bandung

No	Medical Record Form	Recording Review				Incomplete Description
		Complete		Incomplete		
		Total	Percentage	Total	Percentage	
1	Entry And Exit Summary	20	37%	34	63%	Initial Diagnosis
2	DPJP Statement Letter	28	52%	26	48%	Physical examination
3	Education	22	41%	32	59%	Acceptance of Education
4	Nursing Assessment	24	44%	30	56%	Nursing actions
5	Treatment Notes	13	24%	41	76%	Room Name
6	Observation sheet	32	59%	22	41%	Blood pressure
7	Internal Transfers	36	67%	18	33%	Transfer Destination
8	Action Approval Letter	37	69%	17	31%	Action
9	Action Report	34	63%	20	37%	Date, Hour Action
10	Return Summary	22	41%	32	59%	Diagnosis

Based on the results of Table 3 above, from the results of a sample of 54 DMR, it can be concluded that the results from the review of incomplete records were mostly found in the medical record form "Treatment Notes." There were 13, with a percentage of 24% complete, and 41 incomplete, with a percentage of 76%. Meanwhile, the highest completeness was in the medical record form with approval for the action, with a total of 37 with a percentage of 69% complete and 17 with a percentage of 31% incomplete.

4. Discussion

The completeness of medical record documents is essential because it affects the service process by medical officers and the quality of a hospital's services (Saiedeh Sharifi et al., 2023). Incomplete medical record filing describes the health services and quality of medical record services. In addition, complete medical record documents will prevent health workers from recognizing the patient's medical history and claim to insurance companies (Ayaad et al., 2019). In this study, of the 54 DMR inpatient medical record documents for orthopedic surgery, the highest incompleteness was on the medical record form for action reports, 11 with a percentage of 20% complete and 42 with a percentage of 80% incomplete name and date of birth. So that if the patient's identity is complete, the officer may need help in ensuring the accuracy of the patient receiving the procedure. Meanwhile, if the patient's identity is complete, the officer will more easily recognize patients who receive services and actions. For the components of incomplete authentication, of the 54 inpatient medical record documents for orthopedic surgery, the highest incompleteness was in the medical record form for nursing assessment, with 12 with 22% complete and 42 with a percentage of 78% incomplete. Even though including the nurse's name is very important to determine who the nurse is caring for the patient. So that if the name of the nurse is not listed, it will not be known which nurse is responsible for caring for the patient and who is taking action on the patient. This is in line with the results of the study, namely the highest percentage of completing the authentication component in inpatients diagnosed with a fracture of the femur, namely in the items doctor's signature, nurse's name, and nurse's signature, 15 medical record documents (42%) were filled out. Conversely, the lowest percentage was found in the item doctor's name and professional title of 11 filled-out medical record documents (31%). These results indicate that many doctors' names and professional designations still need to be filled in completely in the medical record documents. This is because doctors are busy writing authentication, so doctors often sign. This can result

in the examination, treatment, or medication that has been carried out being unable to be accounted for by the doctor, making it difficult for officers to determine which doctor is responsible for the patient (Rizkika, 2020).
In the other hands, of the 54 inpatient medical record documents for orthopedic surgery that were examined, the highest incomplete reporting was on the medical record form, 13 with a percentage of 24% complete and 41 with a percentage of 76% incomplete. Only complete effect on medication records with complete room names. So it can be difficult for pharmacists to know where the patient is being treated and get service even though the name of the room is essential because it can make it easier for the pharmacist to deliver the medicine to be given. The final results (Delinquent Medical Record) in medical record documents for orthopedic surgery still found a lot of stubbornness. This happens because the relevant officers need to learn the importance of filling out medical record documents.

The influence of incompleteness on filling in the medical record for orthopedic surgery to improve the quality of service at Hasan Sadikin Hospital Bandung obtained from the observation results are as follows: (1) the level of understanding of nurses and doctors regarding the importance of filling out medical records needs to be prioritized, (2) doctors' delays and limitations on practice time so that medical records with a specified time limit are not filled in, (3) the doctors and nurses are busy, so medical records are incomplete, (4) the dependence of doctors on nurses so that doctors fill in medical records after being reminded by nurses, and (5) the nurses and doctors who prioritize health services to patients so that doctors and nurses pay less attention to filling out medical records.

Based on the literature regarding human factors, the causes of incomplete medical record documents can be seen in terms of knowledge, discipline, motivation, workload, and communication. Another cause of incomplete medical records is doctors and nurses who need more discipline in filling out medical records, including health workers who are late in returning medical record documents to medical records officers for more than 2x24 hours. This is supported by the results of other studies, which state that incomplete medical record documents are caused by health workers who lack discipline in filling out medical records (Binarti & Fitriyana, 2022).

Factors that cause frequent primary diagnoses not to be filled include busy doctors, many patients, doctors prioritizing service, patients going home at their request, a lot of workloads (required to work fast but still add other work), taking a lot of time, files medical records have been distributed to other departments, lazy, undisciplined because they do not know the benefits. Therefore, health workers also need to pay attention to their discipline at work. Discipline forms employees' attitudes and behavior so that they voluntarily try to work cooperatively and improve their work performance (Alfiansyah et al., 2022).

5. Conclusion

The results of the incomplete identification review were at most 80% incomplete, the highest completeness was in the internal transfer medical record form. From incomplete authentication reviews were 78% incomplete. While the highest completeness with 32 (59%) complete and 22 (41%) incomplete. The results from the review of incomplete records were at most 76% incomplete. Incomplete effect on medication records with incomplete room names. So it can be difficult for pharmacists to know where the patient is being treated and get service. The effect of incompleteness on filling out medical records for orthopedic surgery at Hasan Sadikin Hospital Bandung. a) nurses' and doctors' understanding of the importance of filling out medical records. b) Doctors' delays and limitations on practice time. c) The level of activity of doctors and nurses. d) The dependence of doctors on nurses. e) doctors and nurses lack attention towards filling out medical records.

6. Implication

Some inputs to improve the quality of medical record services can be applied, especially in filling out medical record form sheets for inpatient orthopedic surgery. Assembling officers to be more focused and pay attention to their work so that medical record documents whose contents are incomplete can be controlled and controlled periodically so that medical record documents are better with lower DMR numbers on filling. Also, exercise discipline in filling out medical record documents and reminding each other related parties, be it doctors, nurses, or other officers so that everything is noticed in filling out medical record documents so that the medical record

completeness standards can be met. The officer concerned with filling out medical record documents should pay more attention to recording, considering the quality of medical records is very important because it determines the quality of services in the hospital. In reporting, pay more attention and fill it in entirely by related parties, be it doctors, nurses, or other officers, and review the records on the form so that the information written is sustainable it can be accounted for.

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