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Africa Medical College

Report on Second Annual In-house Research Seminar



Research and Community Service Office (RCSO)

Report on Second Annual In-house Research Seminar

February 9, 2024

Addis Ababa

February 9, 2024

More soft and hard copies of the document can be obtained from
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Preface

Every HEI is expected to undertake research activities, conduct consultancy and engage in community services. Cognizant of this, Africa Medical College (AMC) has established a Research and Community Service Office and a Research and Publication Committee responsible for planning and undertaking research conferences and seminars every year.

In 2023, the College conducted a one-day research conference and a half day research seminar on which a number of papers were presented and deliberated on. The events were attended by invited guests, academic staff and students of the college. This year, AMC held its 2nd Annual In-house Research Seminar to disseminate research findings from its scholars and those from other research and academic institutions on February 9, 2024 at the College's Graduate Library. The themes of the Seminar were "Prevention of Diseases and Health Promotion, Prevalence and Prevention of Non-Communicable Diseases and Patient Care".

On the occasion, three research papers entitled "Co-occurrence of and factors associated with health risk behaviors among adolescents: A multi-center study in sub-Saharan Africa, China, and India" (by Dr Yadeta Dessie), "New Electrochemical Method to Determine Tryptophan in Fruit Juices: Development and Validation" (by Mr. Assefa Takele) and "Breastfeeding Practices and Associated Factors among Mothers of Children Aged 6 To 24 Months Attending Lemi Kura Sub-City Administration Woreda 2 Health Center Addis Ababa, Ethiopia, 2022" (by Ms. Marta Assefa a PhD candidate) were presented. The Seminar gathered more than 27 academic staff, researchers, and students.

It is the view of the College as well as the Research and Community Service Office that those who participated in the scholarly events so far have benefited from the issues presented and the insights and views entertained enormously.

The College thanks members of Research and Publication Committee who worked tirelessly and sacrificed their precious time and energy to make the event a reality.

Opening Speech

Dr. Mekonnen Belay, Vice President of Africa Medical College

The Seminar was officially opened by Dr Mekonnen Bely, the Vice President of Africa Medical College. In his welcome remarks, the Vice President thanked all participants for having responded positively to the invitation.

He reminded participants that the purpose of AMC Annual In-House Research Seminar was to share research findings and formulate recommendations to inform policy making and disseminate the findings of research to the academic community.

He also thanked the Research and Community Service Office and members of Research and Publication Committee for their effort they exerted to make the In-house Seminar a reality.

He also thanked the researchers' willingness to present their papers which added value to the Seminar's content and helped to attract a wider audience.



Seminar Introduction

Dr Kassahun Kebede, Research and Community Service, Head

What were the objectives of the Seminar?

The objectives of the In-house Research Seminar were to:

- ☐ Encourage the academic staff to engage in relevant studies,
- ☐ Contribute towards improving research practices in national and local priority areas,
- ☐ Disseminate findings of researches, and
- ☐ Develop awareness about research and development.

What has RCSO done so far?

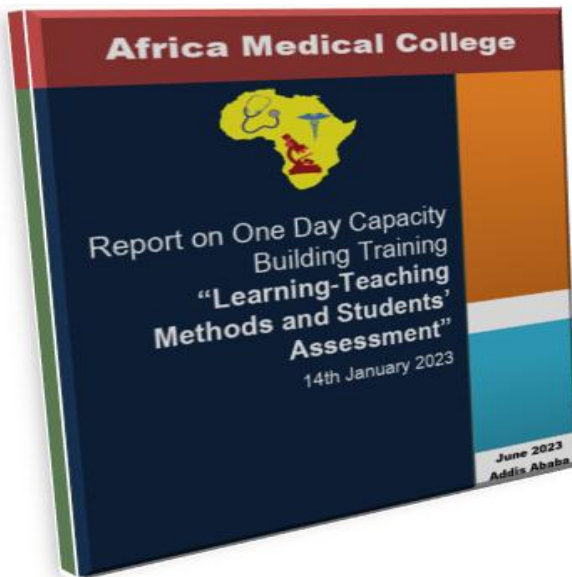
1. The Office coordinated and conducted the 1st AMC Research Seminar on “Academic Research in Medical/ Health Areas and Launching a Scientific Journal”.

At the Seminar, the renowned Professor Abraham Haileamlak, MD, Paediatric Cardiologist is a prominent scholar and editor-in-chief of one of the most successful scientific journals in the country, Ethiopia Journal of Health Sciences (EJHS) presented two papers on “Undertaking Scientific Research in Health and Health Related Areas” and “Launching a Scholarly Journal”.

The output of the Seminar was later published and disseminated to stakeholders in hard and soft copies. Interested readers can find copies of the report at the College’s library and RCSO (in soft copy).



2. RCSO also coordinated a capacity building training on “Learning –Teaching Methods and Students Assessment” on 4th January 2023. The training was attended by academic staff for which they were certified at the end of the training. The Training was offered by two prominent university professors, Assoc. Professor Dr. Frdisa J. Aga, from Addis Ababa University, Institute of Educational Research (IER) and Assoc. Professor Yosef Shumi from Kotebe University of Education on January 13, 2023 at the College’s Graduate library.



3. Annual Research Conference

Africa Medical College organized and conducted a one-day Annual Research Conference on the theme —Evidence for Health–Related Sustainable Development Goalll on February 17, 2023. The Conference was aimed at encouraging relevant research works that contribute to improving research practices in national and local priority areas, disseminating findings of the research, and fostering awareness of academic and administrative staff about research and development activities on health and medical education.

The papers that were presented and discussed on were: Seroprevalence And Associated Risk Factors For Hepatitis B Virus Infections Among Apparently Healthy Pregnant Mothers Attending Anc In Rubkona Primary Health Care Centre In Rubkona County, Unity State, South Sudan by (Michael Pou Machar, MSc in MI, MPH), Effect Of

Menstrual Irregularity On Academic Performance Of Undergraduate Students Of Debre Berhan University: A Comparative Cross Sectional Study (Dr. Esubalew Tesfahun, PhD), Undernutrition Among Pregnant Adolescent, A Scoping Review (Adane Tesfaye, PhD candidate), Assessment Of Traditional Medicine Utilization And Its Determinants Among Parents Of Children, In Gindeberet Oromia, Ethiopia (Dr. Takele Achalu), and High Performance Liquid Chromatography (HPLC) Stability Indicating Method for The Determination Of Bromazepam Via Its Copper (II) Chelates (Assefa Takele, MSc)



4. Newsletters

The College's Newsletter, AMC Today, has been published in six issues (VI, Nos 1234 and VII, 1, 2) and disseminated to internal and external stakeholders. The Newsletter, apart from reporting on major activities of the College, has two permanent columns on which quality assurance and research issues are presented and discussed (Research and Quality Assurance Corners).



5. Policy and Guideline Documents

RCSO has prepared and implemented a number of policy and guideline documents on Research and Community Services. Some of them are stated **hereafter**.

- Research, Consultancy and Ethics Policy Guideline
- Community Service Guideline
- Research Incentive and Reward Guideline
- IRB Guideline

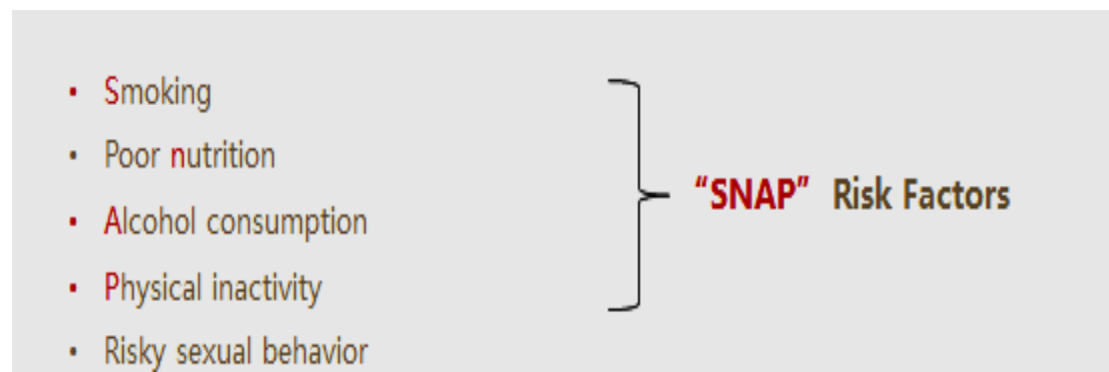
Presentation One

Co-occurrence of and factors associated with health risk behaviors among adolescents: A multi-Centre study in sub-Saharan Africa, China, and India

Yadeta Dessie¹

Background

- According to the World Health Organization's Global Burden of Disease (GBD) study, health risk behaviors (HRBs) are responsible for about two-thirds of cardiovascular deaths globally.



Why do HRBs co-occur?

Gateway Theory

HRBs co-occur by heightening an individual's exposure to other risk behaviors and subsequently increasing their inclination to partake in them.

The problem behavior theory

HRBs co-occur due to a set of shared risk factors for engaging in risky behaviors.

When HRBs co-occur among adolescents, their combined effects can be more detrimental than when they occur independently. For instance, the heightened prevalence of four common risk factors has been associated with a significant 3.35-fold increase in non-communicable disease mortality.

¹ PhD, Associate Professor of Public Health and Reproductive Health, College of Health and Medical Sciences, Haramaya University

Consequently, preventing the co-occurrence of HRBs assumes paramount significance, as addressing individual risk behaviors in isolation is unlikely to yield enduring results. Moreover, addressing multiple HRBs concurrently may prove to be more cost-effective, particularly in light of constrained healthcare resources.

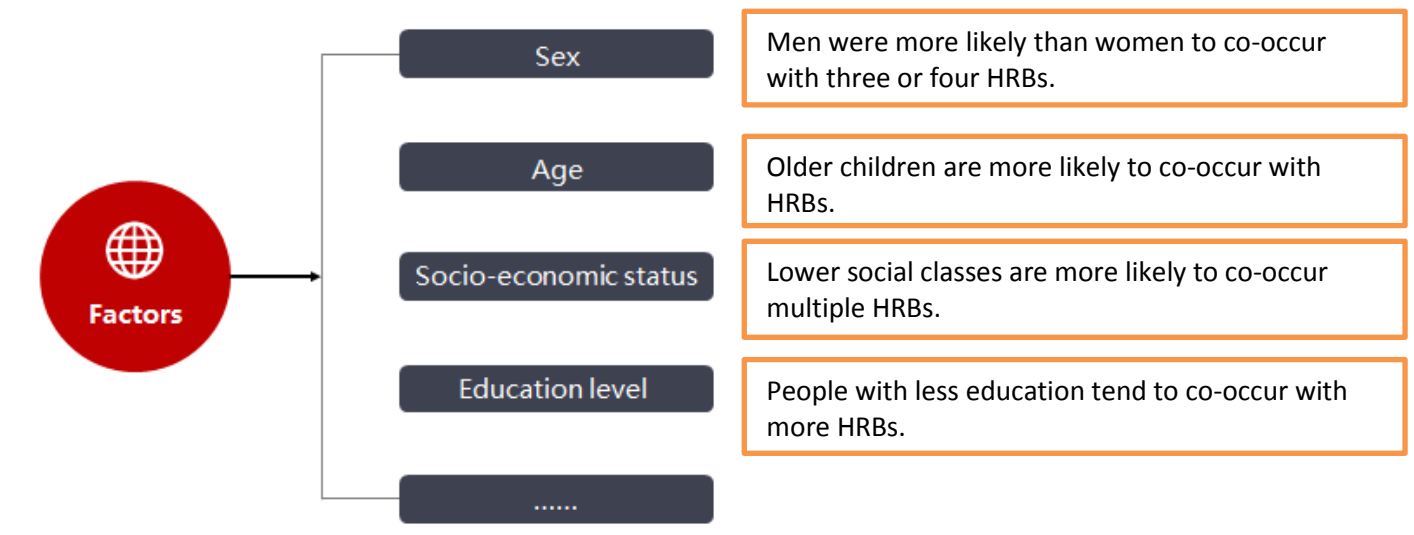
'Downstream' strategies

- Personal effort
- Family level
- School level
- Community level

'Upstream' approaches

Integrated policies

Risk factors



Research gap and objectives

Research gap

- Lack of evidence in LMICs.
- Most of current evidence was based on school-based frameworks, normally focusing on older adolescents in middle schools and lacking evidence from communities.
- Most evidence was based on single country study. Therefore, a multi-center analysis integrating adolescents from both schools and communities should be established.

Objective

- Describe the prevalence of HRBs co-occurrence among adolescents in six sub-Saharan African countries and two Asian countries, encompassing smoking, alcohol consumption, poor dietary patterns, physical inactivity, and risky sexual behavior, as well as identify the risk factors.

Methods: Study Design

- **Sampling sites:** Burkina Faso, China, Ethiopia, Ghana, India, Nigeria, Uganda, Tanzania
- **Sample size:** at least 1200 in each country
- **Study type:** Cross-sectional study
- **Inclusion criteria:**
 - Between the ages of 10-19 years
 - Written informed consent from parent or guardian if under age 18
 - Informed assent from participants under age 18/ Written informed consent if age 18 or 19
 - Resident of the study area and who intend to stay in the study area for the duration of the study
- **Quality control:**
 - Training
 - Data checking

Health Risk Behaviors

Cigarette use

- Have ever smoked
- (Sensitivity analysis: Have smoked in the past 30 days)

HRB: Yes

Alcohol consumption

- Have ever consumed alcoholic beverage
 - (Sensitivity analysis: Have consumed alcoholic beverage in the past 30 days)
- HRB: Yes**

Dietary

- Global Diet Quality Score, GDQS
- 23-49: Low risk
- 15-23: Moderate risk
- <15: High risk
- HRB: Moderate or high risk

Physical inactivity

- During the past 7 days, on how many days were you physically active for a total of at least one hour per day
- HRB: <7

Risky sexual behavior

- Early sexual debut: Age at first sexual intercourse ≤ 14
- Unprotected sexual intercourse

Correlates

- We investigated the sex, age, education, engagement in paid work, people whom participants lived with, and self-perceived socio-economic status of the household as potential influencing factors.
- Age was categorized into two group: ≤ 14 vs ≥ 15 .
- Family cohabitation was categorized into three groups:
 - With parents
 - With other guardians
 - Alone
- **The self-perceived economic and social level was categorized into three groups according to MacArthur Scale:**
 - Low: 0-3
 - Middle: 4-6
 - High: 7-10

Statistical analysis

Descriptive analysis

- Continuous variables:
 - Mean (sd) / Median (IQR)
 - Student's t test / Kruskal-Wallis test
- Categorical variables
 - Number (percentages)
 - Chi-square test / Fisher exact test
- $P < 0.05$ was regarded significant.

Co-occurrence	- Latent class analysis (LCA) - Cluster number was set from 2-10, and AIC criterion was applied to decide the clustering results.
Association study	- Logistic regression - OR (95% CI) - Sensitivity analysis

Results

Table 1 Distribution of socio-demographical features and health risk behaviors of adolescents in sub-Saharan Africa, China and India

Variable	Overall N=9,697	Males (N=4,627)	Females (N=5,070)	P value
Country				
Burkina Faso	1,196 (12·33)	677 (14·63)	519 (10·24)	<0·0001
China	1,179 (12·16)	631 (13·63)	548 (10·81)	
Ethiopia	1,200 (12·37)	462 (9·98)	738 (14·56)	
Ghana	1,235 (12·74)	569 (12·29)	666 (13·14)	
India	1,246 (12·85)	674 (14·56)	572 (11·28)	
Nigeria	1,258 (12·97)	504 (10·89)	754 (14·87)	
Tanzania	1,183 (12·20)	516 (11·15)	667 (13·16)	
Uganda	1,200 (12·37)	595 (12·86)	605 (11·94)	
Age (Median [IQR])				
	14·00 [12·00, 16·00]	14·00 [12·00, 16·00]	14·00 [12·00, 16·00]	<0·0001
Educational enrolment				
Yes	8,574 (88·42)	4,073 (88·01)	4,501 (88·79)	0·2389
No	1,123 (11·58)	555 (11·99)	568 (11·21)	
Being engaged in paid work				
Yes	1,729 (17·83)	1,045 (22·58)	684 (13·49)	<0·0001
No	7,771 (80·14)	3,492 (75·45)	4,279 (84·42)	
Living with				
Parents	7,046 (72·66)	3,319 (71·72)	3,727 (73·53)	<0·0001
Other guardians	1,933 (19·93)	871 (18·82)	1,062 (20·95)	
Alone	718 (7·40)	438 (9·46)	280 (5·52)	
Socio-economic status				
Low	1,863 (19·21)	894 (19·32)	969 (19·12)	0·6347
Middle	6,388 (65·88)	3,029 (65·45)	3,359 (66·27)	
High	1,446 (14·91)	705 (15·23)	741 (14·62)	
Physical activity				
Active	2,884 (29·74)	1,463 (31·61)	1,421 (28·03)	0·0001
Inactive	6,813 (70·26)	3,165 (68·39)	3,648 (71·97)	
Dietary habits				
Low risk	3,791 (39·09)	1,863 (40·25)	1,928 (38·04)	0·0649
Moderate risk	5,181 (53·43)	2,417 (52·23)	2,764 (54·53)	
High risk	725 (7·48)	348 (7·52)	377 (7·44)	
Smoking				

No	9,399 (96.93)	4,368 (94.38)	5,031 (99.25)	<0.0001
Yes	298 (3.07)	260 (5.62)	38 (0.75)	
Alcohol consumption				
No	8,185 (84.41)	3,771 (81.48)	4,414 (87.08)	<0.0001
Yes	1,512 (15.59)	857 (18.52)	655 (12.92)	
Risky sexual behavior				
No	9,029 (93.11)	4,324 (93.43)	4,705 (92.82)	0.2506
Yes	668 (6.89)	304 (6.57)	364 (7.18)	
Number of co-occurrence				
0	918 (9.47)	442 (9.55)	476 (9.39)	<0.0001
1	3,512 (36.22)	1,665 (35.98)	1,847 (36.44)	
2	4,268 (44.01)	1,988 (42.96)	2,280 (44.98)	
3	858 (8.85)	431 (9.31)	427 (8.42)	
4	130 (1.34)	93 (2.01)	37 (0.73)	
5	11 (0.11)	9 (0.19)	2 (0.04)	

Tables are presented as number (percentage). Number of co-occurrence was added by the existence of above five behaviors, where dietary habits were regarded as HRB for both moderate and high risk categories.

Table 2 Distribution of health risk behaviors for the three clusters of participants in sub-Saharan Africa, China and India

Health risk behavior				P value
	n=2,689	n=6,609	n=399	
Physical activity				
Active	2,689 (100.00)	0 (0.00)	195 (48.87)	<0.0001
Inactive	0 (0.00)	6,609 (100.00)	204 (51.13)	
Dietary habits				
Low risk	1,170 (43.51)	2,442 (36.95)	179 (44.86)	<0.0001
Moderate risk	1,345 (50.02)	3,644 (55.14)	192 (48.12)	
High risk	174 (6.47)	523 (7.91)	28 (7.02)	
Smoking				
No	2,689 (100.00)	6,529 (98.79)	181 (45.36)	<0.0001
Yes	0 (0.00)	80 (1.21)	218 (54.64)	
Alcohol consumption				
No	2,230 (82.93)	5,903 (89.32)	52 (13.03)	<0.0001
Yes	459 (17.07)	706 (10.68)	347 (86.97)	
Risky sexual behavior				
No	2,576 (95.80)	6,314 (95.54)	139 (34.84)	<0.0001
Yes	113 (4.20)	295 (4.46)	260 (65.16)	



Healthy



Physical inactivity
and poor diet



Substance use and
risky sexual behavior

Table 3 Multinomial logistic regression for health risk behavior clusters

Model	Risk factor	OR	95%CI	P value	Model	Risk factor	OR	95%CI	P value
Logit 1 Cluster 2 v.s. Cluster 1 (base outcome)	Age in years				Logit 2 Cluster 3 v.s. Cluster 1 (base outcome)	Age in years			
	10-14	Ref				10-14	Ref		
	15-19	0.96	(0.86, 1.07)	0.4205		15-19	7.56	(5.18, 11.03)	<0.0001
	Sex					Sex			
	Male	Ref				Male	Ref		
	Female	1.20	(1.09, 1.32)	0.0002		Female	0.41	(0.32, 0.54)	<0.0001
	Educational enrolment					Educational enrolment			
	Yes	Ref				Yes	Ref		
	No	0.84	(0.71, 0.99)	0.0360		No	1.74	(1.27, 2.38)	0.0005
	Being engaged in paid work					Being engaged in paid work			
	Yes	Ref				Yes	Ref		
	No	1.23	(1.08, 1.41)	0.0020		No	0.54	(0.41, 0.71)	<0.0001
	Participants living with					Participants living with			
	Parents	Ref				Parents	Ref		
	Other guardians	0.97	(0.86, 1.1)	0.6714		Other guardians	1.56	(1.19, 2.05)	0.0015
	Alone	0.99	(0.8, 1.22)	0.9229		Alone	1.57	(0.92, 2.68)	0.0972
	Socio-economic status					Socio-economic status			
	Low	Ref				Low	Ref		
	Middle	1.04	(0.92, 1.18)	0.5358		Middle	0.85	(0.64, 1.13)	0.2663
	High	1.01	(0.85, 1.19)	0.9347		High	0.98	(0.66, 1.46)	0.9368

OR is the odds ratio, CI is the confidence interval. Model 1 involves independent variables as shown above, while model 2 adjusted the country as a covariate. Cluster 1 represents the “Healthy” group. Cluster 2 represented the “Physical inactivity and poor dietary habits” group. Cluster 3 represented high risk of “Smoking, alcohol consumption and risky sexual behavior” group.

- Relative to Cluster 1, being in Cluster 2 was negatively associated with older age (aOR 0.90, 95% CI 0.82-0.99) and having a high socio-economic status (aOR 0.80, 95% CI 0.68-0.93), but positively associated with being female (aOR 1.15, 95% CI 1.05-1.26), not being engaged in paid work (aOR 1.26, 95% CI 1.11-1.42), and living alone (aOR 1.46, 95% CI 1.21-1.76).
- Compared with those Cluster 1, adolescents in Cluster 3 were less likely to be female (aOR 0.43, 95% CI 0.34-0.55), be engaged in paid work (aOR 0.67, 95% CI 0.52-0.86), but more likely to have older age (aOR 3.99, 95% CI 3.06-5.21), not be rolled in educational institution (aOR 1.98, 95% CI 1.51- 2.59), and live with guardians other than parents (aOR 1.93, 95% CI 1.49-2.50)

Conclusion

- This multi-country study provides valuable insights into the high prevalence of co-occurring HRBs among adolescents in LMICs.

- ▶ The findings revealed the distinct clustering patterns for five different HRBs and highlight the socio-demographic factors associated with each cluster.
- ▶ The study sheds light on the potential risk factors of HRBs and underscores the need for tailored interventions that target the specific risk factors and protective factors associated with each cluster in early life.
- ▶ A large proportion of risk takers are involved two or more types of risks, like physical inactivity and poor diet, or cigarette and alcohol consumption, meaning that risk-specific interventions are also indispensable.
- ▶ The findings will inform evidence-informed policies and interventions to promote healthy behaviors and reduce the risk of non-communicable diseases among adolescents in LMICs.

Presentation Two

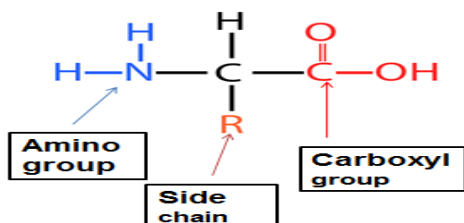
New Electrochemical Method to Determine Tryptophan in Fruit Juices: Development and Validation

Mr Assefa Takele²

Introduction

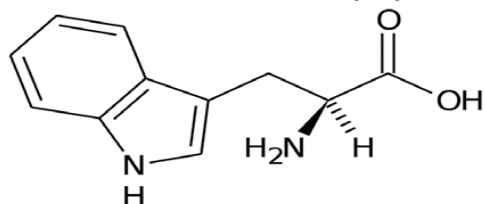
Amino acids are:

- Basic unit of proteins
- Contain an amino group (-NH₂) and a carboxyl group (-COOH)
- Differ from each other depending on R-groups



Tryptophan

- Essential amino acid
- Precursor of
 - Serotonin (5-HT)
 - Melatonin
 - Vitamin B3
- Required for the biosynthesis of proteins
- Maintenance of muscle mass and body weight in humans
- Added as a food fortifier in dietary food products and in pharmaceutical products
- Cannot be directly synthesised in human body



Fruit juices

- Popular choices among consumers
- Natural and considered healthy
- Play important role in human diet

² Senior Higher Education Quality Auditor, Quality Audit Desk, Head, FDRE Education and Training Authority

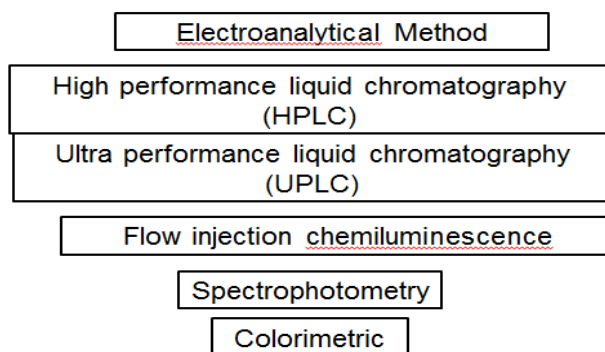
- Contain nutrients, minerals, trace elements, vitamins and phytochemicals all of which have many health benefits
- Single and mixed fruit juices

Eg. Apple, pineapple, mango, grape, peach, tropical, etc.

Benefits of Fruit juices

- Powerful antioxidants to fight free radicals due to the presence of polyphenols and organic acids
- Prevent premature aging
- Support in maintaining fresh and younger looking skin
- Aid in the prevention of cancer
- Digestion enhancement and anti-inflammatory properties

Reported analytical methods for the determination of tryptophan



Ultra performance liquid chromatography (UPLC)

- New category of analytical separation science
- New instrumental system for liquid chromatography
 - Improved sensitivity, speed and resolution
 - Pressures about 8,000 to 15,000 psi
 - Column particles less than 2 μm

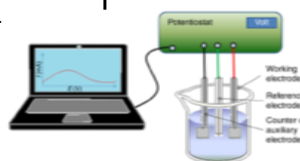
Applications of UPLC

- Metabolite identification
- Analysis of natural products and herbal medicines
- Pharmacokinetic, toxicity, degradation, bio analysis, and bioequivalence studies
- Quality control and in drug discovery
- Determination of pesticides
- Method development and validation in quality assurance and quality control laboratories

Electrochemical Methods

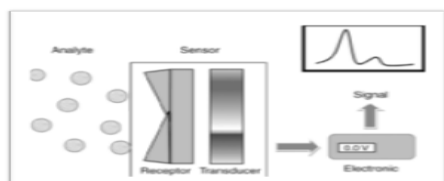
Powerful and versatile techniques

- High sensitivity
- Fast operation
- Reproducibility
- Accuracy
- Low cost



Applications

- Food analysis
- Biological samples
- Pharmaceutical analysis
- Environmental analysis



Objectives

General Objectives:

- To develop, optimize and validate an electrochemical method for the determination of **tryptophan** in fruit juices using ultra performance liquid chromatography as a reference method

Specific Objectives

- To prepare Sonogel-Carbon electrodes for determination of *tryptophan*
- To optimise the electrochemical method using experimental design and modification of electrodes
- To develop a validated electrochemical method for the determination of *tryptophan* in different fruit juices
- To quantify *tryptophan* in different fruit juices using the reference (UPLC) method and the developed electrochemical method

Experimental Method

UPLC Chromatographic Conditions

- Separation was achieved under gradient condition
- Reverse phase RP C18 CORTECS UPLC[®] Solid-Core Based (SCB) Column (silica-based solid-core particle; 100 mm length; 2.1 mm I.D.; 1.6 μ m particle size)
- Mobile phase consisting of phase A (water with 2% acetic acid) and phase B (acetonitrile with 2% acetic acid)
- Flow rate 0.6 ml/min
- Injection volume 1.5 μ l
- Column temperature 47°C
- Detector wavelength set at an excitation wavelength, $\lambda_{\text{ex}} = 280$ nm and an emission wavelength, $\lambda_{\text{em}} = 325$ nm

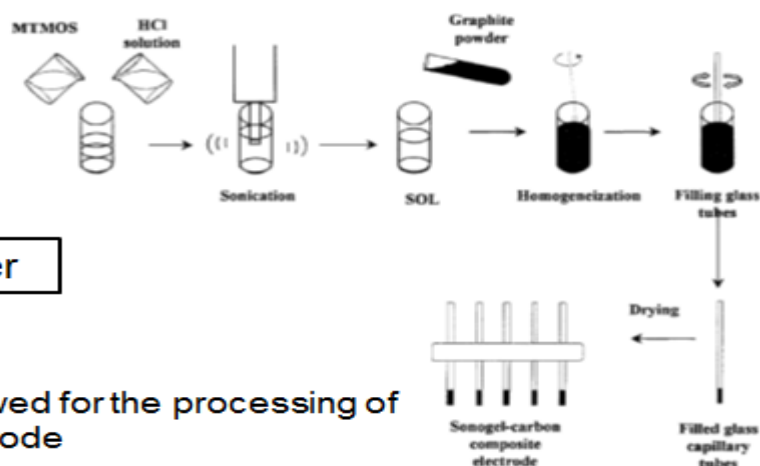
Electrochemical Method

Preparation of Sonogel-Carbon Electrodes

500 μ l of MTMOS

100 μ l of 0.2M HCl

0.5 g of graphite powder



Scheme of the steps followed for the processing of the Sonogel-Carbon electrode

Real Sample Information

Fruit juices were purchased from local super markets (Mercadona and Supersol) in Puerto Real, Cadiz, Spain



Preparation of Real Samples

UPLC and Electrochemical methods

- Apple, pineapple, pineapple + grape, pineapple + apple + grape:
 - Directly filtered through 0.45 μ m filter and then through 0.22 μ m
- Tropical, 5 fruits, peach, peach + apple + grape:
 - First clarified by centrifugation (4000 r.p.m, 5 min)
 - Filtered through 0.45 μ m filter and then through 0.22 μ m

Preparation of tryptophan standard solution

- Stock solution: 100 mg/L
- Working solution: 0.1-5 mg/L

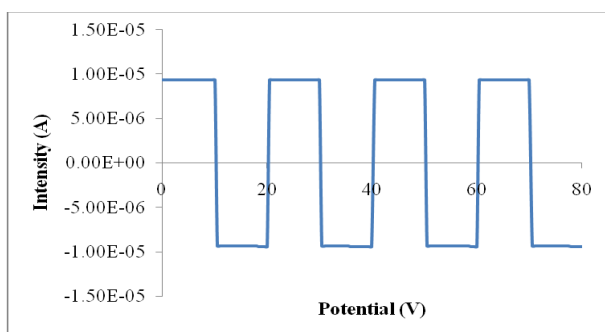
Polarization of Sonogel-Carbon electrodes

SNGCE polished with Water proof Silicon Carbide Paper and white paper

Polarized in 0.1M H₂SO₄

Potential of 1.8 and -0.7 V

Duration 10 min



Example of chronoamperometry for polarization of SNGCE in 0.1M H₂SO₄

Methodologies used for determination

- CV scanning of the electrode after each measurement
- Repolishing, repolarisation and CV scanning
- Standard addition method (DPV)

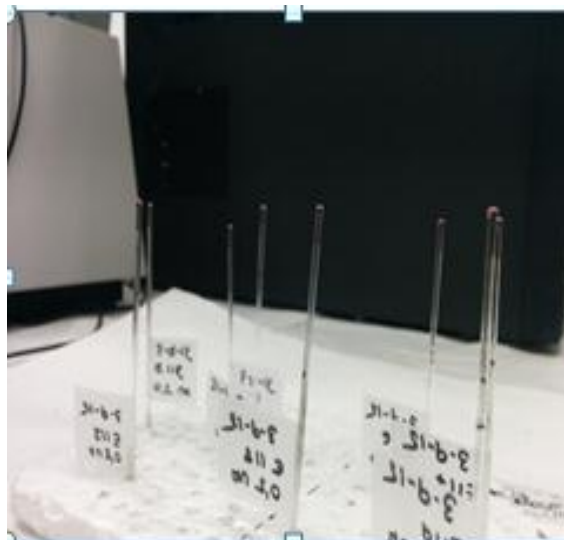
Methodology used for SNGCE cleaning

- Polishing mechanically
- Polarisation
- CV scan (comparison)
- DPV measurement

Modification of SNGCE

1) Electrodeposition of gold solution (0.05 mM HAuCl₄) amperometrically for 200, 600 and 1000 s

2) Drop-casting of gold nano-particles (AuNPs)



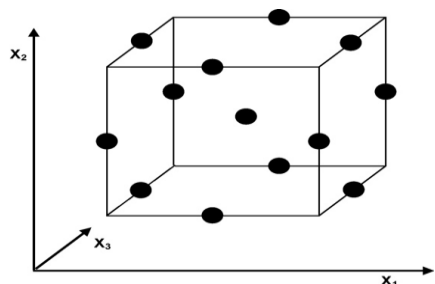
Pretreatment			
Purge time (s):	0		
First conditioning potential (v):	0.18		
Duration(s):	200		
Equilibration time (s):	0		
Standby potential (v)	0		
Number of potential step (1-10)	1		
Potential			
Level	Potential	Duration	Sample time
1	0	1.5	0.05

Optimization of DPV parameters

Box-Behnken Design (BBD)

❖ Variables (factors)

- Modulation amplitude (0.01, 0.055 and 0.1V)
- Step potential (0.004, 0.010 and 0.016 V)
- Interval time (0.2, 0.4 and 0.6 s)



$$N = 2k(k-1) + C_0$$

$$N = 2 \times 3(3-1) + 3 = 15$$

Response variable to be optimized

- Current intensity for Trp

Method of validation

Validation Protocols: ICH and FDA

❖ Validation Parameters

- Linearity and range
- Precision (Repeatability and intermediate precision)
- Accuracy (Recovery)
- Limit of Detection (LOD)
- Limit of Quantitation (LOQ)

Results and Discussion

- a) UPLC Method
- b) Electrochemical Method
- c) Method Validation

a) UPLC

- Different calibration curves were constructed

0.2 - 100 mg/L

0.1 - 10 mg/L

0.1 - 5 mg/L

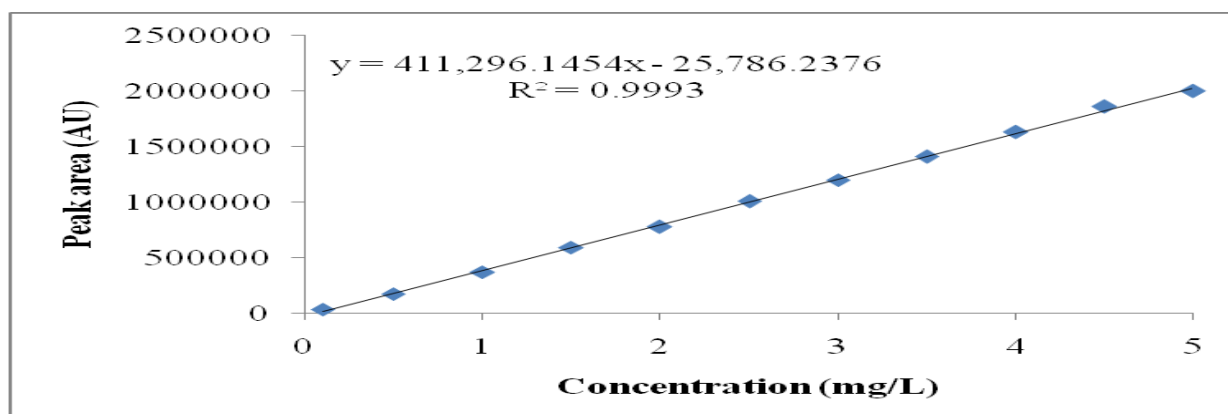
Analytical characteristics for determination of tryptophan

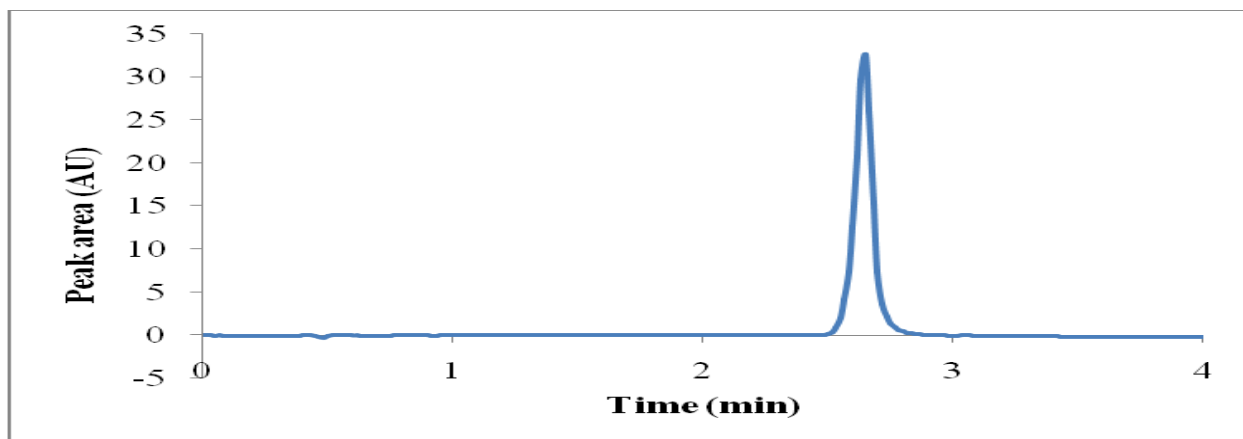
Linearity range (mg/L)	Regression equation	Determination coefficient (r^2)	Correlation coefficient (r)	LOD (mg/L)	LOQ (mg/L)
0.1 to 5	$y = 411296.1x - 25786.2$	0.9993	0.9996	0.09	0.29
0.1 to 10	$y = 12836.5x - 659.4$	0.9989	0.9994	0.16	0.53
0.2 to 100	$y = 7655.3x - 1399.4$	0.9997	0.9998	0.44	1.45

Linearity and range

Analytical characteristics for determination of tryptophan

Linearity range (mg/L)	0.1 – 5
Excitation wavelength (nm)	280
Emission wavelength (nm)	325
Regression equation	$Y = 411296.1454x - 25,786.2376$
Determination coefficient (r^2)	0.9993
Correlation coefficient (r)	0.9996
Slope (a)	411296.1454
Intercept (b)	-25786.2376
Limit of detection (LOD, mg/L)	0.09
Limit of quantitation (LOQ, mg/L)	0.29



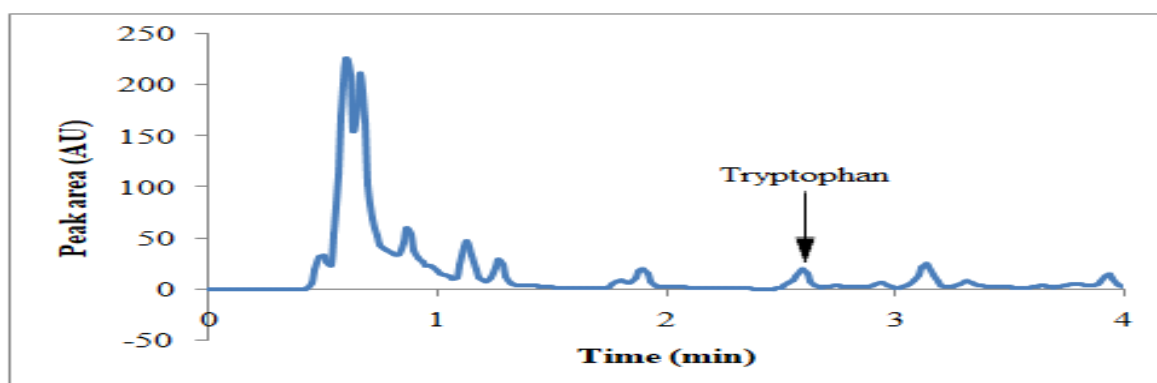


Chromatogram of **tryptophan** from standard solution

Real Sample Analysis (UPLC)

Concentration of tryptophan in fruit juices

S.N.	Real samples	Conc.(mg/L)
1	Pineapple (Mercadona)	1.09
2	Pineapple + grape (Mercadona)	1.78
3	5 Fruits (Mercadona)	1.71
4	Peach + grape (Mercadona)	1.15
5	Apple (Supersol) (Mercadona)	0.39
6	Pineapple + apple + grape (Supersol)	1.98
7	Peach + apple + grape (Supersol)	0.59
8	Peach (Supersol)	0.49



Chromatogram of **tryptophan** from fruit juice sample

Effect of filtration on real samples

Assessed by filtering the real sample before spiking and after spiking

Spiking real sample

Before filtration

After filtration

Recovery (%)

117

115

Method validation parameters for determination of tryptophan**Parameter****UPLC**

Linear range concentration (mg/L)

0.1 - 5

Coefficient of determination (r^2)

0.999

Intra-day precision (n = 9), RSD (%), Real sample
(blank at the beginning and end)

1.77

Intra-day precision (n = 5), RSD (%), Real sample
(blank within each measurement)

1.01

Recovery (%) (n=3)

116.18

LOD (mg/L)

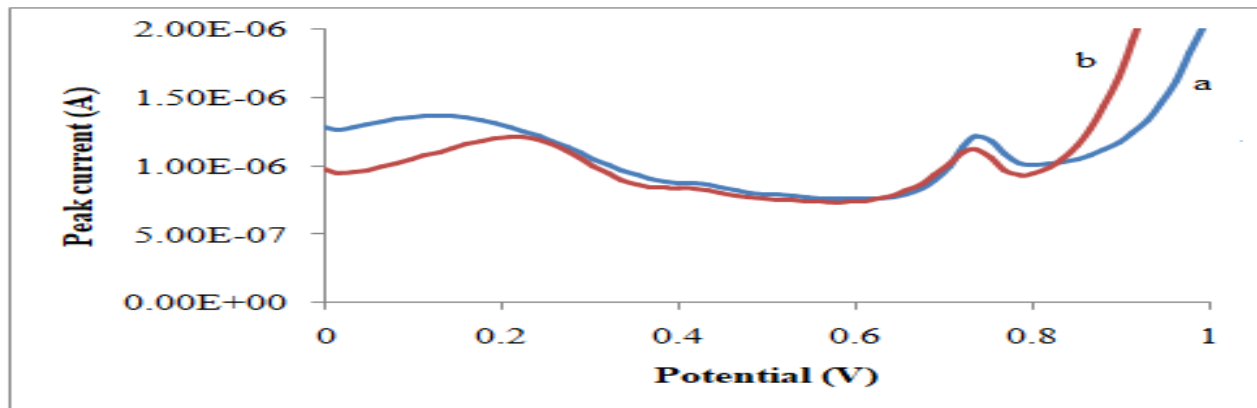
0.09

LOQ (mg/L)

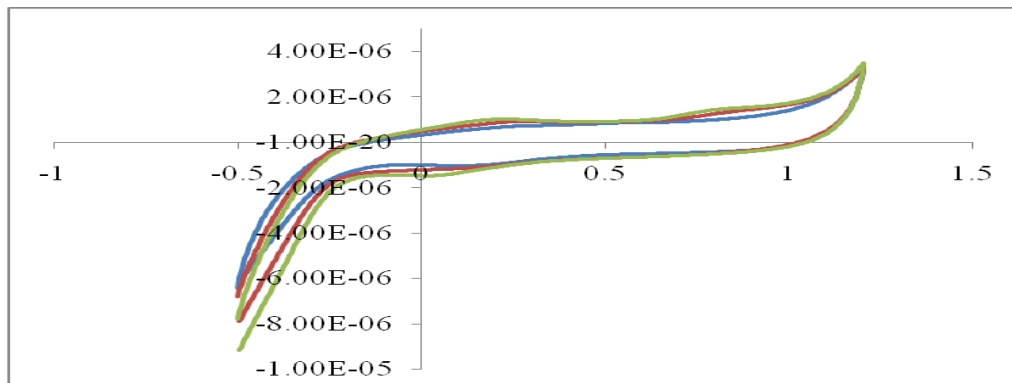
0.29

Electrochemical Methods**Sensitivity of modified and unmodified SNGCE**

SNGCE	Duration (s)	Sensitivity 1 (A · L/mg)	Sensitivity 2 (A · L/mg)
Gold solution electrodeposited (HAuCl ₄)	200	1.89×10^{-7}	1.76×10^{-7}
	600	1.16×10^{-7}	1.08×10^{-7}
	1000	1.45×10^{-7}	1.28×10^{-7}
Gold nano-particles drop-casted (AuNPs)		1.30×10^{-7}	1.23×10^{-7}
Bare (unmodified)		4.57×10^{-7}	3.98×10^{-7}

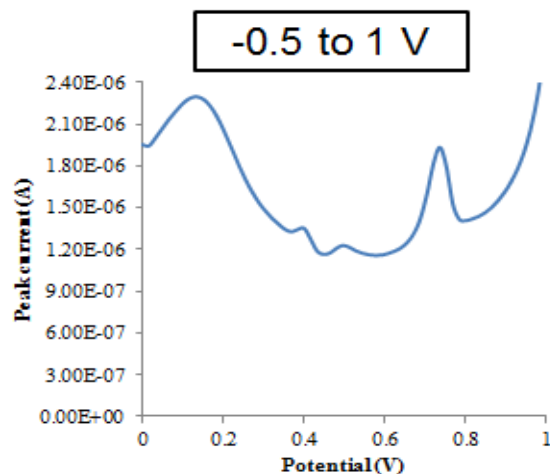


- Voltammogram of tryptophan
 - a) Au (electrodeposited)/SNGCE and
 - b) AuNPs (drop-casted)/SNGCE
- Reproducibility of the electrode was improved when the electrode is repolished, repolarized and CV scanning
- Voltammograms of the SNGCE from CV scanning should be comparable

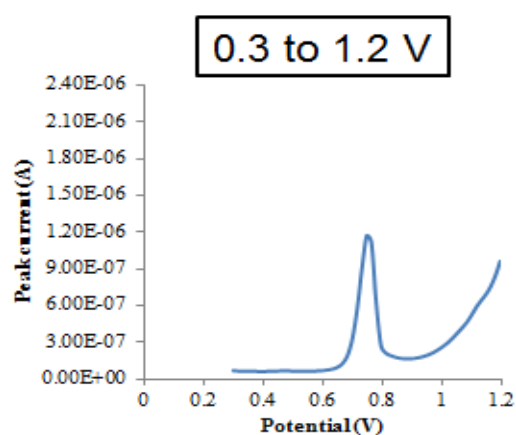


Voltammograms of different SNGCE obtained from CV scanning

Improved peak shapes obtained by varying potential range



Voltammogram of tryptophan (2 mg/L) before optimization



Voltammogram of tryptophan (2 mg/L) after optimization

Optimal values after BBD

- Modulation amplitude = 0.1 V
- Step potential = 0.016 V
- Interval time = 0.6 s

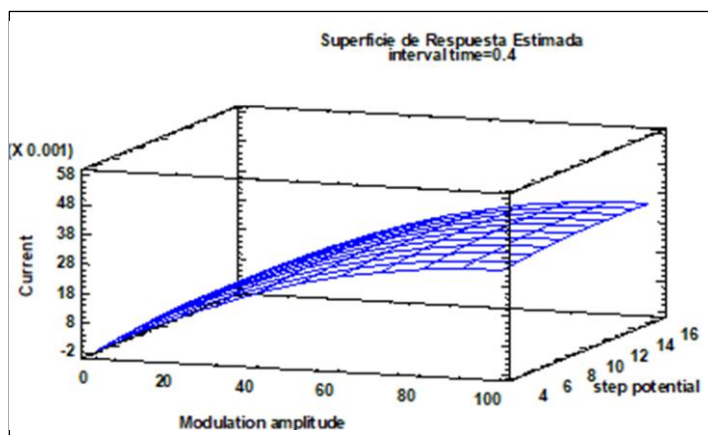
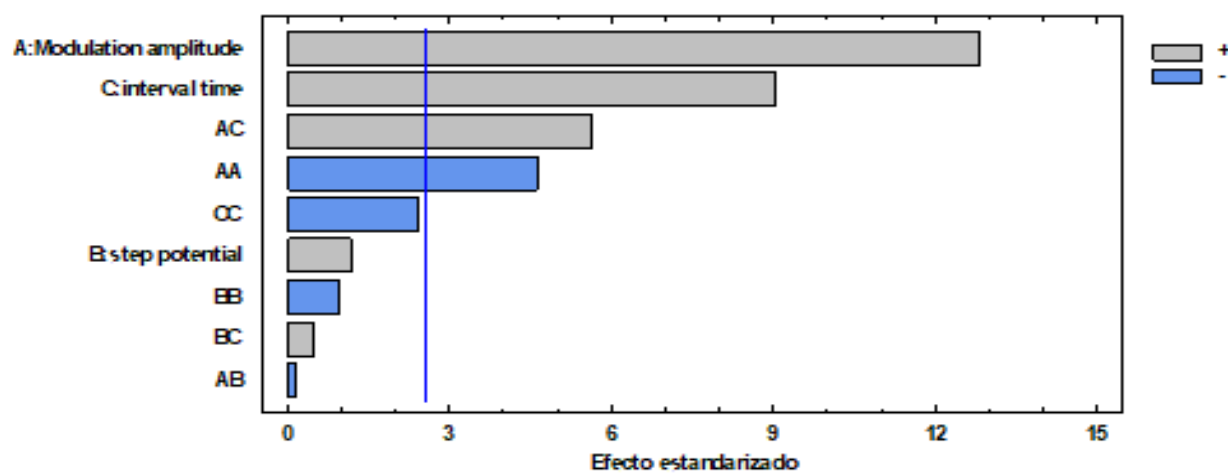
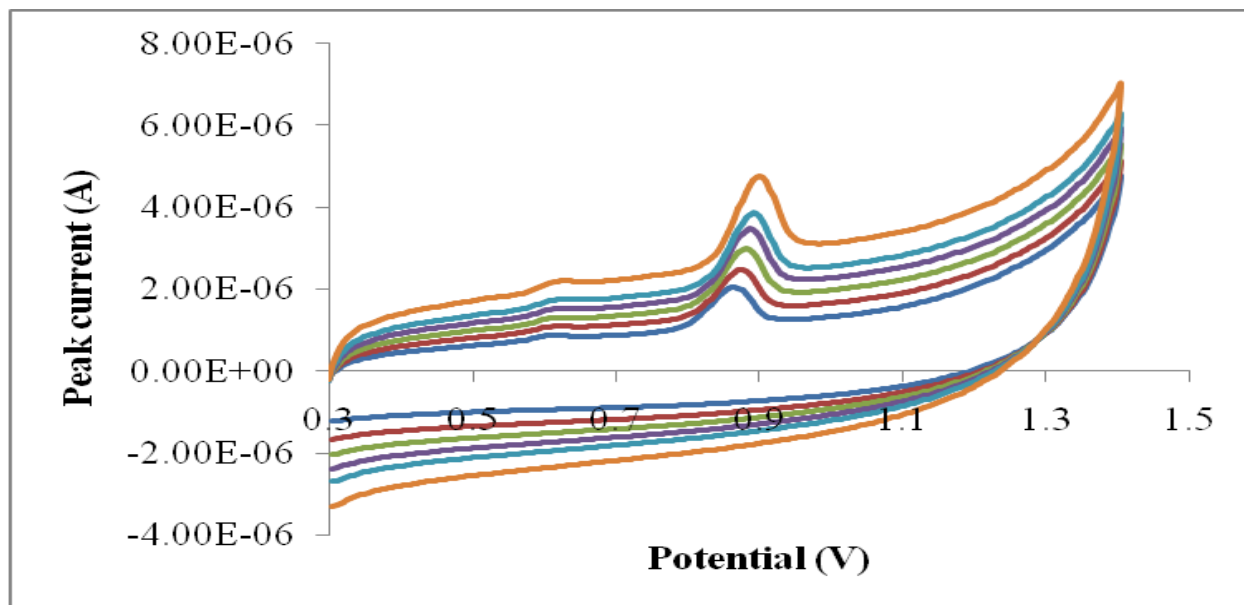


Diagrama de Pareto Estandarizada para Current

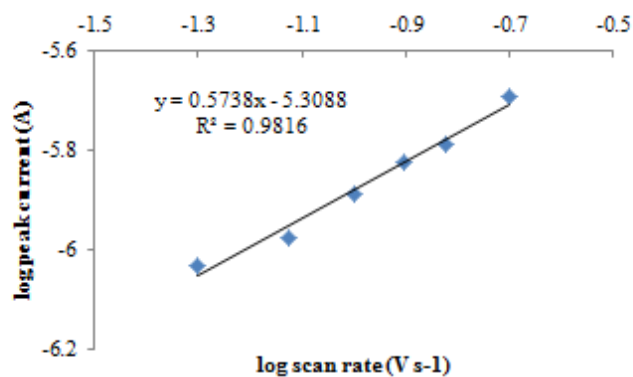
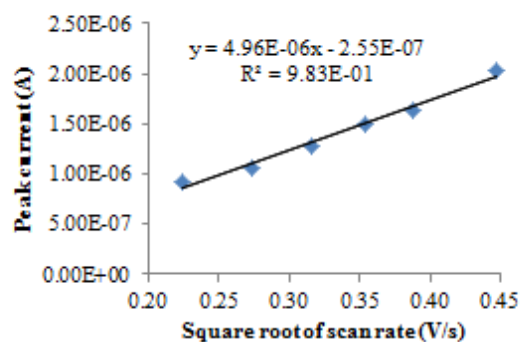
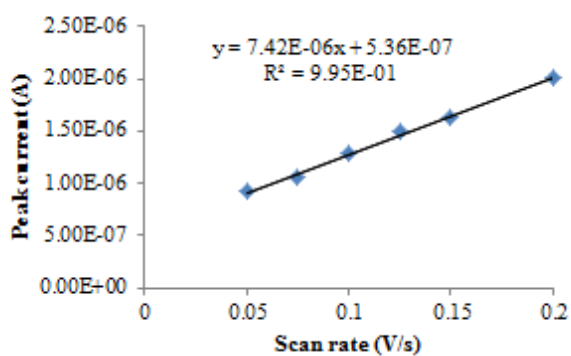


Effect of scan rate

Scan rates: 0.05, 0.075, 0.1, 0.125, 0.15, 0.2 V/s Tryptophan standard solution of 2 mg/L in Britton-Robinson buffer solution (pH 3.6)



Cyclic voltammograms of tryptophan at different scan rates

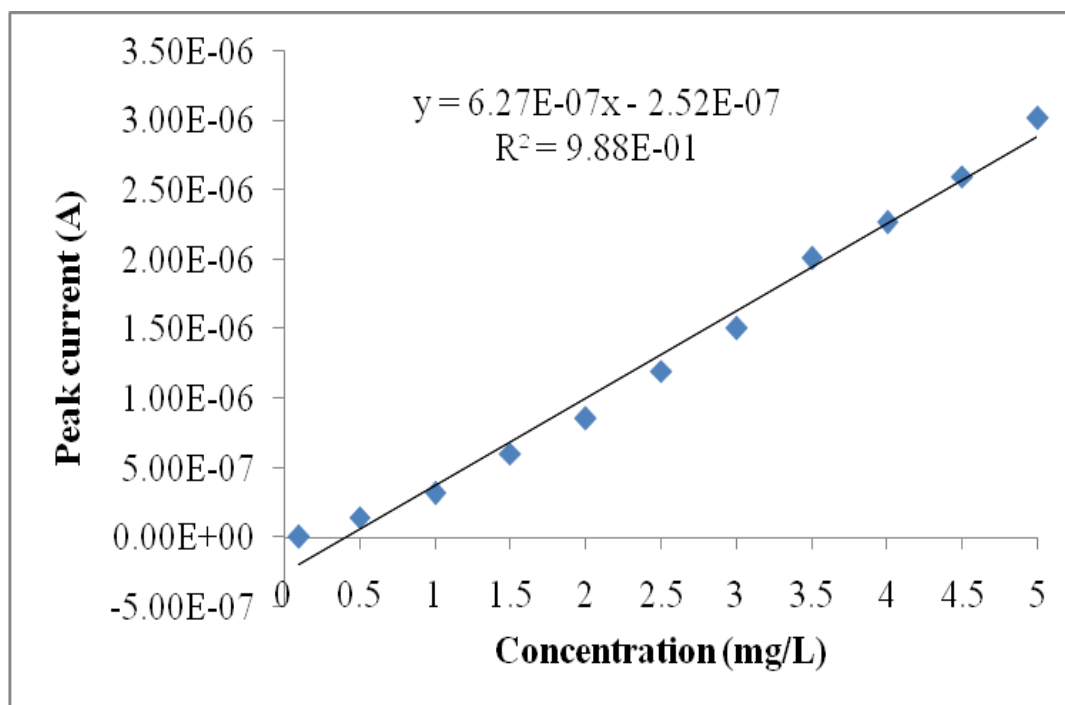


Adsorption/Diffusion
controlled processes

Method Validation

Linearity and Range

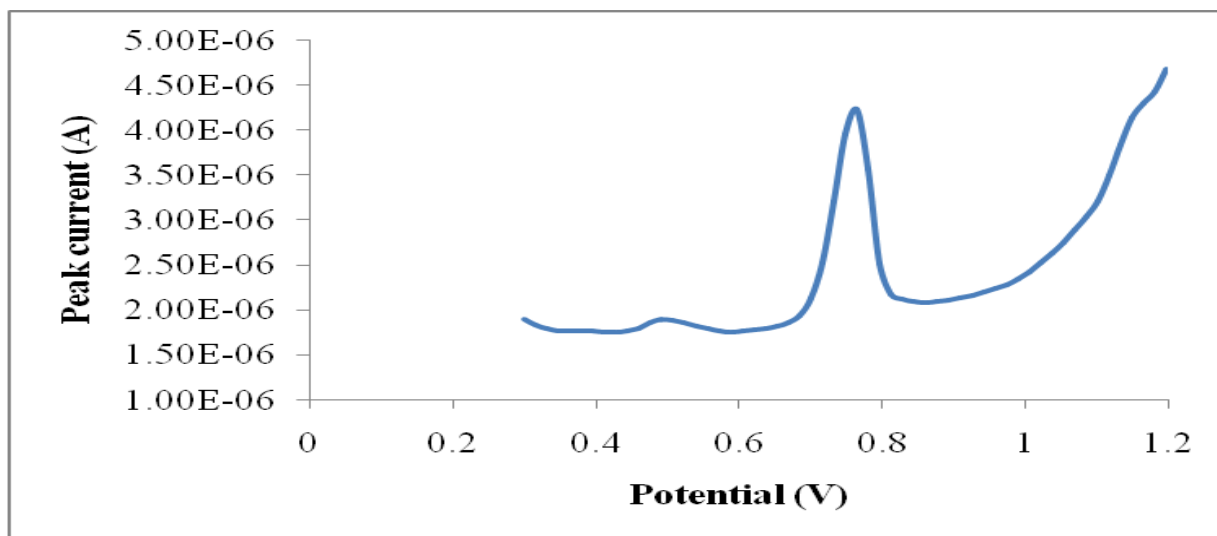
Concentration range: 0.1 - 5mg/L



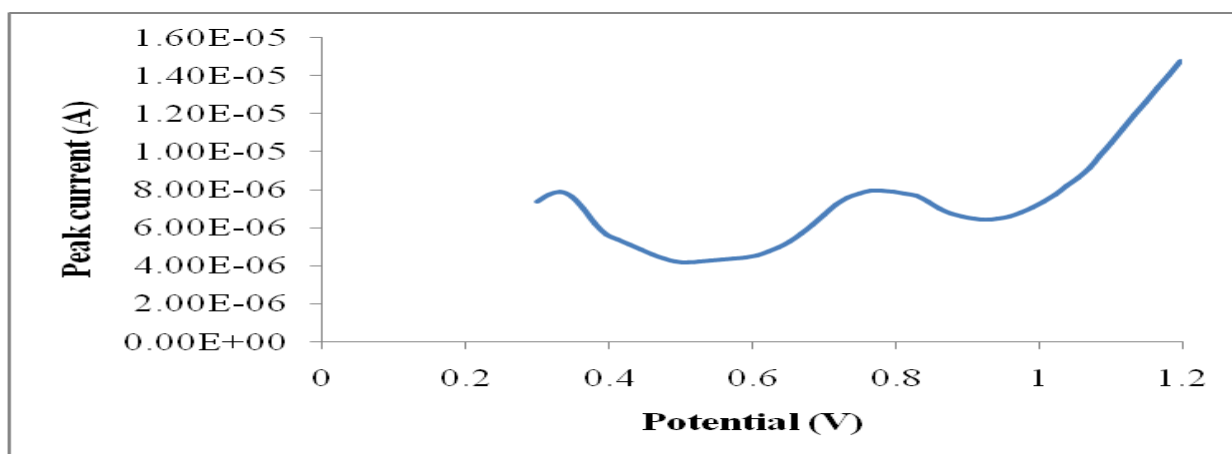
Calibration curve for tryptophan with a SNGCE

Analytical characteristics for determination of tryptophan

Linearity range (mg/L)	0.1 – 5
Regression equation	$Y = 6.27 \times 10^{-7}x - 2.52 \times 10^{-7}$
Determination coefficient (r^2)	0.9880
Correlation coefficient (r)	0.9940
Slope (a)	6.27×10^{-7}
Intercept (b)	2.52×10^{-7}
LOD (mg/L)	0.33
LOQ (mg/L)	1.09



Typical voltammogram of tryptophan obtained during the calibration analysis with a SNGCE and DPV as electroanalytical technique.



Voltammogram of **tryptophan** obtained from pineapple + grape juice

Precision

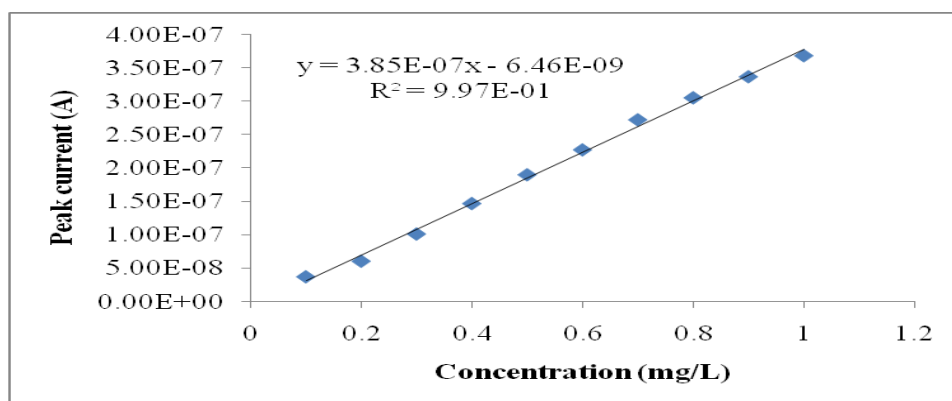
Intra-day precision (n = 10)			Inter-day precision (n = 3)	
Concentration (mg/L)	SD	RSD (%)	SD	RSD (%)
2			1.19×10^{-8}	1.21
2.5	3.94×10^{-8}	3.12	3.19×10^{-8}	2.51
3			4.54×10^{-8}	2.73
Real sample (n=7)	3.06×10^{-8}	4.06		

Accuracy and Recovery (Real sample)

Spiking the fruit juice with tryptophan standard solution

Average recovery (n = 3) = 99.01%

0.1-1 mg/L



Calibration curve of tryptophan for accuracy determination

Real sample analysis (Electrochemical methods)

Concentration of tryptophan in fruit juices

S.N.	Real samples	Conc.(mg/L)
1	Apple (Mercadona)	1.66
2	Pineapple (Mercadona)	2.56
3	Pineapple + grape (Mercadona)	4.25
4	Tropical (Mercadona)	1.68
5	Peach + grape (Mercadona)	1.31
6	Apple (Supersol)	1.34
7	Pineapple + apple + grape (Supersol)	4.08
8	Peach + apple + grape (Supersol)	1.22
9	Peach (Supersol)	1.13

Comparison of UPLC and Electrochemical methods

Parameter	UPLC	Electrochemical
Linear range concentration (mg/L)	0.1 - 5	0.1 - 5
Coefficient of determination (r^2)	0.999	0.988
Intra-day precision (n = 9), RSD (%), Real Sample	1.770	4.060
Recovery (%)	116.180	99.010
LOD (mg/L)	0.090	0.330
LOQ (mg/L)	0.290	1.090

Conclusion

- Electrochemical method using Sonogel-Carbon electrode was developed, optimized and validated for the determination of tryptophan in fruit juices based on UPLC as a reference method.
- Tryptophan was determined in fruit juices using UPLC and Electrochemical Method.
- Developed electrochemical method is sensitive, rapid, cheap and easy to use, thus, it can be successfully applied in food quality control or regulatory analysis laboratory for the determination of tryptophan in fruit juices.

Presentation Three

Breastfeeding Practices and Associated Factors among Mothers of Children Aged 6 To 24 Months Attending Lemi Kura Sub-City Administration Woreda 2 Health Center Addis Ababa, Ethiopia, 2022

Ms. Marta Assefa³

Background

- The WHO recommends exclusive breastfeeding up to 6 months of age, with continued breastfeeding along with appropriate complementary feeds up to 2 years of age or beyond(1).
- Breastfeeding is a life-saving and one of the most cost-effective(2) .
- The benefits of exclusive breast feeding and proper weaning in the growth, development, and prevention of illness in young children are undisputable(1).
- In the developing world, low immunization rates, contaminated drinking water, and reduced immunity as a result of malnutrition make breast feeding crucial to reducing life threatening infections (4).

Statement of the problem

- Breastfeeding (BF) is one of the most important factors for the health, development, and survival of a child.
- According to studies done on the association of breastfeeding and child mortality, neonatal, infant, and under-five child mortality are reported to be lower among breastfed children than non-breastfed children (2).
- that non-breastfeeding is linked to higher mortality, significant morbidity, and other long-term negative health consequences, (12).
- The period of 6–23 months is a critical period of growth during which nutrient deficiencies and illnesses contribute globally to higher rates of under nutrition(15).

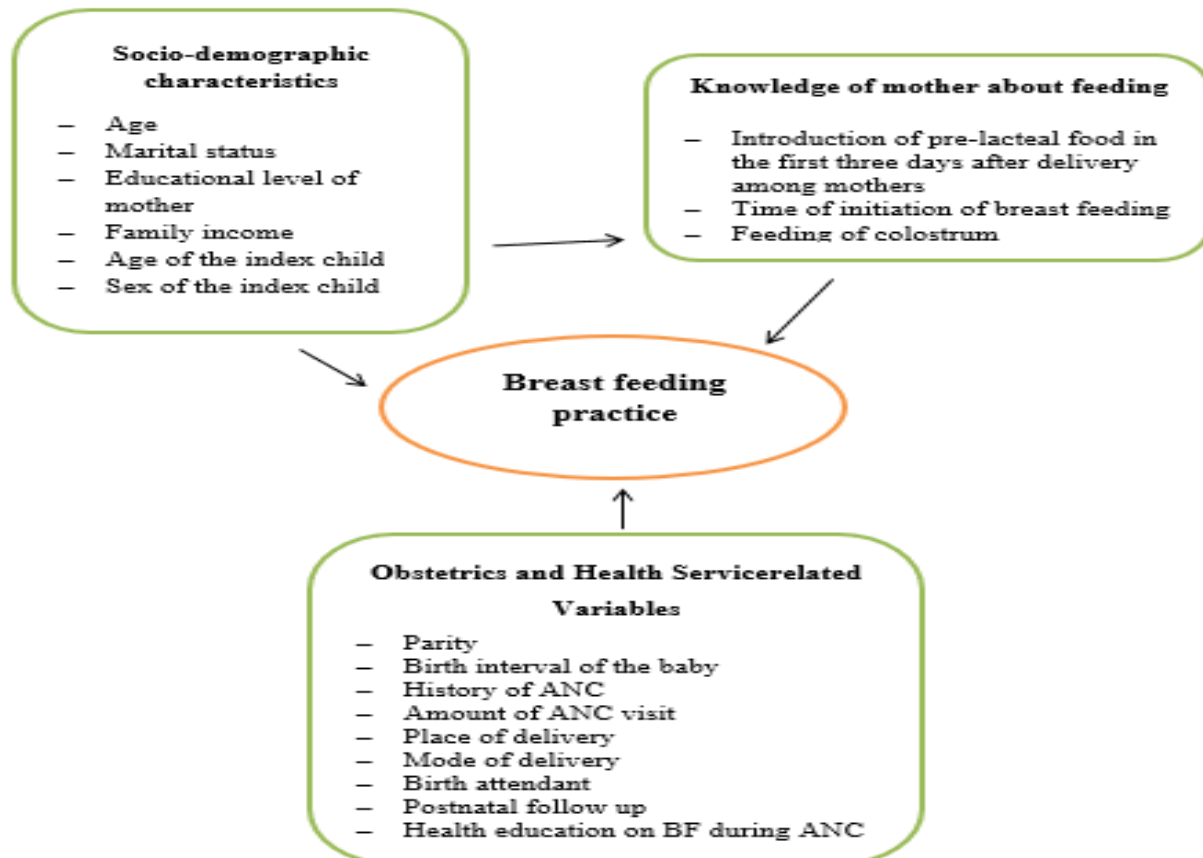
Significance of the study

- The significance of this study lies in its contribution to the understanding of breastfeeding practices and associated factors among mothers of children aged 6 to 24 months attending health centers.

³ Lecturer at Lideta Health College, PhD Candidate at Addis Ababa University

- Breastfeeding is a critical aspect of infant and child health, with numerous benefits for both the child and the mother.
- this study provides valuable insights that can inform interventions and policies aimed at promoting and supporting exclusive breastfeeding.

Conceptual framework of the study



Conceptual framework of the study

- This conceptual framework was created after evaluating numerous published works that demonstrated how the elements covered in the literature review section contributed to the observed breast feeding practice (3,24,26-30,32 and 33).
- These characteristics were categorized into three main groups: socioeconomic and demographic, obstetrics and reproductive, and infant practice. in Figure 1.

OBJECTIVES

3.1 General objective

- To assess Breastfeeding practices and associated factors among mothers of children aged 6 to 24 months attending Lemi Kura Sub-City Administration Woreda 2 Health Center Addis Ababa, Ethiopia, 2023.

3.2 Specific objective

- To assess the magnitude of breastfeeding practices among mothers of children aged 6 to 24 months.

To determine factors associated of socio-demographic characteristics of breast feeding practice among mothers of children aged 6 to 24 months.

METHODS AND MATERIALS

4.1 Study area and period

- The study area is Woreda 2 Health Center of Lemi Kura sub city,. Lemi Kura sub city is one of 11 sub cities in Addis Ababa; this sub city is the newly established sub city in 2018. The study period was Feb, 2023 to July 2023

4.2 Study Design

- A Community based cross-sectional study was conducted on mothers of children aged 6 to 24 months attending L/Kura Sub-City Administration Woreda 2 Health Center Addis Ababa Ethiopia 2023

4.3 Population

4.3.1. Source of population

- All mothers of children aged 6 to 24 months attending Lemi Kura Sub-City Administration Woreda 2 Health Centers.

4.3.2. Study Population

- All mothers of children aged 6 to 24 months attending L/Kura Sub-City Administration Woreda 2 Health Center during the study period.

4.4. Eligibility Criteria

4.4.1. Inclusion criteria

- All mothers of children aged 6 to 24 months attending MCH clinic at Lemi Kura Sub-City Administration Woreda 2 Health Center during the study period and who reside in the area for at least six months were included.

4.4.2. Exclusion criteria

- All mothers, of children aged 6 to 24 months attending MCH clinic at L/Kura Sub-City Administration Woreda 2 Health Center, who are seriously ill or their child is seriously ill at the time of data collection or mothers unable to communicate due to hearing loss were excluded.

4.5. Sample size determination

Since there is no previous research on breast feeding practice in the study area, and to get sample size let us take $P = 50\%$ with a precision level 5% and 95% confidence interval. 10% was added to compensate for non-response. Based on this assumption, the actual sample size for the study was computed using the formula for single population proportion as indicated below.

- $n = (Z \alpha/2)^2 p (1-p) / d^2 + 10\% \text{ non-response}$
- Where, n = the maximum sample size
- $Z \alpha/2$ = standard normal distribution curve value for 95% CI which is 1.96 (where, $\alpha = 0.05$)
- d = the margin error between the sample and the population (0.05)
- $n = (1.96)^2 0.5(1-0.5) = (3.8416 \times 0.25) = 384$
- $(0.05)^2 0.0025$
- $n = 384$
- $10\% = 38.4$
- Thus, the study included 384 study subjects plus 10% non-responses,
- $n = 422$

4.6. Sampling Procedures

- Systematic random sampling method was employed on selected mothers whose child's ages range between 6 and 24 months who visited L/Kura Sub-City Administration Woreda 2 Health Center for immunization, family planning service or under 5 years clinic, health Center immunization service and family planning service.

4.8 Variables

4.8.1 Dependent variable

- Breastfeeding practices

4.8.2 Independent variable

Socio demographic data

- Age mother
- Age of index child
- Mother's educational status
- Mother's occupation
- Income

Independent variable

Obstetrics and Health Service related Variables

- Parity
- Birth interval of the baby
- History of ANC
- Amount of ANC visit
- Health education on BF during ANC
- Place of delivery
- Mode of delivery
- Birth attendant

Postnatal follow up

Independent variable

Feeding Practices Variables

- Introduction of pre-lacteal food in the first three days after delivery among mothers
- Time of initiation of breast feeding
- Feeding of colostrums

4.9. Data quality management

- Training of supervisor and data collector done
- Pretest has been done

- Based on the pretest data, necessary
- Corrections were taken in any questions that need clarity or omission.
- The primary investigator will also closely follow and monitor the overall quality of the data collection.
- Every day the collected data were checked for completeness and relevance of response.

4.10. Data analysis procedures

- The data were exported to SPSS version 26 for analysis from epi info. The relationship between breast feeding practice and independent variables were investigated through bivariate analysis.
- In bivariate analysis, variables with a P-value < 0.25 were selected as candidates for multivariable logistic regression analysis to identify significantly associated variables to breast feeding practice and control confounding variables.
- Frequency tables and charts, odds-ratios, p-values and 95% confidence intervals were used to present and multivariable logistic regression analysis considered statistically significant at P-value < 0.05.

5. Result

5.1 Sociodemographic characteristics of the respondent

- Of four hundred and twenty two (422) sampled mothers, 404 were successfully included in the study making the response rate of 95.73%.
- The mean ($\pm$ SD) age of the participants was 24.37 ($\pm$ 3.07) years.
- Pertaining educational status majority of the respondent were primary school, 213 (52.2%), followed by secondary school, 169(41.8%).
- Regarding occupational status of respondents, 156(38,6%) of them were housewives at the time of data collection

5.3 feeding practices

- In this study, 112 (27.7%) of the mothers fed their infants before lactation.
- Formula milk accounted for 50 (44.7%) of prelactal feeding, followed by water and tenadam (16.9%) and sugar/glucose water (16.0%).
- The reported reasons for starting prelactal feeding for to newborns were insufficient breast milk 91(81.25%) followed by maternal illness 11(9.83%). Approximately 93% of respondents give colostrum to their infant.

Result

- A total of 246 mothers (60.9%) began breastfeeding within one hour after giving birth, while 147 (36.4%) did so between one and six hours later.
- Those respondents who scored above the mean on the practice questions indicated in the operational criteria were classified as good practitioners.
- Therefore, 187 (46.3%) of the respondents in this survey had good breastfeeding practice.

5.4 Determinant of breast feeding and associated factors

- Bivariate and multivariate logistic regressions were done to assess the predictors of breast feeding practice.
- All variables in the bivariate analysis at p-value < 0.25 were entered to the multivariate analysis.
- Among the variables that were included in the multivariate analysis model were ***health education during ANC, postnatal follow up, occupation and educational status of the mother*** were significantly associated with breast feeding practice.
- Health education on breast feeding during ANC were 2.25 times more likely to have good practice of breast feeding compare to those who didn't get health education on breast feeding during ANC [AOR= 2.25: 95%CI (1.43-3.53)].
- Pertaining educational status, those mothers whose educational status mothers whose educational status was secondary school and above were two times more likely to have good breast feeding practice than those mothers whose educational status secondary school and above [AOR= 2.29: 95%CI (1.01-5.19)].
- Regarding the occupation of the respondent, house wives were 2.83 times more likely to have good breast feeding practice than those with private business and employed [AOR= 2.28: 95%CI (1.76-4.55)]
- Similarly, the odds of having good practice of breastfeeding among those mothers who had postnatal follow up were 1.8 times greater than their counterpart [(AOR=1.82:95%CI (1.16-2.84)].

6. Discussion

- This study found that 187 (46.3%) of the survey participants practiced safe breastfeeding.

- In this study, breastfeeding practice was substantially correlated with the mother's occupation, educational status, postnatal follow-up, and health education during ANC.
- In this study the prevalence of exclusive breast feeding practice was 70%.
- This finding is consistent with the study done in Debre Birhan, 68.6% (32).
- However, it is lower than the study done in Bahir Dar 113 (84%) (26), slightly lower than the study conducted in Assosa, 76.0%,(24)
- However, it is higher than the study done in Harar, Ethiopia (45.8%)., Motta East Gojam Ethiopia 50% (30).
- The discrepancy could be due to the study participants' educational status difference and study period.
- Many of the study participants (60.9%) initiated breastfeeding immediately after delivery.
- It is consistent with the study conducted in Assosa, 60.2%.(24).
- However, this finding is higher than study conducted in Addis Ababa 52.6%) (31) and lower than the finding in Azezo district, 99.0 %, (29).
- Prelacteal feeding was prevalent in 112 (27.7%) of the study subjects, which is in accordance with the prevalence of 29% reported in the Addis Ketema subcity study(28), as well as the pooled prevalence of Ethiopia (27%) (28).
- However, compared to the prevalence seen in Harar, Eastern Ethiopia (45.8%) (27), prelacteal feeding is less common in the current study but greater than the Bahir Dar (15%) (26).
- When a mother asked about the type of prelactal feeding, out of 112 mothers who offered prelactal feeding 50(44.7%) gave formula milk, 18(16.0) gave water and sugar and 19(16.9) gave water and tenadam.
- This finding consistent with the study conducted in Addis Ketema, Addis Ababa (28).
- Pertaining educational status, those mothers whose educational status mothers whose educational status was secondary school and above were two times more likely to have good breast feeding practice than those mothers whose educational status secondary school and above [AOR= 2.29: 95%CI (1.01-5.19)].

- This finding is consistent with the study done in Addis Ababa(33) and the study conducted in Addis Ketema(26).
- The finding of this study emphasis the importance of health education, Health education on breast feeding during ANC were 2.25 times more likely to have good practice of breast feeding compare to those who didn't get health education on breast feeding during ANC [AOR= 2.25: 95%CI (1.43-3.53)].
- This finding is supported by the study done in Debre Birhan, Ethiopia (32) and Addis ketma, Addis Ababa, Ethiopia (28).
- Pertaining to occupation of the mother, house wives were 2.83 times more likely to have good breast feeding practice than those with private business and employed [AOR= 2.28: 95%CI (1.76-4.55)].
- This finding is line with a systematic review and meta-analysis done in Ethiopia, that employed mothers were 57% less likely than unemployed mothers to exclusively breastfeed their children [OR 0.43; 95% CI (0.3, 0.62)](25).
- Also, in line with the study conducted in Debre Birhan, where, working women were 0.36 times less likely than stay-at-home mothers to practice EBF (AOR 0.36; 95% CI: 0.18, 0.73) (32), and a study conducted in Azezo district, Ethiopia(29)
- In this survey the odds of having good practice of breastfeeding among those mothers who had postnatal follow up were 1.8 times greater than their counterpart [(AOR=1.82:95%CI (1.16-2.84)].
- This finding is in line with the study conducted in Asosa town which identified post-natal follow up to be 2.4 (1.55–3.55) (24), and the study conducted in Azezo district (29).

7. Conclusion and recommendation

7.1 conclusion

- The overall exclusive breast-feeding practice among the women was found to be good . In this study, breastfeeding practice was substantially correlated with the mother's occupation, educational status, postnatal follow-up, and health education during ANC.
- Unemployed women , women whose educational status were greater than secondary and above, health education and mothers who had follow up of postnatal care had good score of practice breast feeding.

7.2 Recommendation

- Based on the findings of the study, the following recommendations can be made:
1. Promote the education of exclusive breastfeeding during antenatal care: Antenatal care should include health education that covers the advantages and

methods of exclusive breast feeding. This could motivate mothers to breastfeed their children.

2. Strengthen postnatal follow-up: By ensuring regular postnatal follow-up visits, healthcare providers will have the chance to encourage and advise mothers on breastfeeding. Women who do this may find it easier to start and continue exclusive breastfeeding.
3. 3. Encourage the promotion of breastfeeding among medical staff: Medical staff members, such as doctors, nurses, and midwives, should get training on how to give correct and current information on breastfeeding. They may be very important in encouraging and supporting women's practice of exclusive breastfeeding.
4. Implement workplace support for breastfeeding: Policies and initiatives that support breastfeeding in the workplace can encourage employed women to continue exclusive breastfeeding. This can involve offering designated areas for breastfeeding or expressing milk, flexible work hours, and paid maternity leave.
5. 5. Conduct further research: More research needs to be done to examine potential influences on breastfeeding behaviors among women. This may lead to the discovery of new tactics and programs to raise the percentages of exclusive breastfeeding.

Appendices:

Appendix A: Seminar Program Schedule

Africa Medical College Annual In-house Research Seminar Program Schedule

February 9, 2024

	Time	Activity	Presentation	Facilitator
	9.00-9.10am	Welcome		Kassahun K., Research and Community Service, Head
	9.10-9.20am	Opening		Dr Mekonnen Belay, Vice President
	9.20-9.40am	Presentation One	<u>Dr Yadeta Dessie</u> Co-occurrence of and factors associated with health risk behaviours among adolescents: A multi-centre study in sub-Saharan Africa, China, and India	Mr Bizuayehu Desta
	9.40-10.00am	Coffee Break		
	10.00-10.20	Presentation Two	<u>Mr Assefa Takele</u> New Electrochemical Method to Determine Tryptophan in Fruit Juices: Development and Validation	Mr Tekelehaimanot Mezgebe
	10.20-10.40	Presentation Three	Ms Marta Assefa Breastfeeding Practices and Associated Factors among Mothers of Children Aged 6 To 24 Months Attending Lemi Kura Sub-City Administration Woreda 2 Health Center Addis Ababa, Ethiopia, 2022	Mr Sisay
	10.40-12.00	Questions & discussions		Mr Sisay & Mr Teklehaimanot
	12.00-12.30	Closing remarks		Dr Mekonnen Belay, Vice President

Appendix B: Poster Used to Announce the Seminar

