International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Risk Assessment of Cardiovascular Diseases Through Non-Laboratory Based Method and Interventional Strategies At the Selected Rural Communities of Golaghat, Assam

Ms. Jyoti Lakshmi Handique[1], Ms. Bornali Gogoi[2]

[1]Tutor, Community Health Nursing, VKNRL School Of Nursing, Numaligarh, Assam
[2]Tutor, Medical Surgical Nursing, VKNRL School Of Nursing, Numaligarh, Assam

ABSTRACT

Being aware about the chances of developing Cardio Vascular Diseases (CVD) in the population is an important risk oversight plan for the nullification of the disease. Therefore to assess the CVD risk, A cross-sectional survey was done through non-laboratory based method at the selected rural communities of Golaghat, Assam. The study aims to provide Interventional Strategies by raising health awareness among the population. WHO STEPS questionnaire excluding the biochemical measurements were used to assess the CVD risk level among adults aged 40 years to 74 years. WHO CVD risk assessment non-laboratory based chart, (SOUTH ASIA, 2019) was used to calculate the 10 year CVD Risk level among the population. Non-probability purposive sampling method was employed to gather information from a sample of 678. Descriptive analysis was done using SPSS 30.0.0. Univarite analysis was done using chi-square test. Majority of the samples 51.2% belong to the age group 40-49 years and most of them 67.4% were female. In this study, it was found that 49.60% had very low CVD risk (<5%), 29.35% had low risk (<10%), 20.20% had moderate risk (<20%) and only 0.88% had high CVD risk (≥20%) based on WHO CVD Risk assessment chart (SOUTH ASIA, 2019). High CVD risk (≥20%) was found more in male adults, aged 50 years and above, non-vegetarian, currently married, private employee also home maker, who had high blood pressure (≥140 mmHg) and higher BMI (≥25). Significant association of CVD risk level very low to moderate (<5% to ≥10%) was found with age (p value <0.00001), gender (p value 0.000017), smoking(p value <0.00001), hypertension (p value <0.00001), BMI (p value 0.004742) and diabetes mellitus (p value 0.03025) at 0.05 level of significance. No significant association was found with alcohol use at 0.05 level of significance. Interventional strategies were provided by raising health awareness on lifestyle modifications, improving dietary habit and engaging in physical and mindful activities. This study reveals that majority of the sample had a low risk of CVD, a small but obvious portion of the population have a high risk. It also focuses on the inconsistencies among the samples in terms of age, gender, smoking, alcohol use, hypertension, BMI. The use of WHO Non-Laboratory based chart for risk stratification reduces the over dependence on laboratory investigations for CVD risk estimation in resource limited settings. A CVD risk score of 20% or more indicates a significant likelihood of cardiovascular events such as heart attacks or strokes. Identified high risk individuals need referral for second examination as the bio-chemical measurement was excluded in the present study. Follow-up can be done to assess the effectiveness of interventional strategies in

reducing the risk of CVD. The study suggest regular screening and early detection of cardio-vascular risk factors to prevent cardio-vascular events. Targeted interventions need to be developed to address the specific needs of this high-risk population. Health education on the importance of lifestyle modification, risk factor management and regular health check-ups such as monitoring of Blood Pressure , Blood Sugar regularly and also cessation of smoking, drinking should be emphasized among the populations periodically and community health workers need to be trained to provide CVD risk prevention awareness and support high risk population. The study recommends further investigation of CVD risk assessment of the second hand smokers as 17.55%, non-smokers in the present study were found to have moderate to high (≥10%) CVD risk.

Keywords: Cardiovascular Diseases, World Health Organization, Non-Laboratory Based Chart, Cardiovascular Diseases Risk, Blood Sugar, Blood Pressure, Smoking, Risk Level, Hypertension, Health Awareness, Interventional Strategies

INTRODUCTION:

The term cardiovascular diseases (CVD) includes a spectrum of diseases related to the heart and blood vessels. CVDs are a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. More than four out of five CVD deaths are due to heart attacks and strokes, and one third of these deaths occur prematurely in people under 70 years of age. [1]

Risk prediction charts evaluate the risk of cardiovascular disease (CVD) by taking into account various risk factors and categorizing individuals into high-risk and low-risk groups. Prompt and cost-effective interventions can help mitigate the likelihood of serious events like heart attacks, thereby decreasing premature death and disability rates. These CVD risk charts also serve as effective communication tools for tracking behavioral changes on an individual basis. The World Health Organization (WHO) has developed CVD risk charts that include both laboratory-based and non-laboratory-based options, with the latter designed for implementation in resource-limited environments.

According to the WHO, non-communicable diseases (NCDs) kill 41 million people each year, equivalent to 74% of all deaths globally. Of these, 17 million people die from NCDs before the age of 70. Eighty-six percent of these premature deaths occur in low- and middle-income countries (LMICs), which covers most countries in asia, where health systems are the least equipped to deliver care for chronic diseases [2].

India faces one of the highest burdens of cardiovascular disease (CVD) globally. In the country, CVDs account for 45% of deaths in individuals aged 40 to 69 years. The estimated annual deaths from CVD in India are expected to increase from 2.26 million in 1990 to 4.77 million by 2020. The prevalence of coronary heart disease in India varies, with rates between 1.4% and 4.6% in rural areas and 2.5% to 12.6% in urban areas. Key behavioral risk factors contributing to heart disease and strokes include poor dietary habits, lack of physical activity, tobacco consumption, and excessive alcohol intake. These behavioral risk factors can manifest in individuals as elevated blood pressure, increased blood glucose levels, higher blood lipid levels, and overweight or obesity. These “intermediate risk factors” can be evaluated in primary care settings and signal a higher likelihood of heart attacks, strokes, heart failure, and various complications. Quitting smoking, decreasing dietary salt, increasing fruit and vegetable intake, engaging in regular physical exercise, and limiting harmful alcohol consumption have been

proven to lower the risk of cardiovascular diseases. Health policies that foster environments where healthy choices are both affordable and accessible are crucial for encouraging individuals to adopt and maintain healthy habits.

Worldwide, cardiovascular disease (CVD) leads to significant levels of illness, disability, and premature deaths. Assessing the risk of CVD has become crucial for its prevention and management. Estimating an individual's risk helps identify those at a heightened risk of developing CVD and facilitates early interventions. This risk assessment is valuable for making informed clinical decisions concerning the intensity of preventive measures. It also supports policymakers in making appropriate decisions about the distribution of resources for disease prevention. In 2007, the World Health Organization (WHO) created CVD risk charts for specific sub-regions in collaboration with the International Society of Hypertension. In 2019, the charts were updated and expanded to include 21 Global Burden of Disease regions, resulting in a more uniform classification of countries. The WHO offers two varieties of charts: laboratory-based (lab) and non-laboratory-based (non-lab), to estimate the 10-year risk of experiencing either fatal or non-fatal cardiovascular disease (CVD) such as myocardial infarction and stroke. Research indicates that the efficacy of the 2019 WHO non-laboratory-based CVD risk prediction charts is comparable to that of the laboratory-based charts in the general population. Additionally, non-laboratory-based CVD risk charts are valuable for field workers to screen and refer individuals in the community who are at risk of developing CVD.The non-laboratory based risk prediction chart utilizes only age, gender, smoking, systolic blood pressure and BMI for risk calculation [3] . Based on this risk factors the CVD risk of an individual is stratified into very low (<5%), low (5 to <10%), moderate (10-<20%), high (20 to <30%) and very high (≥30%). So in resource limited settings, the non-laboratory based CVD risk estimation chart developed by WHO is an ideal way for initial risk estimation and further referral of high risk individuals [4] .

As CVDs are a major public health concern, India, which is undergoing a rapid epidemiological transition is also facing a huge burden of CVD and prevalence of ischemic heart disease(IHD) and stroke in absolute numbers (IHD:23.8 million, stroke: 6.5 million) in India is alarming [3] . However this rising incidence of CVDs can be prevented by number of strategies such as population-wide reduction in the prevalence of CVD risk factor (primary prevention) and primary prevention among individual with high CVD risk. Seeing the complex nature of CVD prioritizing total CVD risk management proves more cost effective than focusing on individual risk factors or CVD treatment [3] . That is why investigator felt the need to assess the total CVD risk to identify different risk level and provide timely intervention (life style modification) to prevent further development of CVD.

METHODOLOGY:

The method a researcher employs to organize a study in order to collect and examine data pertinent to the research topic is known as the research methodology. A research design serves as a blueprint for carrying out a study; it outlines the general strategy and techniques that will be applied to gather and examine data in order to address a research question or test a hypothesis.

In this study, quantitative Research Approach was adopted in order to assess the CVD risk through non-laboratory based method and Descriptive cross-sectional research design was embraced.The study was conducted at Rural Community under Ponka PHC, Golaghat, Assam. Eight number of villages under the PHC were selected to conduct the study. The study population were Adult (male and female) aged 40 years and above.

SAMPLE SIZE:

Referring the study by Mounika N, Ali A , Yasmin N, Rao S M, Murty S U (2023) et. al who conducted A cross-sectional study on Assessment and prediction of cardiovascular risk and associated factors among tribal population of Assam and Mizoram, Northeast India. Where the Investigators reported Alcohol consumption- 22.6%, smoking habit-11.6%, BMI(over-weight)-17.5%, obese-4.4%, systolic blood pressure (hypertension)- 24.3%, diastolic blood pressure(hypertension)- 17.1% among samples (n=708) in Assam. The P value is highest of systolic blood pressure (24.3%), assuming this as the baseline data, statistical calculations were done and **600** sample would be sufficient for the present study with 95% confidence interval, 80% power allowing 5% margin of error.

Ethically without harming more samples are included in the present study and the sample size of the study is **678**.

In this study, the investigator used the non-probability purposive sampling technique to meet the studies goal based on inclusion criteria relevant to the research objective.

DATA COLLECTION TOOLS AND TECHNIQUE:

Data collection is a key part of research where information is gathered to answer questions and test ideas. Research tool or instrument is a device used to measure the concept of interest in research employed by the researcher to collect data. Techniques of data collection are the specific means of gathering data using particular tools within the chosen methods.

Tools used in this study were:-

Variables	Tool	Technique
Demographic Variable	Semi-structured questionnaire, Part-I	Self-administered paper and pencil
Research Variable- Risk Assessment	WHO STEPs questionnaire for NCD, Part-II, excluding the bio-chemical measurements	Interview technique,
	WHO CVD risk assessment (non-laboratory based) chart , Part III	Physical assessment, screening of systolic Blood pressure and measurement of Height and Weight to calculate BMI

DEVELOPMENT AND DESCRIPTION OF TOOLS:

In this study the tool for data collection are demographic performa and WHO STEPS questionnaire on CVD risk assessment:

SECTION 1: The demographic data which includes 10 no. of questions (i.e) Age, Sex, Education, Marital Status, Type of family, Occupation, Religion, Dietary habit, Monthly Income, Any Family history of CVD.

SECTION 2: The WHO-STEPS questionnaire provides guidelines and supporting material for countries embarking on a non-communicable disease risk factor.

It consists of STEPS-1, Behavioural Measurements, which include: A. Tobacco Use, B. Alcohol Consumption, C. Diet, D. Physical Activity, E. History Of Raised Blood Pressure, F. History Of Diabete

s and STEPS 2 Physical Measurements.
It includes Measurement of Height, Weight, BMI and Systolic and diastolic Blood Pressure. Standard procedures and calibrated equipment were used for physical measurement including blood pressure and BMI. Blood pressure measurements were recorded in a seated position with 5 minute resting interval between the measurements and the average of the last two readings was considered [5].

DATA COLLECTION PROCEDURE:
After obtaining clearance from Institutional Ethics Committee VKNRL School Of Nursing, Numaligarh, written permission was obtained from Medical & Health Officer of Ponka PHC. The study was then conducted at 8 nos. of villages under Ponka PHC. The ASHA workers of the respective villages were approach and an assessment was done regarding the adult population of their respective area and for the appropriate timing for data collection. Study motive was also simplified to the ASHAs, seeking for their help and co-operation during data collection. After that a reliable and validated tool was used for data collection. We used the WHO STEPS questionnaire , excluding STEPs 3 of the Manual that is the Biochemical Measurements for our study. The period of data collection was from September to December, 2025.
For data collections WHO STEPs questionnaires were translated to Assamese and language was validated by an expert. Investigators have recruited 6 students of GNM 3rd year and trained them for 3 days with the WHO-STEPS Questionnaire. Then they were sent to the community with all the logistics for data collection ,where ASHA of the respective village have helped them in finding the sample. Samples were selected randomly. Our data collector have given self introduction and stated the motive of the study. Addressed the terms of confidentiality, obtained written informed consent from the samples. Data was collected as per the STEPs questionnaire. Separate code number is given to each subject. Data was collected by interviewing the subjects & also through measurement of Height, Weight and Blood Pressure. For each sample, Interviewing part took 15-20 minutes. Physical assessment part took 15-20 minutes. As a whole, 30-40 minutes time was approximately required for each sample. After obtaining the required data, gratitude was expressed to each and every sample of the study.

CVD RISK ASSESSMENT:
WHO Non-Laboratory based CVD Risk prediction chart (South Asia 2019) was used to assess the CVD Risk. The non-laboratory based chart utilizes only age, gender, smoking, systolic blood pressure and BMI for risk level assessment and the CVD risk is stratified into very low (<5%), low (5 to <10%), moderate (10-<20%), high (20 to <30%) and very high (≥30%).

OBJECTIVES OF THE STUDY:
1. To identify at risk for CVD
2. To provide interventional strategies in the identified risk group
3. To find out the association of identified risk score with the selected variables

VARIABLES:
1. Research variable:
In this study, the Research Variable is Risk Assessment for CVD

2. Demographic Variable:

In this study ,the demographic variables are-Age, Sex, Education, Marital Status, Type of family, Occupation, Religion, Dietary habit , Monthly Income, Any Family history of CVD.

OPERATIONAL DEFINITION:

1. **Risk**- According to oxford learner's dictionary risk means the possibility of something bad happening at some time in the future; a situation that could be dangerous or have a bad result.
   In this study risk means the factors (modifiable and non-modifiable) which leads to the occurrence of cardiovascular disease.
2. **Cardio Vascular Diseases**- According to World Heart Federation "Cardiovascular disease is a class of diseases that affect the heart or blood vessels".
   In this study it includes the diseases such as coronary artery disease, cardiac arrest, stroke and hypertension.
3. **Non-Laboratory Technique**- As per dictionary non-laboratory technique means not pertaining to or suited to a laboratory.
   In this study it means the same
4. **Interventional Strategies**- According to Collins English dictionary, interventional strategies means- a plan for taking a decisive or intrusive action in order to modify or determine events or their outcome.

In this study interventional strategies means- a plan for raising health awareness on CVD prevention and educate people in order to modify health behavior in terms of lowering the risk of CVD.

DATA ANALYSIS AND INTERPRETATION

The data collected through interview technique and physical assessment on CVD risk assessment, was tabulated, analysed and interpreted by using descriptive and inferential statistics, which are necessary to provide a substantive summary of results to the objectives [6]. CVD risk level was calculated based on WHO CVD risk chart (South Asia,2019).

PRESENTATION OF DATA

The obtained data were grouped and analysed under the following sections.

Section 1- Frequency and percentage distribution of samples according to their demographic variables

Section 2-Frequency and percentage distribution of samples according to Behavioural Measurements (Step-1) WHO STEPs Questionnaire

Section 3-Frequency and percentage distribution of samples according to Physical Measurements (Step-2) WHO STEPs Questionnaire

Section 4- Inferential statistics

Section 5- CVD risk score based on WHO CVD Risk Assessment Chart (South Asia 2019)

SECTION-1
FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR DEMOGRAPHIC VARIABLES

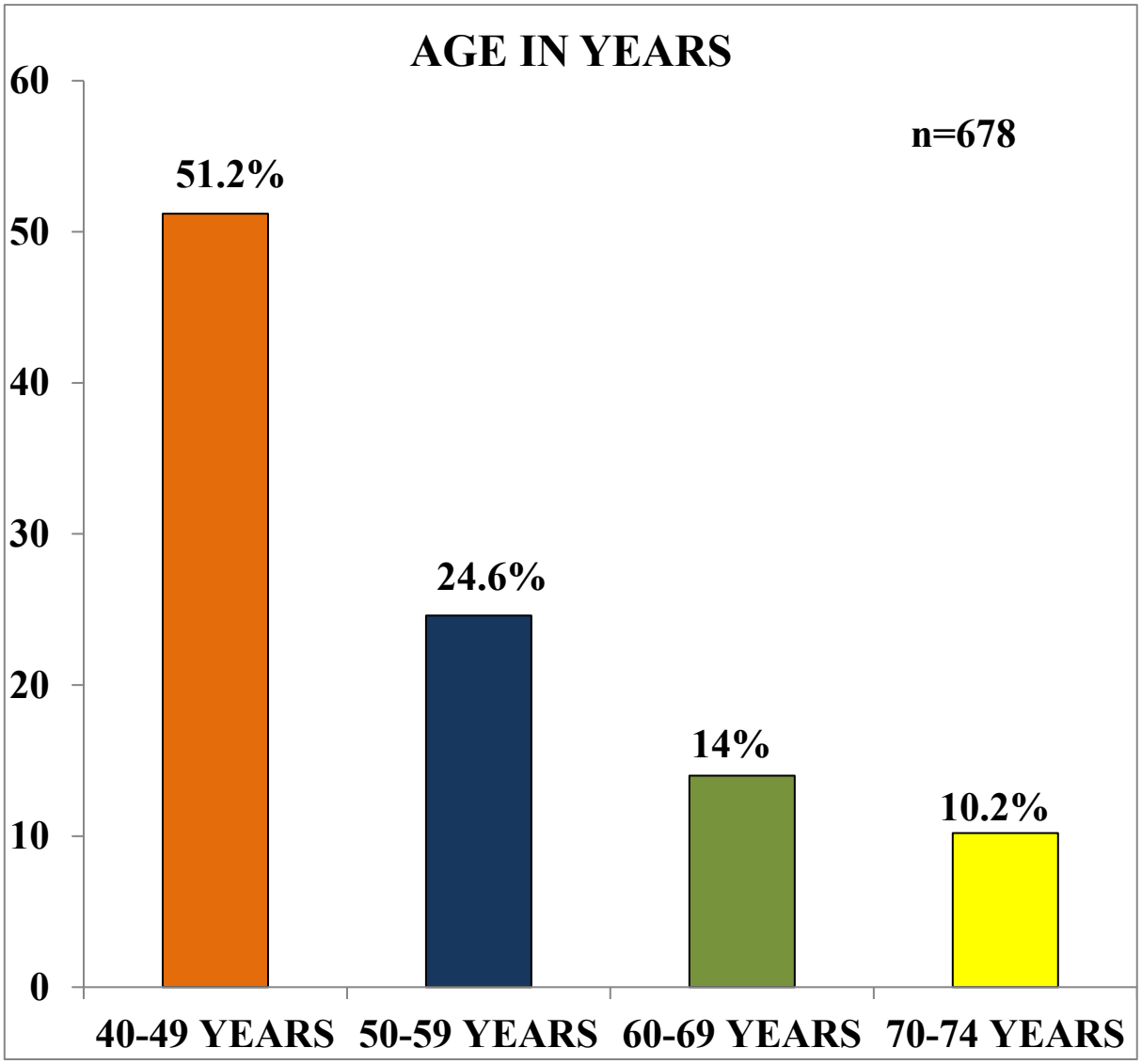

FIG- 1 PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR AGE GROUP

The bar diagram shows that, out of 678 samples, majority i.e. 51.2% (347) of the respondents were in the age group 40-49 years, 24.6% (167) respondents were in the age group of 50-59 years, 14% (95) respondents were in the age group of 60-69 years, 10.2(69) respondents were in the age group of 70-74 years.

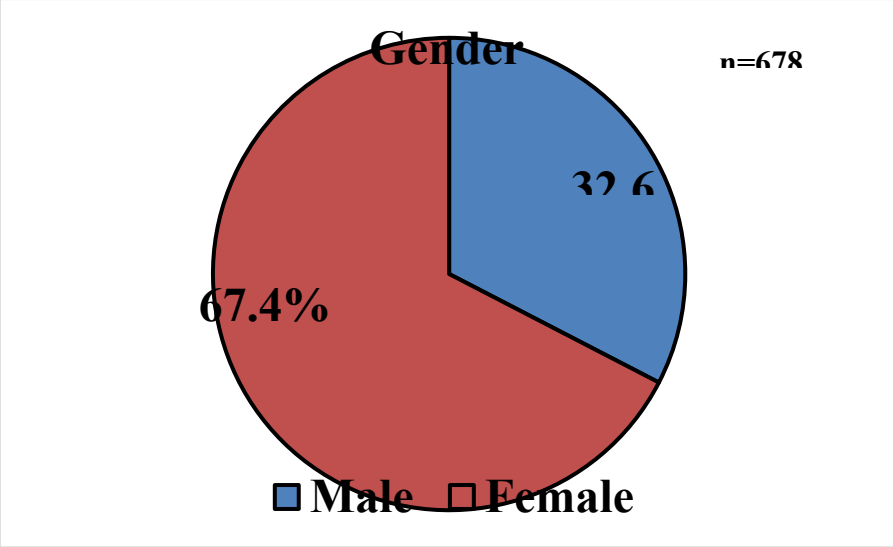

FIG 2- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR GENDER

The pie diagram shows that, out of 678 samples, majority i.e. 67.4% (451) of the respondents were female, 32.6% (221) were male.

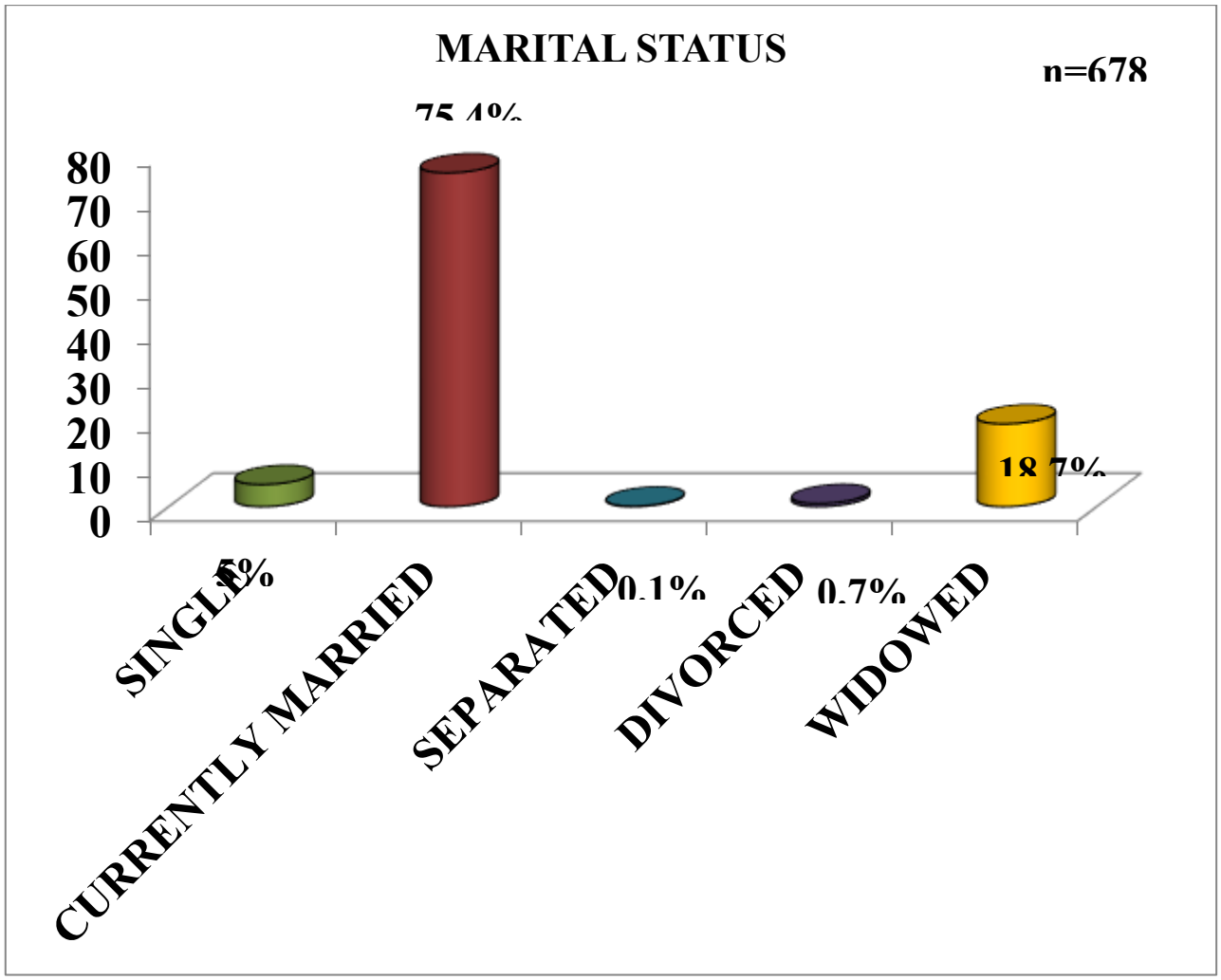

FIG 3- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR MARITAL STATUS

The cylindrical bar diagram shows that, out of 678 samples, majority i.e. 511 (75.4%) were currently married, 127 (18.7%) were widowed, 34 (5%) were single, 5 (0.7%) were divorced, 1 (0.1%) were separated.

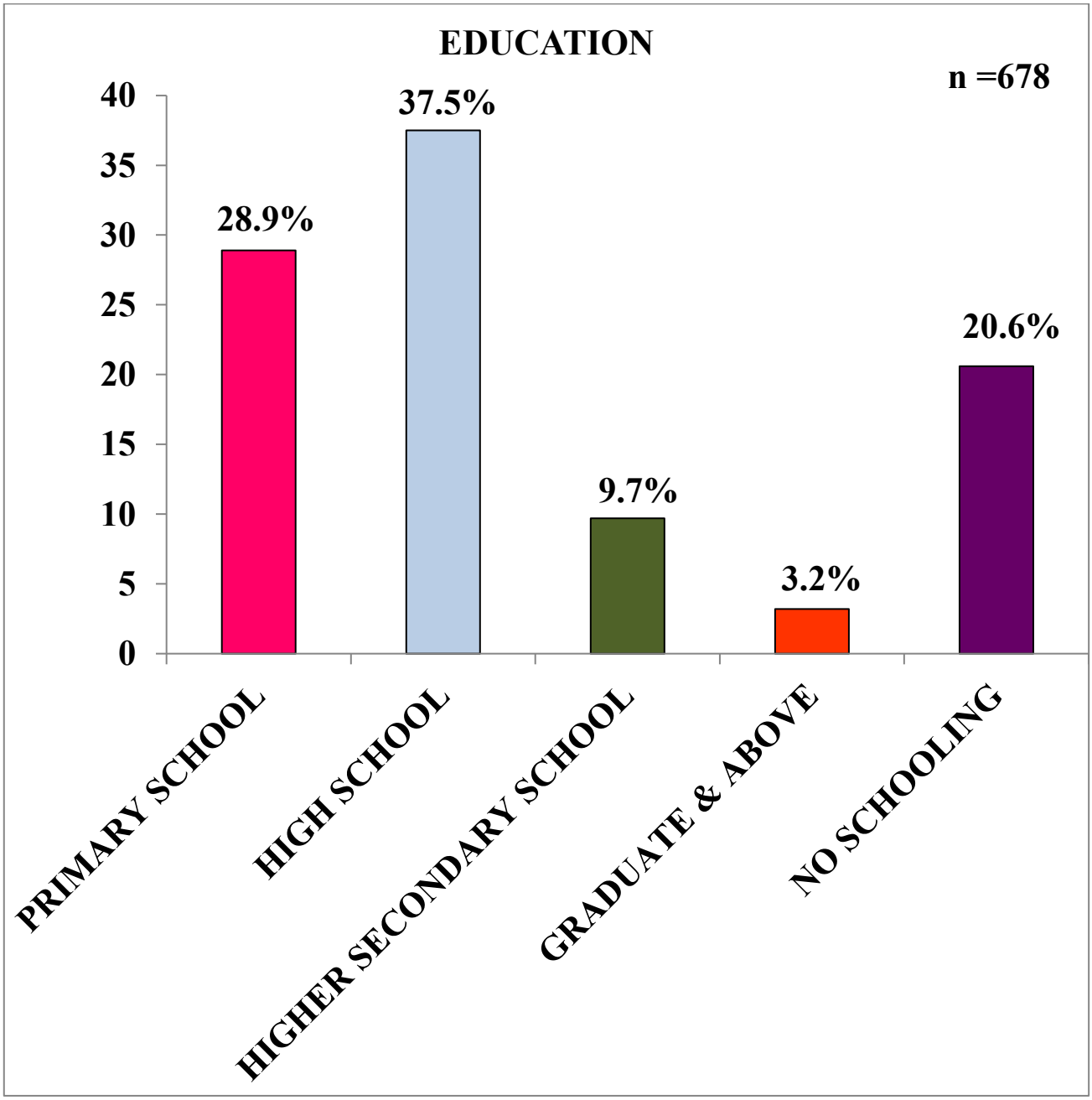

FIG 4- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR EDUCATION

The bar diagram shows that, out of 678 samples, majority i.e. 254(37.5%) completed high school, 196(28.9%) completed primary school, 140 (20.6%) have not undergone any formal education, 66(9.7%) completed higher secondary school, 22(3.2%) were graduate and above.

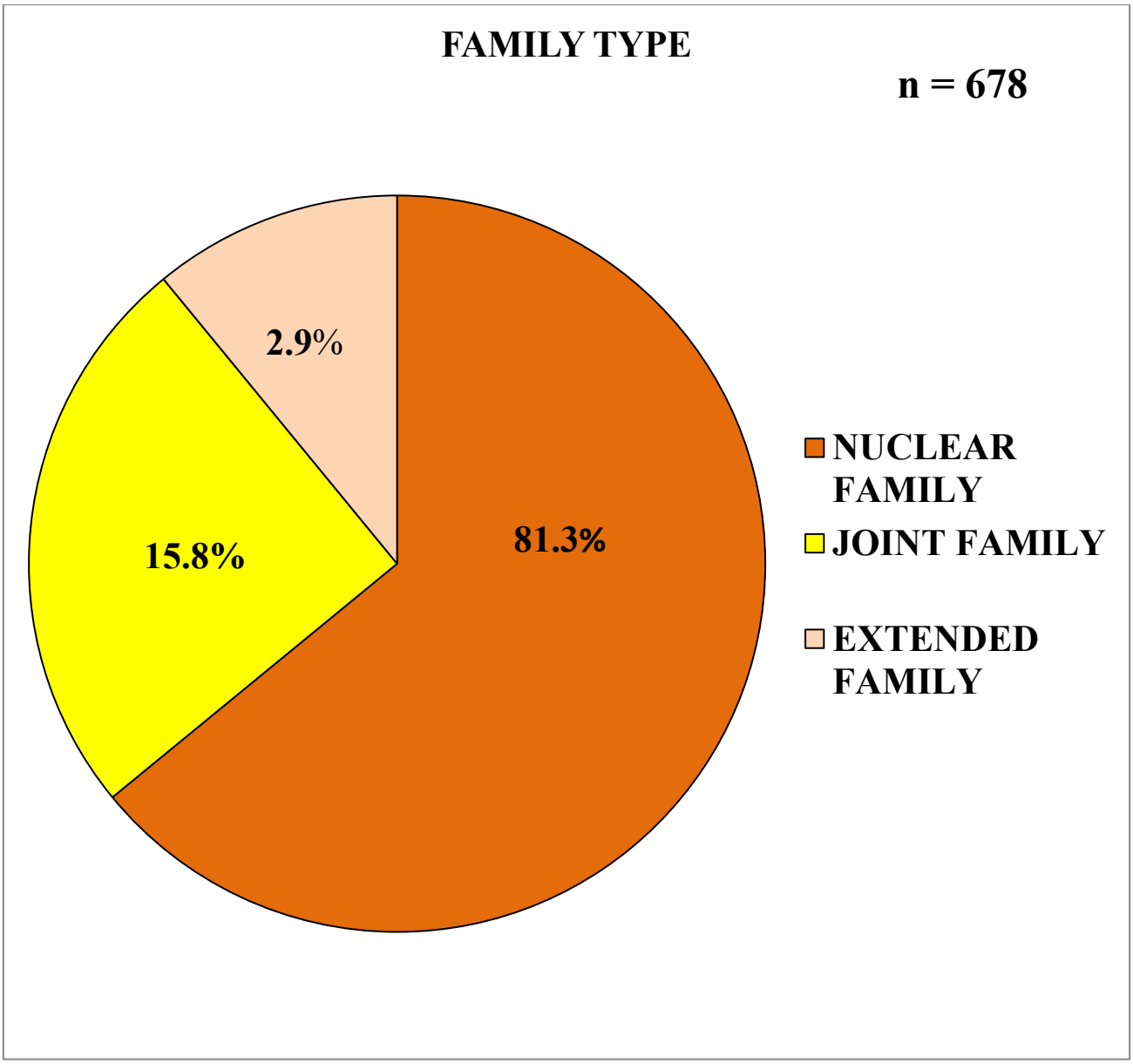

FIG 5-PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR FAMILY TYPE

The pie diagram shows that, out of 678 samples, majority i.e. 551(81.3%) belongs to nuclear family, 107 (15.8%) belongs to joint family, 20 (2.9%) belongs to extended family.

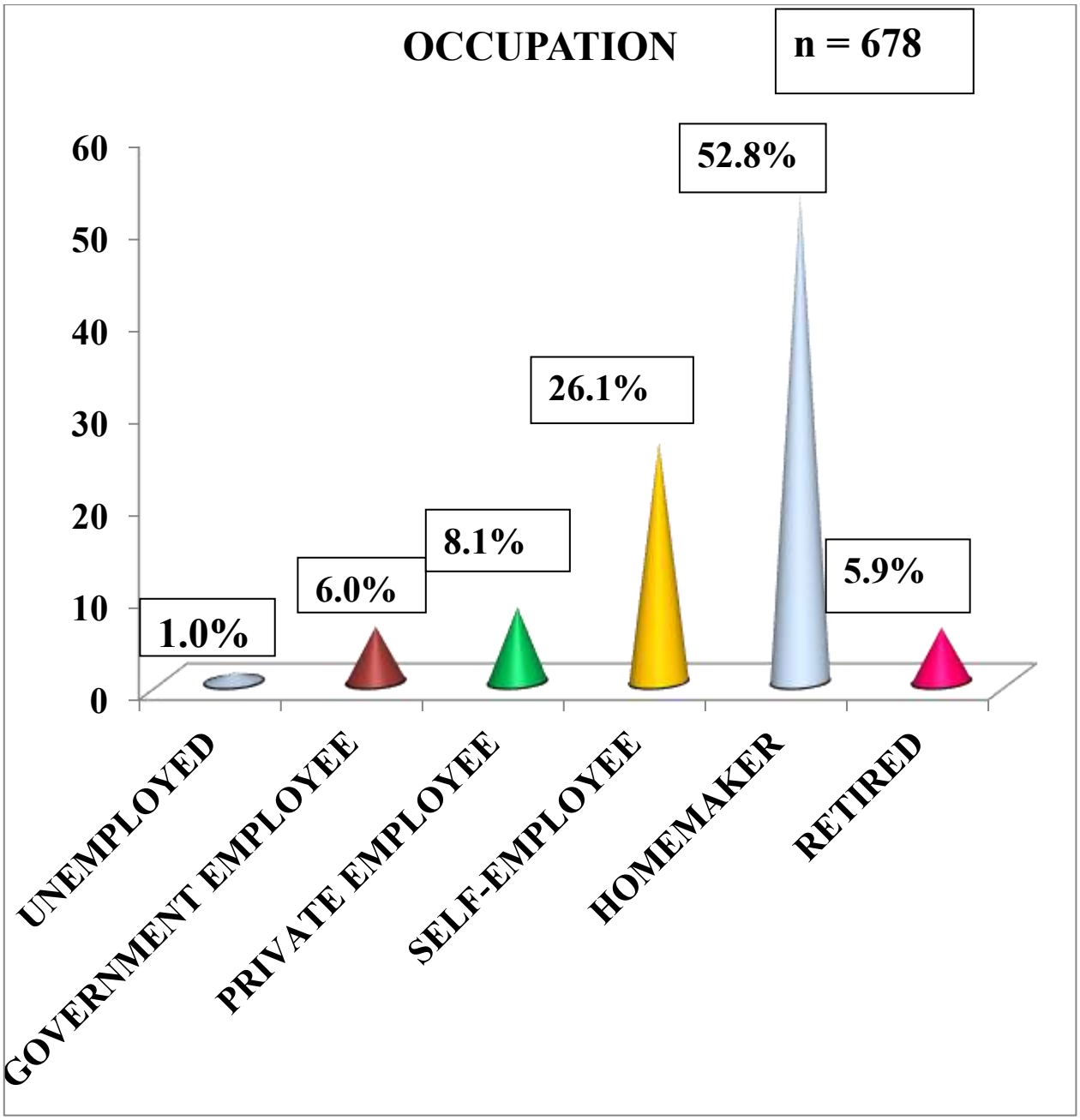

FIG 6- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR OCCUPATION

The conical bar diagram shows that, out of 678 samples, majority i.e. 358(52.8%) were homemaker, 177 (26.1%) were self-employed, 55(8.1%) were private employee, 41 (6%) were government employee, 40(5.9%) were retired, 7(1%) were unemployed.

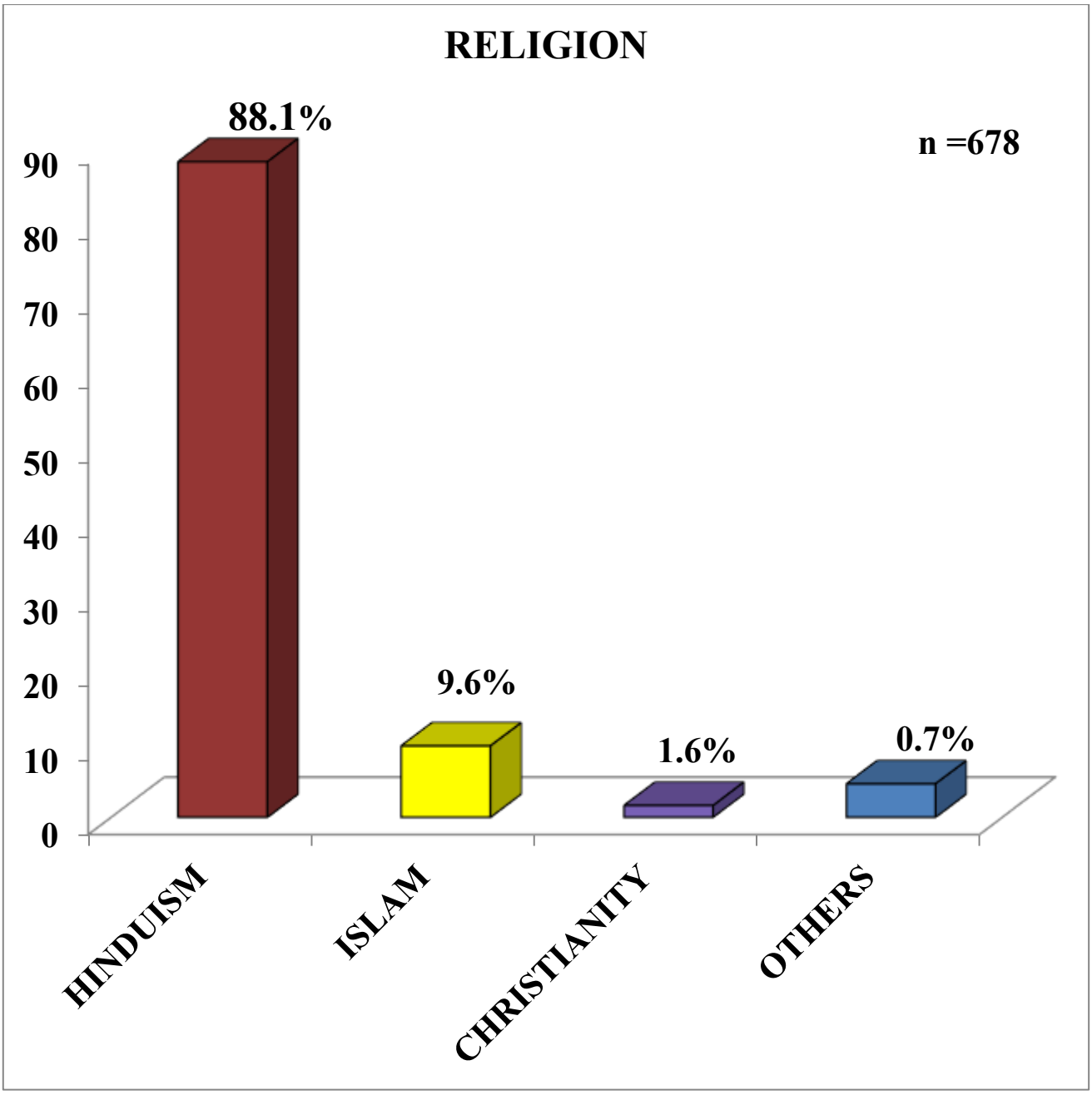

FIG 7- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR RELIGION

The bar diagram shows that, out of 678 samples, majority i.e. 597(88.1%) were hindu, 65 (9.6%) were Islam, 11(1.6%) were Christianity, 5 (0.7%) were others.

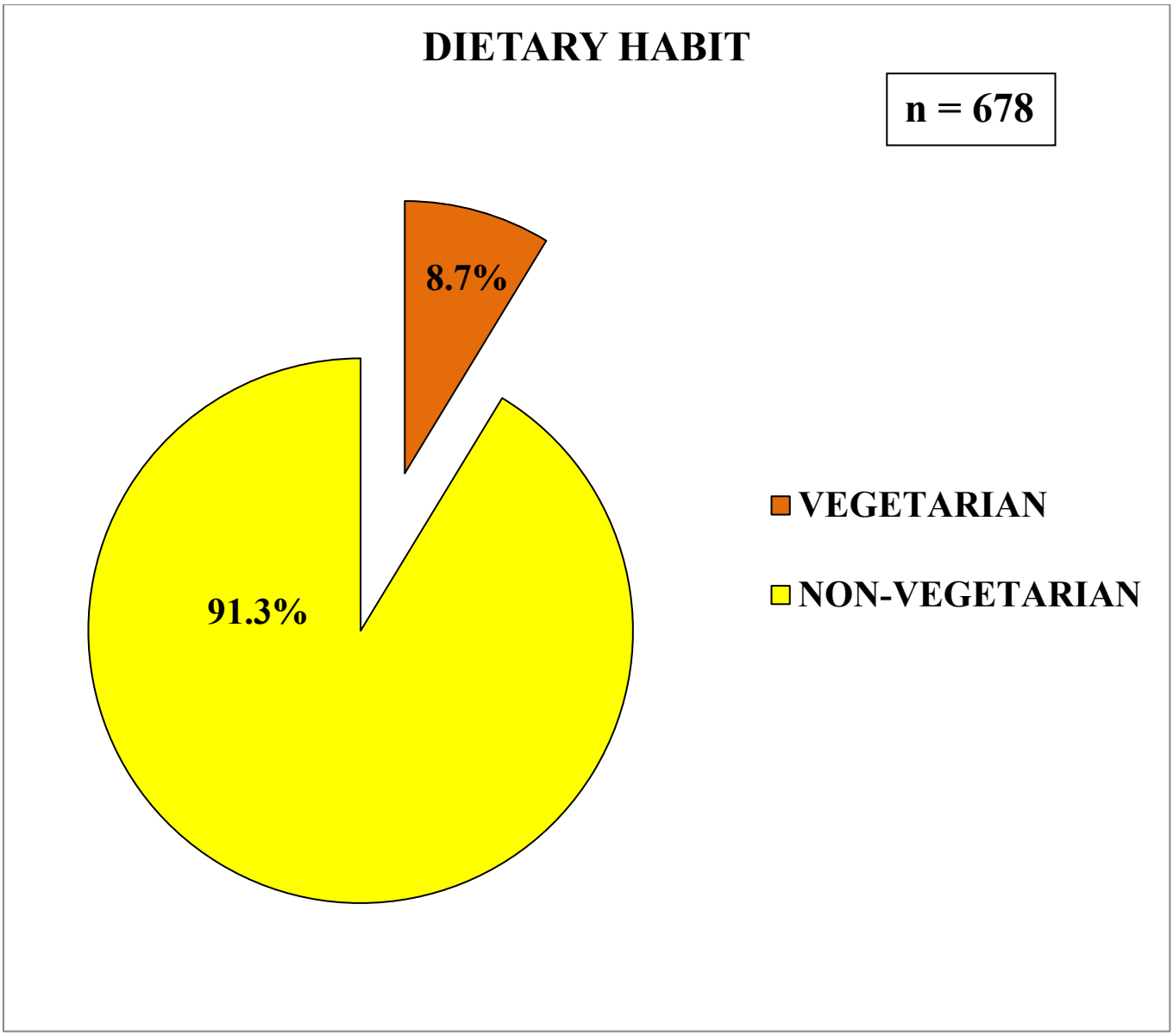

FIG 8- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR DIETARY HABIT

The pie diagram shows that, out of 678 samples, majority i.e. 619(91.3%) were non-vegetarian, 59 (8.7%) were vegetarian.

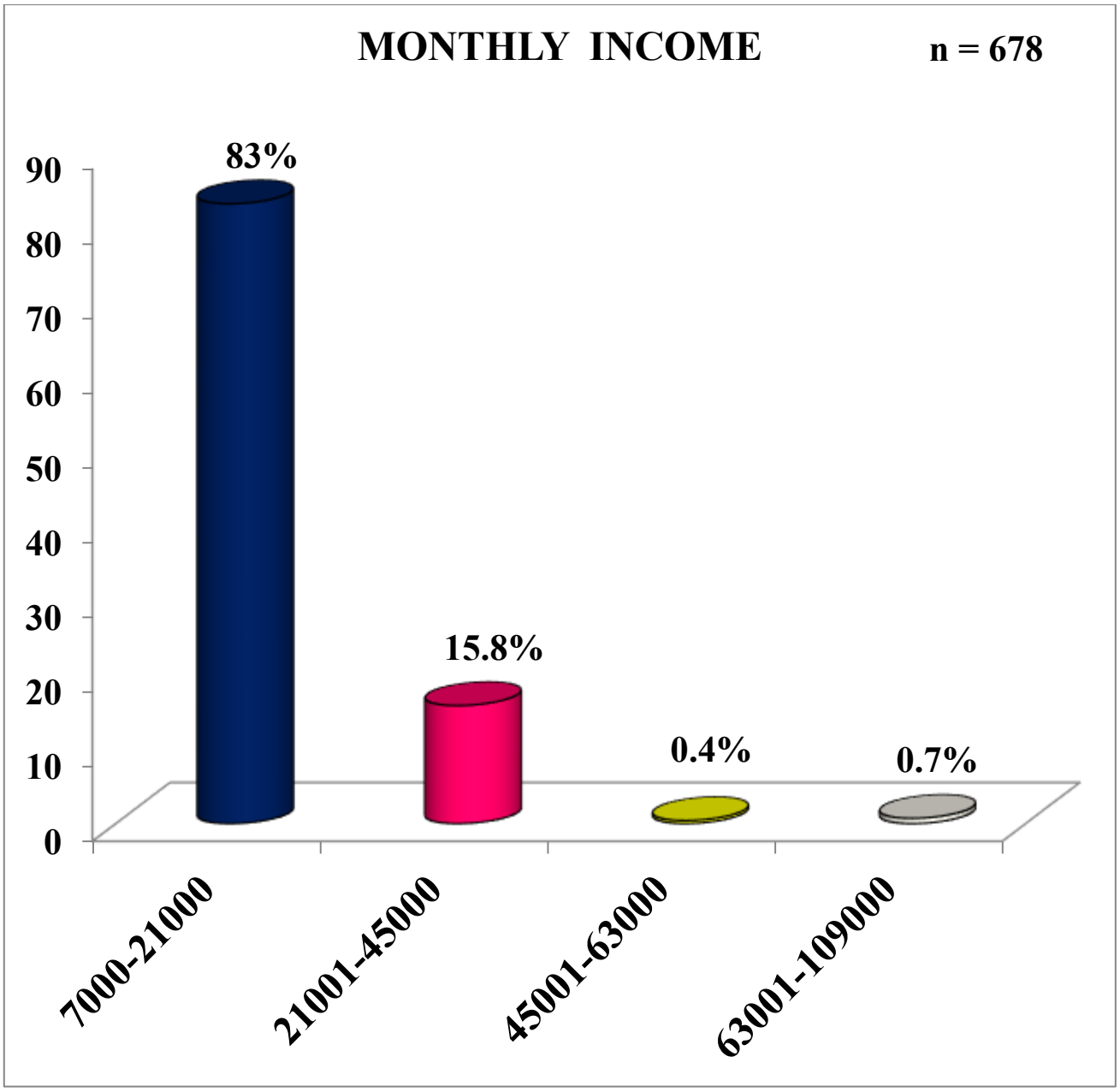

FIG 9- PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR MONTHLY INCOME

The cylindrical bar diagram shows that, out of 678 samples, majority i.e. 563(83.0%) had an monthly income of 7000-21000, 107(15.8%) had monthly income of 21001-45000, 5 (0.7%) had an annual income of 63001-109000, 3(0.4%) had an monthly income of 45001-63000.

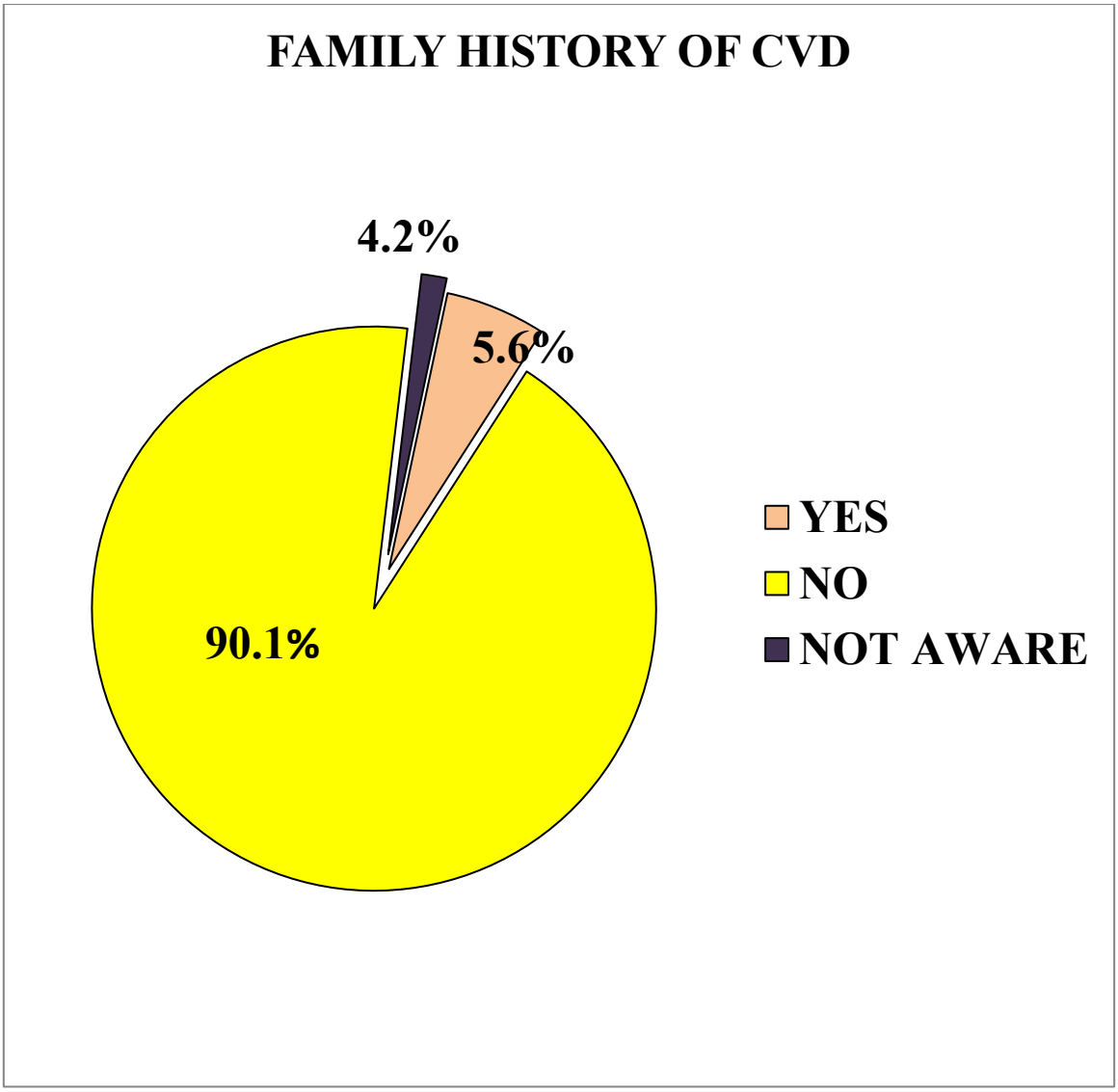

FIG 10-PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THEIR FAMILY HISTORY OF CVD

The pie diagram shows that, out of 678 samples, majority i.e. 611(90.1%) had no any family history of CVD, 38(5.6%) had family history of CVD, 29 (4.2%) were not aware of any family history of CVD.

SECTION-2

BEHAVIOURAL MEASUREMENTS (STEP-1) WHO STEPS QUESTIONNAIRE

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO TOBACCO USE

TABLE-1 **N=678**

CURRENTLY SMOKE ANY TOBACCO PRODUCTS	Frequency	Percentage	Mean	SD
YES	53	7.81%	339	404.465
NO	625	92.18%		

* **SD-** standard deviation

The table 1 reveals that out of 678 Samples; majority i.e. 625(92.18%) samples do not smoke any tobacco products currently, 53 (7.81%) respondents smoke tobacco products currently. The overall mean and standard deviation of currently smoke any tobacco products was 339 and 404.465 respectively.

TABLE-1 (a) **N=678**

CURRENTLY SMOKE ANY TOBACCO PRODUCTS	MALE	FEMALE	Mean	SD
YES	45(6.63%)	08(1.17%)	169.5	173.02
NO	176(25.95%)	449(66.22%)		

*** SD-** standard deviation

The table 1 (a) reveals that out of 678 Samples; 6.63% of the smokers are male, whereas only 1.17% of the smokers are female.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO THE USE OF SMOKELESS TOBACCO

TABLE-1 (b) **N=678**

USE OF SMOKELESS TOBACCO PRODUCTS	Frequency	Percentage	Mean	SD
YES	438	64.6%	339	99
NO	240	35.39%		

*** SD-** standard deviation

The table 1(b) reveals that out of 678 Samples majority 438 (64.6%) use smokeless tobacco products and 240 (35.39%) do not use smokeless tobacco products.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO ALCOHOL CONSUMPTION

TABLE-2 **N=678**

ALCOHOL CONSUMPTION	Frequency	Percentage	Mean	SD
YES	124	18.28%	339	215
NO	554	81.71%		

*** SD-** standard deviation

The table 2 reveals that out of 678 Samples majority 554 (81.71%) do not consume alcohol and 124 (18.28%) consume alcohol.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO PHYSICAL ACTIVITY

TABLE-3 **N=678**

PHYSICAL ACTIVITY THAT INVOLVES VIGOROUS INTENSITY	FREQUENCY	PERCENTAGE	Mean	SD
YES	80	11.79%	339	259
NO	598	88.20%		

*** SD-** standard deviation

The table 3 reveals that out of 678 samples, majority 598(88.20%) do not do, and only 80 (11.79%) do Physical Activity that Involves Vigorous Intensity.

TABLE-3 (a) **N=678**

PHYSICAL ACTIVITY THAT INVOLVES MODERATE INTENSITY	FREQUENCY	PERCENTAGE	Mean	SD
YES	125	18.43%	339	214
NO	553	81.56%		

*** SD-** standard deviation

The table 3 (a) reveals that out of 678 samples, majority 553(81.56%) do not do, 125 (18.43%) do Physical Activity That Involves Moderate Intensity.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO HISTORY OF BLOOD PRESSURE

TABLE-4 **N=678**

RAISED BLOOD PRESSURE OR HYPERTENSION	FREQUENCY	PERCENTAGE	Mean	SD
YES	171	25.22%	339	168
NO	507	74.77%		

*** SD-** standard deviation

The table 4 reveals that out of 678 samples, majority 507(74.77%) do not have , 171 (25.22%) have history of raised blood pressure or hypertension.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO HISTORY OF DIABETES

TABLE-5 **N=678**

RAISED BLOOD SUGAR OR DIABETES	FREQUENCY	PERCENTAGE	Mean	SD
YES	67	9.88%	339	272
NO	611	90.11%		

*** SD-** standard deviation

The table 5 reveals that out of 678 samples , majority 611(90.11%) do not have , 67 (9.88%) have history of raised blood sugar or diabetes.

SECTION 3- PHYSICAL MEASUREMENTS (Step-2) WHO STEPs QUESTIONNAIRE

TABLE-6 **N=678**

SYSTOLIC BLOOD PRESSURE	≥140 mm of Hg	<140 mm of Hg	Mean	SD
MALE	30(4.42%)	191(28.17%)	169.25	126.25
FEMALE	92(13.56%)	364(53.68%)		

*** SD-** standard deviation

The table 6 reveals that out of 678 samples, majority 13.56% of females have higher systolic Blood Pressure than males 4.42%.

TABLE-6(a) **N=678**

DYSTOLIC BLOOD PRESSURE	≥90 mm of Hg	<90 mm of Hg	Mean	SD
MALE	19 (2.80%)	202(29.79%)	169.5	165.43
FEMALE	30(4.42%)	427(62.97%)		

*** SD-** standard deviation

The table 6(a) reveals that out of 678 samples, majority 4.42%% of females have higher diastolic Blood Pressure than males 2.80%.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO BMI

TABLE-7 **N=678**

BMI	≥25	<25	Mean	SD
MALE	55(8.11%)	166(24.48%)	169.5	86.63
FEMALE	158(23.30%)	299(44.1%)		

*** SD-** standard deviation

The table 7 reveals that out of 678 samples, majority of female i.e 23.30% and only 8.11% of males have higher BMI (≥25), females 44.1% and male 24.48% have normal BMI (<25).

SECTION 4- INFERENTIAL STATISTICS

TABLE 8:-CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN TOBACCO USE AND SELECTED DEMOGRAPHIC VARIABLES

N=678

SL.NO	SOCIO-DEMOGRAPHIC VARIABLES	TOBACCO USE		TOTAL	CHI-SQUARE	df	P value	REMARKS
		YES	NO					
1.	AGE (in years)							
	40-49	25	322	347	3.0935	3	0.377427	NS
	50-59	13	154	167				
	60-69	06	89	95				
	70-74	09	60	69				
2.	GENDER							
	MALE	13	208	221	1.7032	1	0.194872	NS
	FEMALE	40	417	457				
3.	EDUCATION							
	PRIMARY SCHOOL	16	180	196	2.9537	3	0.398824	NS
	HIGH SCHOOL	15	239	254				
	HIGHER SECONDARY AND	07	81	88				

	ABOVE							
	NO FORMAL EDUCATION	15	125	140				
4.	TYPE OF FAMILY							
	NUCLEAR FAMILY	44	507	551	0.1157	1	0.73372	NS
	JOINT FAMILY	09	118	127				
5.	DIETARY HABIT							
	VEGETARIAN	05	54	59	0.0388	1	0.843914	NS
	NON-VEGETARIAN	48	571	619				
6.	FAMILY HISTORY OF CVD							
	YES	6	34	40	25.1011	2	< 0.00001	S*
	NO	37	565	602				
	NOT AWARE	10	26	36				

(at 0.05 level of significance)

S= Significance, NS= Non- Significance

TABLE-8 Shows that there is significant association of tobacco use with family history of CVD at 0.05 level of significance **(χ^2=25.1011, p=< 0.00001 and df=2)** and no significant association was found with other demographic variables age, gender, education, type of family, dietary habit.

TABLE:- 9 CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND SELECTED DEMOGRAPHIC VARIABLES

N=678

SL. NO	SOCIO-DEMOGRAPHIC VARIABLES	ALCOHOL CONSUMPTION		TOTAL	CHI-SQUARE	df	P value	REMARKS
		YES	NO					
1.	AGE (in years)							
	40-49	70	277	347	6.0134	3	0.110961	NS
	50-59	20	147	167				
	60-69	19	76	95				
	70-74	15	54	69				
2.	GENDER							
	MALE	49	172	221	3.3078	1	0.068952	NS
	FEMALE	75	382	457				
3.	EDUCATION							
	PRIMARY SCHOOL	41	155	196	2.4415	3	0.485959	NS
	HIGH SCHOOL	45	209	254				
	HIGHER SECONDARY AND ABOVE	12	76	88				
	NO FORMAL	28	112	140				

	EDUCATION							
4.	TYPE OF FAMILY							
	NUCLEAR FAMILY	92	459	551	4.9898	1	0.025497	S*
	JOINT FAMILY	32	95	127				
5.	DIETARY HABIT							
	VEGETARIAN	14	45	59	1.2796	1	0.257974	NS
	NON-VEGETARIAN	110	509	619				
6.	FAMILY HISTORY OF CVD							
	YES	8	30	38	2.0253	2	0.363264	NS
	NO	108	503	611				
	NOT AWARE	8	21	29				

(at 0.05 level of significance)

S= Significance, NS= Non- Significance

TABLE-9 Shows that there is significant association of alcohol consumption with type of family at 0.05 level of significance **(χ^2=4.9898, p=0.025497and df=1)** and no significant association was found with other demographic variables age, gender, education, dietary habit, family history of CVD.

TABLE:- 10 CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND SELECTED DEMOGRAPHIC VARIABLES

N=678

SL.NO	SOCIO-DEMOGRAPHIC VARIABLES	PHYSICAL ACTIVITY		TOTAL	CHI-SQUARE	df	P value	REMARKS
		YES	NO					
1.	AGE (in years)							
	40-49	39	308	347	2.6766	3	0.444223	NS
	50-59	20	147	167				
	60-69	09	86	95				
	70-74	12	57	69				
2.	GENDER							
	MALE	24	197	221	0.2782	1	0.597893	NS
	FEMALE	56	401	457				
3.	EDUCATION							
	PRIMARY SCHOOL	15	181	196	7.6794	3	0.053125	NS
	HIGH SCHOOL	40	214	254				
	HIGHER SECONDARY AND ABOVE	08	80	88				

	NO FORMAL EDUCATION	17	123	140				
4.	TYPE OF FAMILY							
	NUCLEAR FAMILY	65	477	542	0.0969	1	0.755557	NS
	JOINT FAMILY	15	121	136				
5.	DIETARY HABIT							
	VEGETARIAN	11	48	59	2.9091	1	0.08808	NS
	NON-VEGETARIAN	69	598	619				
6.	FAMILY HISTORY OF CVD							
	YES	05	33	38	10.9614	2	0.004166	S*
	NO	66	545	611				
	NOT AWARE	09	20	29				

(at 0.05 level of significance)

S= Significance, NS= Non- Significance

TABLE-10 Shows that there is significant association of physical activity with family history of CVD at 0.05 level of significance **(χ^2=10.9614, p=0.004166and df=2)** and no significant association was found with other demographic variables age, gender, education, type of family, dietary habit.

TABLE:- 11 CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN HISTORY OF DIABETES AND SELECTED DEMOGRAPHIC VARIABLES

N=678

SL.NO	SOCIO-DEMOGRAPHIC VARIABLES	HISTORY OF DIABETES		TOTAL	CHI-SQUARE	df	P value	REMARKS
		YES	NO					
1.	AGE (in years)							
	40-49	35	312	347	1.3531	3	0.716573	NS
	50-59	14	153	167				
	60-69	12	83	95				
	70-74	06	63	69				
2.	GENDER							
	MALE	17	204	221	1.7653	1	0.183965	NS
	FEMALE	50	407	457				
3.	EDUCATION							
	PRIMARY SCHOOL	23	173	196	3.2343	3	0.356897	NS
	HIGH SCHOOL	28	226	254				
	HIGHER SECONDARY AND ABOVE	06	82	88				
	NO FORMAL	10	130	140				

	EDUCATION							
4.	TYPE OF FAMILY							
	NUCLEAR FAMILY	52	499	551	0.653	1	0.41905	NS
	JOINT FAMILY	15	112	127				
5.	DIETARY HABIT							
	VEGETARIAN	13	46	59	5.5323	1	0.018668	S*
	NON-VEGETARIAN	54	565	619				
6.	FAMILY HISTORY OF CVD							
	YES	17	46	63	30.5518	2	<0.00001	S*
	NO	40	524	564				
	NOT AWARE	10	41	51				

(at 0.05 level of significance)
S= Significance, NS= Non- Significance
TABLE-11 Shows that there is significant association of history of diabetes with dietary habit, family history of CVD at 0.05 level of significance **(χ^2=5.5323, p=0.018668 and df=1), (χ^2=30.5518, p=<0.00001 and df=2)** and no significant association was found with other demographic variables age, gender, education, type of family.

TABLE:- 12 CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN HISTORY OF BLOOD PRESSURE AND SELECTED DEMOGRAPHIC VARIABLES
N=678

SL.NO	SOCIO-DEMOGRAPHIC VARIABLES	HISTORY OF BLOOD PRESSURE		TOTAL	CHI-SQUARE	df	P value	REMARKS
		YES	NO					
1.	AGE (in years)							
	40-49	90	257	347	3.5082	3	0.319706	NS
	50-59	38	129	167				
	60-69	21	74	95				
	70-74	23	46	69				
2.	GENDER							
	MALE	49	172	221	1.7698	1	0.183412	NS
	FEMALE	123	334	457				
3.	EDUCATION							
	PRIMARY SCHOOL	49	147	196	0.8002	3	0.849414	NS
	HIGH SCHOOL	64	190	254				
	HIGHER	20	68	88				

	SECONDARY AND ABOVE							
	NO FORMAL EDUCATION	39	101	140				
4.	TYPE OF FAMILY							
	NUCLEAR FAMILY	130	421	551	4.8965	1	0.026911	S*
	JOINT FAMILY	42	85	127				
5.	DIETARY HABIT							
	VEGETARIAN	19	40	59	1.5944	1	0.206695	NS
	NON-VEGETARIAN	153	466	619				
6.	FAMILY HISTORY OF CVD							
	YES	14	49	63	1.4501	2	0.484289	NS
	NO	148	416	564				
	NOT AWARE	10	41	51				

(at 0.05 level of significance)

S= Significance, NS= Non- Significance

TABLE-12 Shows that there is significant association of history of blood pressure with type of family at 0.05 level of significance **(χ^2=4.8965, p=0.026911and df=1)** and no significant association was found with other demographic variables age, gender, education, dietary habit and family history of CVD.

TABLE 13 shows that very low (<5%) CVD risk level was found in 49.60%, low risk level (<10%) was found in 29.35%, moderate risk level(<20%) was found in 20.20%, high risk level (≥20%) was found in 0.88% of the total samples

TABLE:- 13 RISK LEVEL FOR CVD BASED ON WHO CVD RISK ASSESSMENT CHART (SOUTH-ASIA, 2019)

SL. NO	SAMPLE	RISK LEVEL				
		<5%	5% - <10%	10%- <20%	20%- <30%	≥30%
1	336	49.60 %				
2	199		29.35%			
3	137			20.20%		
4	6				0.88%	
5	NIL					NIL
TOTAL SAMPLE	678					

TABLE 14:- DISTRIBUTION OF PARTICIPANTS AS PER CVD RISK LEVEL

SL.NO.	VARIABLES	RISK LEVEL					TOTAL
		<5%	5-<10%	10-<20%	20-<30%	≥30%	
1	AGE						
	a. 40-49	310	30	7			347
	b. 50-59	23	124	18	2		167
	c. 60-69	1	43	51			95
	d. 70-74	2	2	61	4		69
2	GENDER						
	a. Male	78	75	64	4		221
	b. Female	258	124	73	2		457
3	DIETARY HABIT						
	a.Vegetarian	34	20	4	1		59
	b.Non-Vegetarian	302	179	133	5		619
4	OCCUPATION						
	a.Government employee	22	12	7			41
	b.Private	26	22	3	4		55
	c.Self-employed	91	51	35			177
	d.Home-maker	172	99	85	2		358
	e.Retired	21	14	5			40
	f.Unemployed	4	2	1			7
5	MARITAL STATUS						
	a.Currently Married	256	153	97	5		511
	b.Widowed	59	35	32	1		127
	c.Divorced	2	2	1			5
	d.Single	19	8	7			34
	e.Separated		1				1
6	FAMILY HISTORY OF CVD						
	a.Yes	13	12	12	1		38
	b.No	302	182	122	5		611
	c.Not Aware	21	5	3			29
7	ALCOHOL USE						
	a. Yes	53	48	22	1		124
	b. No	283	151	115	5		554
8	SMOKER						
	a. Yes	7	22	22	2		53
	b. No	329	177	115	4		625
9	HYPERTENSION						
	a. Yes	41	55	69	6		171
	b. No	295	144	68			507

10	BMI						
	a.Normal BMI (<25)	224	129	112			465
	b.Obesity (≥25)	112	70	25	6		213
11	DIABETES MELLITUS						
	Yes	33	13	21			67
	No	303	186	116	6		611

TABLE:- 15 CHI SQUARE VALUE TO DETERMINE THE SIGNIFICANCE OF ASSOCIATION BETWEEN CVD RISK LEVEL AND SELECTED RISK FACTORS

N=678

SL.NO	RISK FACTORS ON CVD	CVD RISK LEVEL		TOTAL	CHI-SQUARE	df	P value	REMARKS
		<10%	≥10%					
1.	AGE (in years)							
	40-59	487	27	514	320.2935	1	<0.00001	S*
	60-74	48	116	164				
2.	GENDER							
	MALE	153	68	221	18.4513	1	0.000017	S*
	FEMALE	382	75	457				
3.	ALCOHOL USE							
	Yes	101	23	124	0.5897	1	0.442539	NS
	No	434	120	554				
4.	SMOKING							
	Yes	29	24	53				
	No	506	119	625	20.2173	1	<0.00001	S*
5.	HYPERTENSION							
	Yes	96	75	171		1	<0.00001	
	No	439	68	507	71.4565			S*
6.	BMI							
	a.Normal BMI (<25)	353	112	465		1		
	b.Obesity (≥25)	182	31	213	7.9752		0.004742	S*
7.	DIABETES MELLITUS							
	Yes	46	21	67	4.695	1	0.03025	S*
	No	489	122	611				

(at 0.05 level of significance)

S= Significance, NS= Non- Significance

TABLE-15 Shows that there is significant association of CVD risk level with age, gender, alcohol use, smoking, hypertension, BMI and no significant association was found with Alcohol Use at 0.05 level of significance.

DEVELOPMENT OF HYPOTHESIS:

H1 : There is significant association of age with CVD risk level very low to moderate (<5% to ≥10%)
H2 : There is significant association of gender with CVD risk level very low to moderate (<5% to ≥10%)
H3 : There is significant association of smoking with CVD risk level very low to moderate (<5% to ≥10%)
H4 : There is significant association of Hypertension (≥140 mm of Hg) with CVD risk level very low to moderate (<5% to ≥10%)
H5 : There is significant association of BMI with CVD risk level very low to moderate (<5% to ≥10%)
H6 : There is significant association of Diabetes Mellitus with CVD risk level very low to moderate (<5% to ≥10%)

DISCUSSION:

In this study 49.60% had very low CVD risk of (<5%), 29.35% had low risk (<10%),20.20% had moderate risk (<20%) and only 0.88% had high CVD risk (≥20%). Here the 10 year CVD risk based on WHO risk assessment chart was found high (≥20%) for people with age group with 50 years and above, gender –male; Non-vegetarian, who are currently married and home maker and private employee who had blood pressure more than equal to 140mm of Hg and Higher BMI (≥ 25) but had normal blood sugar. The results are similar to those of a study on ten-year risk assessment for cardiovascular disease & associated factors among adult Indians (aged 40-69 years): Insights from the National Noncommunicable Disease Monitoring Survey (NNMS) by Kulothungan V, Nongkynrih B, Krishnan A, and Mathur P (2024).In this case, the population's 10-year CVD risk was classified as high-to-very high (>20%), moderate (10-20%), and very low-to-low (10%). Fifty percent of the 4480 participants were younger (ages 40–49). The percentages of the populations at very low to low, moderate, and high to very high risk for CVD were, respectively, 84.9, 14.4, and 0.7%. People without jobs had a higher estimated 10-year CVD risk (adjusted odds ratio 5.12; 95% CI: 3.63, 7.24), and their blood glucose levels were higher (adjusted odds ratio 1.81; 95% CI: 1.39,2.34). The current study is contradicted by a high risk of CVD due to elevated blood sugar.

In the present study majority of the sample 78.9% of the study sample had low risk (<10%) for CVD. Whereas least 0.88% had high risk (≥20%) . This finding was similar with the study conducted by Kannan R, Kiran PR, Gnanaselvam NA, Mathew KG, and Johnson J C(2022) where 65% of the study population had low risk (<10%) and 4.1% had high risk (20-30%) according to the WHO CVD Risk assessment chart.

In the present study the means of systolic B.P, diastolic B.P and BMI were higher in females than males.This is because majority of the samples were female. This findings were similar with the study conducted by Dehghan A, Rayatinejad A, Khezri R, Aune D, Rezaie F (2023) where means of systolic B.P, diastolic B.P & BMI were higher in females than in males. It was also similar with the study conducted by Mamgai A, Halder P, Goel K, Behera A, Pal S et al. (2024) on Cardiovascular risk assessment using non-laboratory based WHO CVD risk prediction chart with respect to hypertension status among older Indian adults. Where it was found that 30.2% of females and 33% of males had high blood pressure while 29.8% of females and 21.2% of males were known cases of hypertension.

In the present study majority 56.34% females had a 10 years CVD risk of <10% and only a minority (0.29%) had a high risk of ≥20% . High CVD risk score of ≥20% was observed in individuals aged 50 years and above , those who are smokers and those with systolic blood pressure greater than equal to

140 mm of Hg and BMI ≥ 25 . High CVD risk was also found in 0.74% of non-vegetarian samples ,those who are currently married and home-maker. Here most non-smokers 57.22% had a low CVD risk of < 5%, only a minority 0.58% of the non-smoker had a CVD risk of ≥ 20%, while 3.53% of the smokers had a CVD risk of more than 10%. Also very low CVD risk (<5%) was found among 43.36% samples who had systolic blood pressure <140 mm of Hg and 11.06% of the samples had CVD risk of >10% with systolic B.P of ≥140mmHg. CVD risk score was higher in female compared to male. It was observed that samples with normal BMI (<25) 52.06% had a CVD risk of <10% and with higher BMI (≥25) 4.42% had CVD risk of ≥ 10% and 26.99% had a CVD risk of <10%. The results are comparable to a study conducted by Mamgai A, Halder P, Goel K, Behera A, Pal S et al. (2024) on Cardiovascular risk assessment using non-laboratory based WHO CVD risk prediction chart with respect to hypertension status among older Indian adults, where two-third (68.7%) of the population had a 10 year fatal and non-fatal Cardiovascular disease (myocardial infraction & stroke) risk of <10% and 2.7% had a risk of ≥20%. CVD risk score of 30% or higher was observed in individuals aged above 65 years, smokers and those with systolic blood pressure above 160 mm of Hg. This was distributed across both genders and all BMI categories.

In the present study it was found that out of total 678 samples. 7.81% smoke tobacco products. 64.6% use smokeless tobacco product, 18.28% consume alcohol, 25.22% had history of raised blood pressure or hypertension, 9.88% had history of high blood sugar or diabetes and 11.79% perform vigorous physical activity. Higher BMI (≥25) was found in female samples (23.30%) whereas, only 8.11% of male had higher BMI. It was found that 31.41% of the total samples had higher BMI (≥25). The finding was similar with the study conducted by Mounika N, Ali A, Yasmin N, Rao S M, Murty S U (2023) et. al where smoking habit was found to be 24.5%, alcohol consumption was 22.6%, BMI analysis reveal 21.9% of the total sample had higher BMI (≥25). But in contrast with the prevalence of higher diastolic and systolic blood pressure which was found more in males than compared to females.

In the present study it was found that age, gender, diabetes mellitus, smoking, hypertension, BMI were significantly associated with increased CVD risk ($p<0.00001$),suggesting for intervention to modify life style and prevent CVD risk. The findings are similar with the study conducted by Chaudhary RS, Venkateshmurthy NS, Dubey M, Jarhyan P, Prabhakaran D, et al. (2024) were hypertension, smoking were associated with increased CVD risk ($p<0.01$).

SIGNIFICANT FINDINGS OF THE STUDY:

- High CVD risk level (≥20%) was found only in 0.88% (6 no. of sample) of the total sample.
- High risk for CVD was found in 4 male and 2 female.
- Those sample with high CVD risk were under the age group of 50 years and above.
- High CVD risk level was found among private employee, homemaker and those who were currently married.
- High risk individuals were mostly non-smoker (4 sample), with high Blood Pressure (≥140 mm of Hg) and higher BMI (≥25).
- Significant association of CVD risk level very low to moderate (<5% to ≥10%) to moderate risk was found with age, gender, smoking, hypertension, BMI and Diabetes Mellitus.

RECOMMENDATION:

- Experimental studies can be conducted to evaluate the effectiveness of specific lifestyle modification in reducing CVD risk
- Longitudinal project can be conducted to find out the effectiveness of interventions and track the progression of CVD risk factor over time.
- Studies can be done to analyze the relationship between specific risk factors and CVD risk to inform targeted Interventions
- Comparative study can be also done to assess the CVD risk level through laboratory and non-laboratory based method

LIMITATIONS

The study was limited to:

- Sample size as per WHO risk non-laboratory based charts to be selected was from 40 years to 74 years.
- Only the villages under one PHC was selected.
- Broad generalization is not possible as it was conducted only in few settings.
- Non- laboratory method of risk assessment, limits bio-chemical measures to assess the CVD risk hence generalization of risk level is not so certain.

CONCLUSION:

Cardiovascular diseases are the leading cause of death globally. Risk assessment helps to identify the multiple risk factors and stratify the risk level into high, moderate, low. As it says prevention is better than cure, so the provision of early detection and preventive interventions should be emphasized, as the treatment for CVD is quiet expensive for the patient and health care system. The use of WHO Non-Laboratory based chart for risk stratification reduces the over dependence on laboratory investigations for CVD risk estimation. Individuals with elevated risk can be subjected to further investigation, reducing resource utilization. As interventional strategies awareness should be raised among the population regarding life style modification, healthy eating habit and regular monitoring of blood pressure, blood sugar, weight and engaging in physical activities and mindful activities. Finally factors such as education, type of family, and religion weren't considered for risk estimation in our study, so the results have to be interpreted with caution for assessing the individual level of CVD risk. Further research is needed on the positive association of physical activity and dietary habit with CVD risk in India, Assam.

ETHICAL STATEMENT:

Prior to data collection, ethical approval was obtained from the institution ethics committee VKNRL School Of Nursing, Numaligarh. Inform consent was taken from all the participants.

FUNDING:

The study is funded by CSR NRL, Numaligarh as a part of faculty development programme of VKNRL School Of Nursing. The funding body wasn't involved in any kind in the methodology, analysis, interpretation of results or in writing the manuscript.

REFERENCES

1. World Health Organization. https://www. who. int/healthtopics/cardiovascular-diseases# tab= tab_1. Retrieved March. 2024;11.
2. https://www.ifpma.org/insights/time-to-lead-the-charge-the-pharmaceutical-industrys-role-in-combating-ncds/
3. Rubin JB, Borden WB. Coronary heart disease in young adults. Current atherosclerosis reports. 2012 Apr;14:140-9.
4. Kaptoge S, Pennells L, De Bacquer D, Cooney MT, Kavousi M, Stevens G, Riley LM, Savin S, Khan T, Altay S, Amouyel P. World Health Organization cardiovascular disease risk charts: revised models to estimate risk in 21 global regions. The Lancet global health. 2019 Oct 1;7(10):e1332-45.
5. Amarchand R, Kulothungan V, Krishnan A, Mathur P. Hypertension treatment cascade in India: results from national noncommunicable disease monitoring survey. Journal of Human Hypertension. 2023 May;37(5):394-404.
6. Basavanthapa B.T Nursing Research. 2nd ed. New Delhi: Jaypee Brothers Publication; 2007