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Application of Vermicompost Boosts Sorghum Yield and Reduces Striga Infestation

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Key Messages

- Applications of vermicompost along with tied-ridge planting patterns enhance soil moisture and fertility.
- Combined application of vermicompost at a rate of 4.5 tons per hectare with tied-ridge in an intercropping system boosted sorghum yield by 60%, and reduced striga weed density and infestation by 85.71% and 77%, respectively.

Introduction

Sorghum and groundnut are providing economic and nutritional benefits for more than 100 million smallholder farmers in sub-Saharan Africa (SSA). Despite the ability of these crops to adapt in drought-prone areas, their productivity remained low mainly due to inadequate soil fertility and drought, resulting in a national average yield of sorghum less than 1.8 tons per hectare which is far below their potential of 3 to 6 tons per hectare (CSA, 2021). Hence, to improve its productivity, the development and promotion of sustainable agronomic practices such as the use of vermicompost, cereal/legume intercropping, and conservation practices are crucial. Vermicompost is a very promising and environmentally friendly natural fertilizer that can be easily produced at a low cost from locally available materials. Despite its benefits, the use of vermicompost, seedbed type, and intercropping is still limited compared to chemical fertilizers and monoculture (monocrop) and economic viability in intercropping systems.

On the other hand, most intercropping practices in eastern Hararghe are unsustainable leading to poor soil fertility and reduced crop yields. Therefore, this study aimed to evaluate the effects of vermicompost, conservation practices, and cropping systems on the productivity of sorghum, as well as its impact on soil fertility and striga weed control.

Approaches and Results

Two field experiments were conducted at the Kile (Qilee) farmers' field and Babile research site of Haramaya University, Eastern Ethiopia in the 2021 and 2022 cropping seasons. The treatment combinations include intercropping of the Melkam sorghum variety with two groundnut varieties (Babile-1 and Babile-2) under different rates of vermicompost (0, 1.5, 3, and 4.5 tons per hectare) and two seedbed types (open-furrow and tied-ridge planting pattern).

The result showed that the application of vermicompost at a rate of 4.5 tons per hectare for intercropped sorghum with groundnut- enhanced soil organic carbon (1.45 g cm-3), total- N (0.247%), available-P (38.46%), exchangeable-Fe (27%), exchangeable-Zn (40%), and sorghum grain yield (58%) over the control (Table 1). Intercropping systems at high vermicompost dose along with tied-ridge brought about maximum sorghum stalk yield (14.2 tons per hectare) and grain yield (6.0 tons per hectare) (Table 2). Additionally, there was a substantial reduction (77%) in the area under the Striga number progress curve compared to monocropping without fertilizer (Figure 2).

Table 1: Residual effect of vermicompost and cropping system on soil nitrogen and phosphorus.

Vermicompost (t/ha)	Total Nitrogen (N%)				Available Phosphorus (Olsen P mg kg⁻¹)			
	Intercrop	Monocrop	Open furrow	Tied-ridge	Intercrop	Monocrop	Open furrow	Tied-ridge
0	0.008[ef]	0.007[f]	0.008[e]	0.009[e]	3.868[e]	3.573[e]	3.748[f]	3.693[f]
1.5	0.093[de]	0.099[d]	0.094[d]	0.098[d]	4.762[d]	4.582[d]	4.727[e]	4.617[e]
3	0.135[c]	0.125[c]	0.13[c]	0.13[c]	7.04[c]	6.935[c]	7.457[c]	6.518[d]
4.5	0.247[a]	0.208[b]	0.242[a]	0.213[b]	9.822[a]	8.93[b]	9.677[a]	9.075[b]
LSD	0.014				0.495			

Vermicompost (t/ha)	Zinc (mg kg⁻¹)		Iron (mg kg⁻¹)		Manganese (mg kg⁻¹)	
	Intercrop	Monocrop	Intercrop	Monocrop	Intercrop	Monocrop
0	0.62[f]	0.28[g]	3.65[f]	3.73[f]	2.01[bcd]	2.47[a]
1.5	0.86[d]	0.74[e]	4.17[e]	4.22[e]	1.98[cd]	2.16[b]
3	1.18[b]	1.08[c]	5.16[c]	4.72[d]	1.89[d]	2.08[bc]
4.5	1.45[a]	1.18[b]	6.37[a]	5.7[b]	1.90[d]	1.97[cd]
LSD	0.08		0.38		0.18	

LSD = Least Significant Difference (cut-off point); Means sharing the same letters under each variable was non-significant (LSD>Minimum difference between corresponding values).
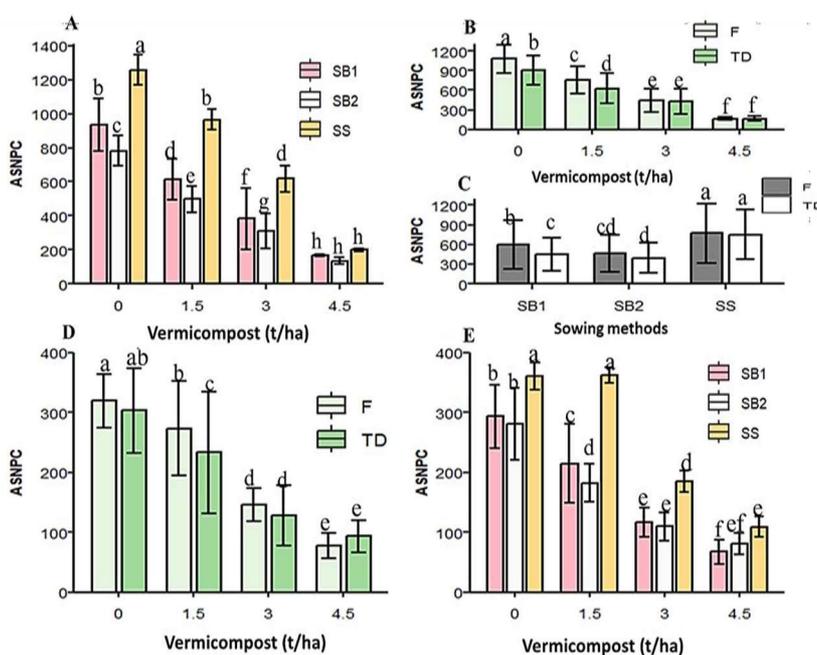
Figure 2: Two-way interaction effect of vermicompost with cropping methods and seedbed types as well as the two-way interaction effect of cropping method and seedbed types on ASNPC during 2021 (A, B, and C) and 2022 (D and E) years.

SS=sole sorghum; SB1/SB2= sorghum intercropping with *Babile-1* and *Babile-2* groundnut varieties; F= open-furrow planting; TD = tied ridge; Bars sharing the same letters are not significantly different at the 5% level of significance.

Table 2: Interaction effect of vermicompost, seedbed type, and sowing methods on sorghum stover yield and grain yield at Kile *Kebele* during 2021 and 2022 years.

(a) Stover yield (t/ha)

Cropping Pattern	VC (t/ha) 2021 year				VC (t/ha) 2022 year			
	0	1.5	3	4.5	0	1.5	3	4.5
SB1F	3.149[h]	3.947[gh]	6.852[d]	8.34[bc]	4.93[jklm]	4.794[klm]	8.918[f]	12.152[b]
SB1TD	3.590[gh]	5.490[e]	8.177[c]	10.81[a]	4.79[klm]	6.404[gh]	10.770[d]	12.01[bc]
SB2F	3.273[gh]	4.339[fg]	6.194[de]	9.275[b]	5.29[ijkl]	5.953[hi]	9.905[e]	12.619[b]
SB2TD	3.940[gh]	5.856[de]	8.578[bc]	10.95[a]	5.14[ijkl]	7.181[g]	11.22[cd]	14.205[a]
SSF	3.213[h]	5.804[de]	3.264[gh]	8.073[c]	3.549[n]	2.723[h]	8.117[f]	12.207[b]
SSTD	3.766[gh]	6.018[de]	8.206[bc]	8.83[bc]	4.214[m]	5.536[ijk]	8.349[f]	11.28[cd]
LSD	1.092				0.814			

(b) Grain yield (t/ha)

Cropping Pattern	VC (t/ha) 2021 year				VC (t/ha) 2022 year			
	0	1.5	3	4.5	0	1.5	3	4.5
SB1F	1.503[n]	2.49[ijk]	3.54[d]	4.782[c]	1.981[j]	2.689[h]	3.413[g]	5.033[cd]
SB1TD	2.29[jkl]	2.728[ij]	3.236[gh]	5.350[b]	2.171[j]	2.836[h]	4.719[de]	5.602[b]
SB2F	1.84[lmn]	2.39[ijk]	3.470[fg]	4.35[cd]	2.074[j]	2.635[h]	4.419[e]	5.584[b]
SB2TD	2.05[klm]	2.819[hi]	4.20[de]	5.817[a]	2.228[ij]	2.931[h]	4.813[de]	6.014[a]
SSF	1.445[n]	2.538[ij]	3.264[gh]	4.16[de]	1.549[k]	2.723[h]	3.562[fg]	4.605[e]
SSTD	1.627[mn]	2.44[ijk]	3.839[ef]	5.285[b]	1.885[jk]	2.592[hi]	3.941[f]	5.286[bc]
LSD	0.456				0.403			

SS = sole sorghum; SB1/SB2 = sorghum with *Babile-1* and *Babile-2* groundnut varieties; F = open-furrow planting; TD = tied ridge; VC = vermicompost; Means sharing the same letters are not significantly different at the 5% level of significance; LSD = least significant difference.

Policy Recommendations

- Ministry of Agriculture should launch a targeted campaign and training to motivate farmers to produce and use vermicompost along with tied ridge and intercropping planting patterns for enhanced sorghum yield and striga weed management.
- A coordinated action is required by the Ministry of Labor and Skills, NGOs, and other concerned stakeholders to support the youth to commercialize vermicompost production.
- Investors, unions, and cooperatives should be involved in the large-scale production and commercialization of vermicompost.

Effective Microbes Supplementation on Diets Boosts Growth Performance of Short-Eared Somali Goats

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Key Messages

- Goat fed with 7% EM Bokashi supplementation gained 50% body weight whereas the control group gained 7.4% in short-eared Somali goats.

- Supplementation of the yearling goats with a diet containing 7% EM-Bokashi showed a commendable marginal rate of return of 19.5%.

Introduction

Despite the large number and importance of goats in Ethiopia, productivity is still low due to mainly lack of sufficient and high-quality feed. Roughage which is characterized by poor quality constitutes a major feed resource for animals. Improving feed and nutrition through effective microbe-treated wheat bran (EM-Bokashi) optimizes rumen fermentation and increases protein supply for rumen microorganisms.

Effective microorganisms are a mixture of groups of organisms that have a reviving effect on the natural environment and consist of approximately 80 species of selected beneficial microorganisms, including lactic acid bacteria, yeasts, photosynthetic bacteria, and actinomycetes. Wheat bran Bokashi is prepared by mixing effective microbes with wheat bran to create probiotics that increase the quantity, availability, digestibility, and assimilation of nutrients in the animal body. The effective microbes equilibrate the microflora within the intestines of the animals and consequently improve feed conversion and weight gain due to increased nutrient assimilation. So, to enhance the utilization of roughage feeds by livestock such as goats, the use of effective microbes- Bokashi is imperative. This study was conducted to evaluate the effects of the inclusion of different levels of wheat bran Bokashi in a concentrate mixture on the growth performance, and carcass yield of Somali goats fed a basal grass hay diet.

Approaches and Results

Goat feeding experiment was conducted at Haramaya University Goat Farm in Eastern Ethiopia. A total of 20 yearling intact male short-eared Somali goats were purchased from local markets and used for a 90-day feeding trial. Animals were blocked based on their initial body weight using a randomized complete block design. The bucks were grouped into five blocks and four treatment groups (Table 1).

The concentrated mixtures formulated from wheat bran, noug seed cake, and ruminant vitamin and mineral premixes were fed to the animals on a DM basis at a rate of 2.5% of their body weight. A basal diet of pasture grass hay was provided ad libitum (as much as animals need). The result indicated that the intake of dry matter, organic matter, and crude protein increased as the inclusion level of EM Bokashi increased from 3% to 7%. On the other hand, the intake of neutral detergent fiber, acid detergent fiber, and acid detergent lignin decreased as the concentration increased from 3 to 7% (Table 2).

Nutrient digestibility was improved for goats fed with EM Bokashi compared to those without supplementation (Table 3). This might be attributed to microbial solubilization or increased biodegradability of cell wall components.

Feed supplemented with 7% EM Bokashi achieved the highest final body weight (27.9 kg), average daily gain, and feed conversion efficiency in bucks compared to those fed on the other treatment (Table 4).

Table 1: Experimental treatment arrangement.

Treatments	Basal Diet	Mixture or Proportions of Experimental Diets
Treatment 1 (Control)	*Ad libtum* grass hay	Concentrate mixture diet without EM WB *Bokashi*
Treatment 2	*Ad libtum* grass hay	3% EM *Bokashi* + 97% concentrate mixture diets
Treatment 3	*Ad libtum* grass hay	5% EM *Bokashi* + 95% concentrate mixture diets
Treatment 4	*Ad libtum* grass hay	7% EM *Bokashi* + 93% concentrate mixture diets

EM WB= Effective microorganisms Wheat bran; CMs= Concentrate mixtures (Noug seed cake+ WB+ Ruminant vitamin premixes)

Table 2: Daily nutrient intake of Somali goats fed on EM Bokashi.

Nutrient intake (gm/Day)	Treatments					SEM
	T1	T2	T3	T4	Mean (±)	
DMI	589.7[c]	686.6[b]	752[b]	824.5[a]	713.20	18.5
OMI	558[d]	659.7[c]	749.7[b]	828.3[a]	698.93	17.8
CPI	97.7[d]	113[c]	139.6[b]	159[a]	127.33	2.5
NDFI	466[a]	432[ab]	398[b]	397.9[b]	423.48	17.0
ADFI	191.8[a]	165.5[ab]	128[c]	148.5[bc]	158.45	9.0
ADLI	113.8[a]	92.8[b]	83.5[b]	89.5[b]	94.90	5.2

[a-d] Means bearing different superscripts within factors across columns are significantly different at $P < 0.05$; SEM= Standard Error Mean; EM= Effective Microorganism; DMI= Dry Matter Intake; OMI= Organic Matter Intake; CPI = Crude Protein Intake; NDFI= Neutral Detergent Fiber Intake; ADFI= Acid Detergent Fiber Intake; MEI= Metabolizable Energy; T1= Ad libitum Grass Hay + 100% CMs+ 0% WB *Bokashi*; T2 = Ad Libtum Grass Hay + 3% WB *Bokashi* + 97% CMs; T3 = *Ad Libtum* Grass Heild + 5% WB *Bokashi* + 95% CMs; T4 = Ad Libtum Grass Hay + 7% WB *Bokashi* + 93% CMs.

Table 3: Apparent digestibility Coefficient (%) of Somali goats fed on EM *Bokashi.*

Nutrient	Treatments				SEM
	T1	T2	T3	T4	
DM	72.29[b]	78.55[ab]	80.34[a]	83.50[a]	1.82
OM	73.2[b]	77.1[ab]	80.5[a]	82.4[a]	1.73
CP	57.3[c]	68.0[bc]	77.7[ab]	81.9[a]	2.99
NDF	63.9[b]	71[ab]	80.3[a]	77.4[a]	2.78
ADF	42.9[b]	45.5[ab]	56[ab]	61[a]	4.69

[a-d] Means bearing different superscripts within factors across columns are significantly different at $P < 0.05$; SEM= Standard Error Mean; T1= Ad libitum Grass Hay + 100% CMs+ 0% WB *Bokashi*; T2 = Ad Libtum Grass Hay + 3% WB *Bokashi* + 97% CMs; T3 = *Ad Libtum* Grass Heild + 5% WB *Bokashi* + 95% CMs; T4 = Ad Libtum Grass Hay + 7% WB *Bokashi* + 93% CMs.

Table 4: Body weight changes and FCE of Somali goats supplemented with EM Bokashi.

Weight parameter	Treatments				SEM
	T1	T2	T3	T4	
IBW (kg)	17.5	18.2	18.2	18.6	0.56
FBW (kg)	18.8[c]	23.2[b]	25.6[ab]	27.9[a]	0.72
ADG (g/d)	13.3[c]	54.9[b]	82.6[a]	103.3[a]	5.98
FCE	0.02[c]	0.08[b]	0.1[ab]	0.124[a]	0.01

Where: FBW=Final body weight; ADG= Averege daily gain; FCE= Feed conversion efficiency

Table 5: Carcass yields and fat thickness of Somali Goats fed on EM Bokashi.

Parameter	Treatments				Mean
	T1	T2	T3	T4	
HCW (kg)	6.6	10.3	11.9	13.7	10.63
CCW (kg)	6.2	9.6	11.1	12.8	9.93
Lean (kg)	1.90	2.76	3.10	3.20	2.74
Bone (kg)	0.88	1.27	1.39	1.55	1.27
Fat (kg)	0.36	0.66	0.77	1.00	0.70
RDP (%)	44.9	54.3	58.7	61.6	54.88
REA(Inch sqr)	0.54	0.601	0.63	0.71	0.62
FT (mm)	1.40	2.81	2.94	3.30	2.61

HCW = Hot Carcass Weight; CCW = Cold Carcass Weight; RDP = Real Dressing Percentage (EBW) basis; REA=Rib eye area; FT = Fat thickness.

Hot and cold carcass weight, dressing percentage, and fat thickness showed an increasing trend with an increased inclusion rate of EM-Bokashi levels from 3 to 7% in the supplemental feed compared with those in the non-EM Bokashi-supplemented control group (Table 5). Bucks-fed diets supplemented with EM Bokashi had a greater carcass composition (lean, fat, and bone) than those fed on unsupplemented dietary groups. Finally, goats in the EM Bokashi supplement treatment groups had greater Rib eye area and back fat thickness than the animals in the control group.

Policy Recommendations

- Universities, research centers, agricultural bureaus, NGOs, and other stakeholders should provide training for farmers and development agents on the importance, preparation, and utilization of EM Bokashi supplementation.

- Individuals and cooperative unions involved in medium and large-scale fattening are advised to use EM Bokashi supplementation.

- Ministry of Agriculture and NGOs should work on scaling up EM Bokashi on a wider scope.

Training Interventions Enhances Hygiene and Meat Safety in Eastern Ethiopian Butcheries

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Key Messages

- Training for butchery workers substantially reduced S. Aureus contamination and prevalence from 52.4% to 11.9% demonstrating effectiveness in improving hygiene practices

- A significant reduction in S.Aureus contamination was observed in both environmental (41.66%) and meat samples (26.7%) after training intervention.

- High resistance rates to amoxicillin (88.68%) and pencillin-G (79.25%) among S. Aureus isolates indicates the need for prudent antibiotic use and ongoing monitoring.

Introduction

Prevailing poor food handling and sanitation practices, inadequate food safety laws, weak regulatory systems, lack of financial resources to invest in safer equipment and lack of education for food-handlers attributed to food borne diseases. Animal products, such as meat, are generally regarded as high-risk commodity in respect of pathogen contents. Poor butchery shops (cutting boards, utensils, prep tables, scales and meat slicers) environmental hygiene, and personnel hygienic practices with low knowledge were reported in Ethiopia.

The presence of spoilage microbial on the minced meat and contact surface materials in butcheries with significant increases in microbial load with day heat at butchery shops have been reported in Ethiopia. Besides, the occurrences of public health risk due to microbial on meat and the environment has been reported. The E. coli, Salmonella, and S. aureus on meat contact surface samples were 29.17%, 4.17%, and 37.5% and in minced meat at 43.75%, 6.25% and 37.5% were reported from butchery shops, respectively. Furthermore, the risk of the presence of drug-resistant pathogen in butcher shops were reported from different parts of Ethiopia.

The need for workers training to reduce meat contamination has been a concern in a number of studies in which the effectiveness of food hygiene training was evaluated by using inspection checklists, microbiological analyses, and questionnaires. Thus, the aim of this study was to assess the improvement of hygienic meat handling at butchery shops using Staphylococcus aureus in Ethiopia.

Approaches and Results

A cross-sectional study was conducted from November 2020 to June 2023 on butcheries of selected towns inEastern Ethiopia (Haramaya, Awaday, Malk-Rafu and Harar towns). Two round sampling were performed. First round sampling had taken place before the delivery of hygienic meat handling training to the selected 30 butcher workers and the second one was after the delivery of the training. A total of 210 different samples (Carcass sample from flank, thorax, crutch, and breast sites) and environmental samples (swab samples were also taken from cutting board, knife, hooks, floor and personal hands) were collected during each round. The S. aureus was isolated from various samples collected from butcheries followed by two-day-training on hygienic meat handling for butcher workers. Based on the recommendations by Vaz et al. (2005), regarding the need for supervision and refresher activities for food (meat) handlers, theoretical and practical trainings were delivered to the selected representative meat shops workers. Two months later, similar number and types of samples were re-collected and tested for S. aureus. Antimicrobial resistance test was performed using the Kirby-Bauer disk diffusion method only on randomly selected 53 S. aureus isolates during the first round.

From a total of 210 samples taken from the selected butchery shops, an overall S. aureus prevalence of 51.4% and 11.90% were observed before and after the training, respectively, showing significant reduction (39.5%). Significant levels of S. aureus contamination reduction in environmental (41.66%) and from meat (26.70%) were observed. Prevalence of S. aureus before the delivery of training in environmental and meat samples was similar. But, significant differences were observed after the training (P = 0.03). Overall and at the environmental samples, significant reductions were observed after training (p < 0.001). In general odds of S. aureus reduction after the training were more than three, nine and seven fold at environmental, meat and overall samples, respectively. All of the 30 respondents (butcher workers) were males (100%). From the respondents, 11 (36.67%) have

elementary class educations, 12 (40%) were in age group between 26–30 years and 13 (43.33%) had between 1 to 2 years of work experience in butchery shops. Regarding the butcheries demography and the prevalence of S. aureus, prevalence of 50% and 46.7% were observed before and after the training, respectively. Considering the workers age and level of education, S. aureus was observed in all, except for the degree holders. Considerable S. aureus reductions were also observed after the training.

Antimicrobial resistance profiles of the 53 S. aureus isolate were also studied. Pan susceptibility to microbial complete susceptible to all tested antimicrobial agents (gentamicin) and resistance to antibiotics used treat serious bacterial infections (vancomycin) were observed. The majority of isolates were susceptible to different antibiotics such as chloramphenicol (83.02%), sulfamethoxazole-trimethoprim (69.81%) and erythromycin (60.38%). Again, the majorities of isolates were resistant to amoxicillin (88.68%) and penicillin-G (79.25%). Distribution of the resistant isolates (n = 53) against the combination of drugs of the same generic were observed. Two generic drug (beta lactam and glycol-peptide group) resistant isolates were 67.92%. Multiples drug (≥ 3 drugs generic) resistant isolates were 16 (30.19%). Two of the isolates (3.77%) were resistant to drugs of four generic groups (beta lactam, sulfonamide, macrolides and glycol-peptide groups).

Policy Recommendations

- Ministry of health and regional health bureaus should provide continuous training on hygienic meat handling, awareness creation on appropriate use of antimicrobials to reduce the prevalence of antimicrobial-resistant pathogens.

- Ministry of health, NGOs and other stakeholders need to provide logistic support and frequent supervision to ensure significant, sustainable and long-term improvements of hygienic meat handling.

Liver Cirrhosis in Eastern Ethiopia: Strong Association with High Level of Aflatoxin B$_1$

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Key Messages

- Aflatoxin B$_1$ albumin adduct detected in patients with high levels (≥8.6 pg/mg) was found to be strongly associated with liver cirrhosis.
- High AF-alb levels were associated with an increased risk of liver cirrhosis, alongside factors such as older age, farming occupation, family history of liver disease, and HBV infection.

Introduction

Liver cirrhosis, marked by the change of liver structure and the formation of regenerative nodules, is a major cause of illness and death among patients with liver disease. It is a significant global health issue and responsible for 2.4% of all deaths in 2019 (Huang et al., 2023).

In Ethiopia, liver cirrhosis ranks as the seventh leading cause of mortality, accounting for 24 deaths per 100,000 population. Although treatment for liver cirrhosis has improved significantly in recent years, the attitude of patients still remains poor. Therefore, it is essential to prioritize the identification and management of preventable risk factors. Liver cirrhosis is a serious condition linked to various risk factors, including obesity, non-alcoholic fatty liver disease, excessive alcohol consumption, and infections from Hepatitis B or C virus (HBV or

HCV) (Huang et al., 2023; Wang et al., 2022). Additionally, autoimmune disorders, cholestatic diseases, and iron overload are among the contributors. Despite remarkable advancements in our understanding of this disease, one-third of cirrhosis cases in sub-Saharan Africa are still classified as cirrhosis of the liver of unknown cause (Mokdad et al., 2014).

A previous study in Eastern Ethiopia revealed that 55% of liver cirrhosis cases were of uncertain origin. Tissue examinations have shown that these cases often involve toxic liver injury which calls for further study and interventions. Dietary exposure to aflatoxin B$_1$ (AFB$_1$), a potent fungal toxin produced by Aspergillus flavus and Aspergillus parasiticus, is increasingly recognized as a significant contributor to liver cirrhosis.

A recent study in Guatemala revealed a strong association between AFB$_1$ exposure and the incidence of liver cirrhosis. In Eastern Ethiopia, multiple studies have shown alarming levels of AFB$_1$ contamination in sorghum and groundnut. However, there is limited evidence linking AFB$_1$ exposure to the development of liver cirrhosis. Therefore, this study is aimed to investigate exposure to aflatoxin and the risk of liver cirrhosis linkage in Eastern Ethiopia.

Approaches and Results

A case-control study was conducted in Hiwot Fana Comprehensive Specialized University Hospital (HFCSUH), Harar, Eastern Ethiopia, from 1 January 2020 to 31 July 2021. A total of 127 cases and 253 control patients were included based on diagnosis with ultrasound-based cirrhosis scale. A structured questionnaire and standardized formats were used to gather demographic, lifestyle, and clinical information.

Table 1: Multivariable binary logistic regression analysis of predictive factors of liver cirrhosis in Eastern Ethiopia, 2020/21.

Variables	Category	Cases n (%)	Control n (%)	COR (95% CI)	AOR (95% CI)
Gender	Male	84 (66)	144 (57)	1.5 (0.9, 2.3)	1.0 (0.6, 1.9)
	Female	43 (34)	109 (43)	1.00	1.00
Age category	<35	65 (51)	125 (49)	1.00	1.00
	35-44	23 (18)	48 (19)	0.9 (0.5, 1.6)	0.5 (0.3, 1.1)
	45-54	18 (14)	32 (13)	1.1 (0.6, 2.1)	0.7 (0.3, 1.5)
	55 and above	21 (17)	48 (19)	0.8 (0.5, 1.5)	0.4 (0.2, 0.8) *
Residence	Urban	20 (16)	78 (31)	1.00	1.00
	Rural	107 (84)	175 (69)	2.4 (1.4, 4.1)	1.0 (0.5, 2.0)
Marital status	Never married	14 (11)	52 (20)	0.5 (0.3, 0.9)	0.7 (0.3, 1.6)
	Married	110 (87)	194 (77)	1.00	1.00
	Divorced/Widowed	3 (2)	7 (3)	0.8 (0.2, 3.0)	1.4 (0.3, 7.6)
Formal education	No	102 (80)	140 (55)	1.00	1.00
	Yes	25 (20)	113 (45)	0.3 (0.2, 0.5)	0.6 (0.3, 1.3)
Occupation	Not farmer	23 (18)	120 (47)	1.00	1.00
	Farmer	104 (82)	133 (53)	4.0 (2.4, 6.8)	3.0 (1.5, 6.0) *
Khat use	No	48 (38)	132 (52)	1.00	1.00
	Yes	79 (62)	121 (48)	1.8 (1.2, 2.8)	1.3 (0.7, 2.4)
Tobacco use	No	99 (78)	221 (87)	1.00	1.00
	Yes	28 (22)	32 (13)	2.0 (1.1, 3.4)	1.4 (0.7, 2.8)
Body mass index	Normal	73 (58)	162 (64)	1.00	1.00
	Underweight	45 (35)	82 (32)	1.2 (0.8, 1.9)	1.4 (0.8, 2.3)
	Overweight	9 (7)	9 (4)	2.2 (0.8, 5.8)	1.8 (0.6, 5.7)
Family history of liver disease	No	111 (87)	245 (97)	1.00	1.00
	Yes	16 (13)	8 (3)	3.5 (1.5, 8.0)	2.9 (1.1, 7.9) *
HBV Positive	No	100 (79)	239 (94.5)	1.00	1.00
	Yes	27 (21)	14 (5.5)	4.6 (2.3, 9.2)	4.0 (1.9, 8.8) *
AF-alb adduct level	Nondetectable	32 (25)	91 (36)	1.00	1.00
	Low	38 (30)	91 (36)	1.2 (0.7, 2.1)	1.2 (0.6, 2.2)
	High	57 (45)	71 (28)	2.3 (1.3, 3.9)	2.0 (1.1, 3.7) *

Note: *p value < 0.05; AF-alb, aflatoxin B_1 (AFB_1)-albumin adduct; AOR, Adjusted Odds Ratio COR, Crude Odds Ratio; HBV, Hepatitis B Virus.

In addition, blood samples were collected from each participant to examine liver function, hepatitis B virus (HBV), hepatitis C virus (HCV), and an aflatoxin-albumin assay. The relationships between liver cirrhosis and the independent variables were statistically analyzed. The findings reveal that AF-alb levels were detected in 75% of liver cirrhosis cases compared to 64% of controls. The median level of AF-alb in cases was 11 pg/mg (IQR: 5.5-25), notably higher than the 7.0 pg/mg (IQR: 4.3-20.5) found in the controls which is statistically significant ($p < 0.05$) (Table 1).

The probability of developing liver cirrhosis decreased by 60% in patients aged 55 years and above compared with patients younger than 35 years. Patients who were farmers by occupation and those with a family history of liver disease had 3- and 2.9-times higher possibility of developing liver cirrhosis than their counterparts, respectively. Hepatitis B virus seropositive patients had a 4 times higher possibility of developing liver cirrhosis than seronegative patients. Likewise, the chance of developing liver cirrhosis in patients with high concentrations of AF-alb was 2 times higher than in those with undetected levels.

Policy Recommendations

- Ministry of Agriculture and concerned stakeholders should develop and implement a comprehensive strategy to reduce AFB1 contamination in the food value chain through proper pre and post- harvest management.
- Ministry of Agriculture and other stakeholders should conduct regular monitoring of AFB_1 levels in food and feed commodities to reduce aflatoxin.
- Ministry of Health should regularly screen patients with hepatitis B virus seropositive and family history of liver disease for liver cirrhosis.
- Concerned stakeholders should conduct an awareness creation campaign to educate farmers, traders, and consumers on safe food handling practices, and the risk of AFB_1 exposure and its association with liver cirrhosis.

Schizophrenia on the rise in Eastern Ethiopia

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Key Messages

- Th trends of Schizophrenia (severe mental illeness) increased from 57% in 2016 to 65% in 2020 in eastern Ethiopia

- Schizophrenia was associated with unemployment, educational status, having a family history of mental illness, and polysubstance uses.

- Non-adherence to anti-psychotic medications was observed in 44.57% of patients with schizophrenia which were linked to current substance use, treated with first-generation antipsychotics, poor insight into their illness, and experienced medication side effects.

- Poly-substance users and those who experienced perceived self-stigma were the independent predictors of low quality of life in social domain.

Introduction

Schizophrenia is a severe mental disorder characterized by delusions, hallucinations, and negative symptoms (Patel et al., 2014), onset in late adolescence or early adulthood. Although the exact cause is unknown, genetic, environmental, and behavioral factors may influence the likelihood of developing the disorder (Bruijnzeel and Tandon, 2011). Schizophrenia is a global serious health problem that affects an estimated 24 million people globally (World Health Organization, 2022). more than 15 million in China (Ma et al., 2022) and 5 million in Africa (Rachel Feldman, 2014, Saha et al., 2005). It ranks among the top ten in terms of global disease burden (Charlson et al., 2018), is associated with unhealthy lifestyle choices such as obesity and substance abuse, and has a high suicide rate, this might result in a 10- to 25-year decrease in life expectancy(Alfredsson et al., 2017). Antipsychotic medication is a long-term treatment, but poor adherence can lead to negative outcomes like relapse, hospitalization, and suicide (A. Orrico-Sánchez et al., 2020).

Schizophrenia significantly impacts the quality of life, with hallucinations, delusions, cognitive impairments, and social isolation (Vassileva et al., 2014). Although Ethiopia has adopted the 2030 Sustainable Development Agenda to decrease mental illnesses like schizophrenia and has developed a comprehensive national mental health plan (Ethiopian Federal Ministry of Health, 2020).

Approaches and Results

A hospital-based retrospective study was conducted among 29,184 medical records of psychiatric patients from 2016 to 2020. A hospital-based matched case-control study included 218 patients with schizophrenia and 218 healthy individuals aged ≥ 18 year who visited hospitals during the same time period and, hospital-based cross-sectional study was conducted among 909 patients with schizophrenia age > 18 year. A structured questionnaire was used to obtain information about socio-demographic characteristics, clinical factors and substance use related questions

through Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) were used to obtain information about substance use (Group, 2002). Antipsychotic medication adherence was measured using a modified version of, Medication Adherence Rating Scale (MARS), which is a 10-item self-report scale. A MARS score of 3 or higher indicates adherence, while a MARS score of less than or equal to 2 indicates non-adherence to the antipsychotic treatment (Thompson et al., 2000).

Insight was measured using the self-report insight scale for Psychosis (ISP) is an 8-item self-report scale that is simple to answer and represent three subscales: awareness of illness (2 items), symptom relabeling (2 items), and treatment need (4 items). With a score of 9 or more indicating good insight (Birchwood et al., 1994).

To assess the quality of life, World Health Organization Quality of Life Assessment Short version, (WHOQOL-BREF), were used which contains 26 items of self-administered generic questionnaire and its short version of the WHOQoL-100 scale were used (Organization, 1998). The tool has four domain scores: physical health (7 items), psychological health (6 items),

social relationships (3 items), environmental health domain (8 items) as well as two separately scored items about the individuals' perception of their quality of life. Therefore, domain scores are scaled in a positive direction (i.e. higher scores correspond to a better quality of life(Skevington et al., 2004). The finding indicated that the mean age of the participants was 34.18 years (SD=+10.43) ranging from 18 to 65 years. The majority of the respondents were males, accounting for 706 (77.67%) of the sample and slightly more than half (56.55%) of the participants were from urban settings. Moreover, a significant proportion (42.57%) of the participants had no formal education and nearly half (40.70%) of them had no paid jobs.

Schizophrenia has shown an increased trend over the five years (2016 to 2020) from 57% to 65% (Figure 1). Schizophrenia is significantly associated with no formal educational (AOR: 3.11; 95% CI: 1.30–7.42), single marital status (AOR: 6.15; 95%CI: 2.47–15.28) and unemployed status (AOR: 4.60; 95% CI: 1.80–11.71), family history of mental illness (AOR: 12.21; 95% CI: 4.83–30.00), current tobacco users (AOR: 2.31; 95% CI: 1.08–4.91), Khat chewer (AOR: 2.82; 95% CI: 1.23-6.45), and polysubstance users (AOR: 4.45; 95% CI: 1.28–15.45) (Figure 2).
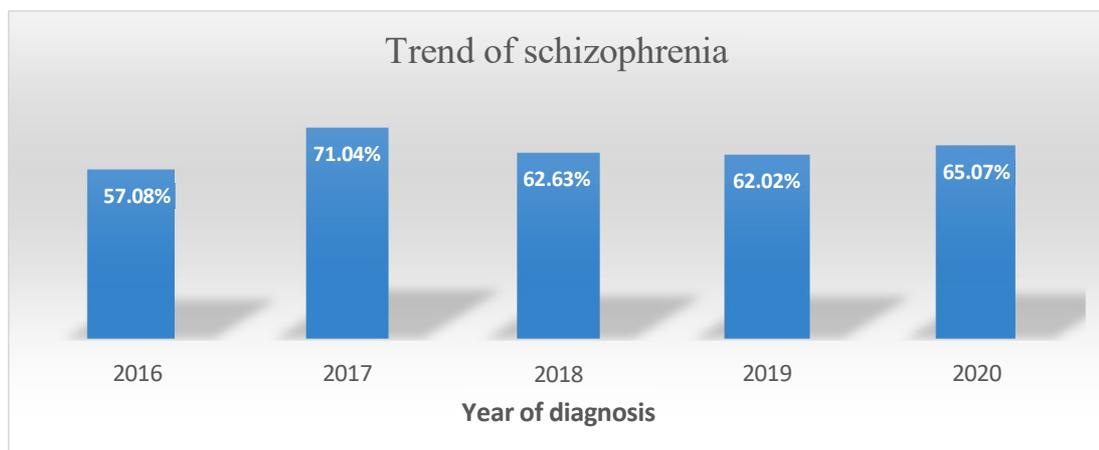

Figure 1: Overall Trend of patients with schizophrenia from 2016-2020.
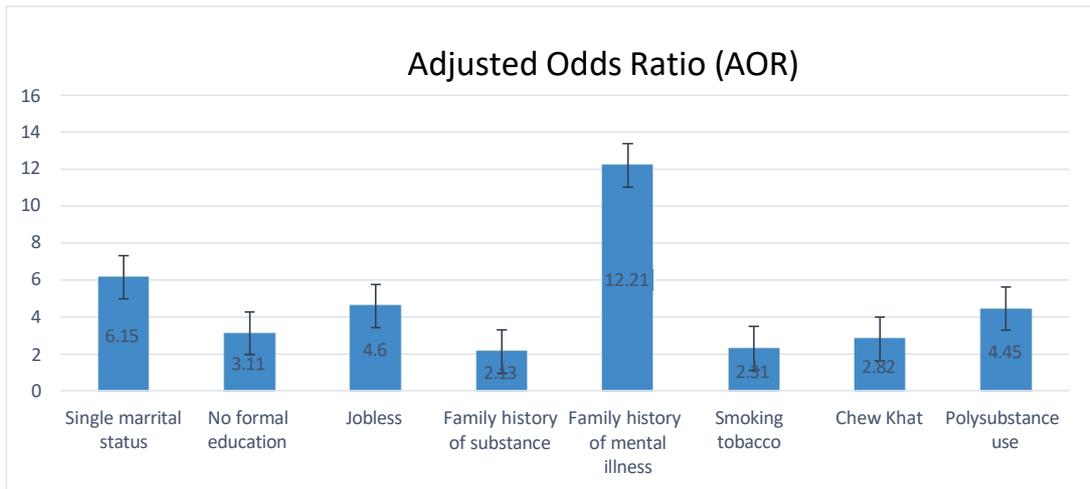
Figure 2: Determinants of schizophrenia at selected public Hospitals, Eastern Ethiopia.

Non-adherence to anti-psychotic medications was observed in 44.57% of patients with schizophrenia. Non-adherence to medication was associated with single marital status (AOR=2.478; 95% CI(1.713-3.855), current cigarette smoker (AOR= 2.034; 95 % CI (1.496- 2.674), alcohol users (AOR= 1.991 ; 95 % CI (1.457- 2.719), Khat consumers (AOR= 2.836; 95 % CI (2.0601- 3.902) and illness duration less than or equal to 5 years) (AOR 1.446; 95 % CI (1.049- 1.993) (Figure 3).
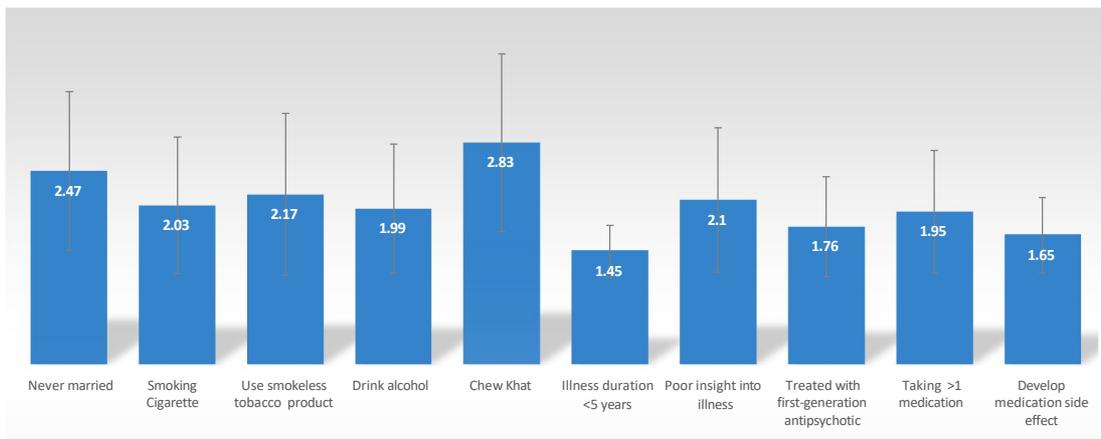
Figure 3: Factors associated with antipsychotic medications nonadherence. Among patients with schizophrenia at public Hospitals, Eastern Ethiopia from December 1, 2022, to January 31, 2023.

Among the four domains of quality of life, respondents scored the highest mean in the environmental health domain 23.39 (±3.64) and lowest in the social health domain 9.52 (± 2.57). Physical health domain quality of life reduced by 0.86 (p-value=0.040) among those who have low social support. Psychological health domain quality of life was reduced by 0.77(β = -0. 768, P =0.001), among polysubstance users and by 0.48 among individuals with poor social support. Social relation domain quality of life reduced by -0.7(β = -0. 71, P =0.001) among polysubstance users and reduced by 0.57 (β = -0.57, P =0.0001) among those who perceive self-stigma. Environmental health domain quality of life reduced by 0.532(β = 1.125, p-value=0.0001) among patients with poor social support.

Policy Recommendations

- Ministry of Health, Customs authority, and law enforcing agencies should implement and promote strategies that reduce poly/substance use.
- Health institutions in collaboration with NGOs should establish rehabilitation centers and provide counseling services.
- Community leaders, religious institution, universities and schools should create awareness on the effects of substance uses.
- Community and religious leaders should take the leading role to reduce stigma and promote social support.

High Incidence of Surgical Site Infections and Poor Prevention Practice among Health Care Providers in Hospitals in Eastern Ethiopia

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Key Messages

- A significant number of patients (13.98%) in Eastern Ethiopia hospitals develop infections at the surgical site after their operations/surgery and gram-negative bacteria were found predominant (66.10%) isolates causing the infections.

- Staphylococcus Species (the bacteria often associated with skin normal flora) followed by Klebsiella Spps and E. coli were the most common multidrug-resistant bacterial isolates identified by drug susceptibility patterns.

- Nurses in surgical and maternity wards often don't follow the best practices to prevent surgical site infections.

Introduction

A surgical site infection (SSI) is a type of healthcare-associated infection. It is an infection that occurs near or at the incision site and/or deeper underlying tissue spaces and organs within 30 days of a surgical procedure. It remains an important public health challenge in the clinical setting. It accounts for a high proportion of the total number of hospital-acquired infections and has a great impact on patients' healthcare costs, morbidity, and mortality worldwide. Despite improvements in operating room practices, instrument sterilization methods, better surgical techniques, and the best efforts of infection prevention strategies, surgical site infections remain major causes of healthcare-associated infections in developing countries. Unlike other health professionals, nurses are the primary responsible bodies and can play a central role in preventing surgical site infections. However, the incidence of surgical site infection, bacterial isolates antimicrobial susceptibility, and the nurses' practices toward surgical site infection prevention are rarely studied in Ethiopia, particularly in the eastern part of the country.

Approaches and Results

A hospital-based prospective cohort study was conducted in public hospitals in Eastern Ethiopia. A total of 801 patients who underwent major surgical procedures were selected systematically and followed for the outcomes of interest (SSI). Likewise, a cross-sectional study was undertaken among 476 randomly selected nurses working in public hospitals in Eastern Ethiopia. Data were collected by reviewing patient cards, interviewing patients and nurses, observing surgical sites for the outcomes, and wound care practices using standard checklists. Descriptive analysis was done and a logistic regression model was employed to assess the association between the predictors and outcome variables.

Among the tested swabs 112 (13.98%) clinical samples of surgical site wounds yielded bacteria growth based on culture. The majority (66.1%) of these isolates were gram-negative. Staphylococcus species were the 36 leading isolates (32.14%) followed by Escherichia coli 22(19.6%) and Klebsiella species 21(18.75%).

Staphylococcus species showed high (%) resistance to the most commonly used antibiotics; azithromycin, gentamycin, cotrimoxazole, erythromycin, tetracycline, and penicillin G, but better susceptibility to vancomycin.

Table 1: Multivariate analysis of factors associated with SSIs among patients undergoing major surgical procedures in public Hospitals in Eastern Ethiopia, 2024.

Variables	SSI status		COR (95%CI)	AOR (95%CI)
	Yes N(%)	No N(%)		
Age in years				
<=18	12(20.0%)	48(80.0%)	1	
19-40	83(14.6%)	485(85.4%)	0.685(0,349,1.343)	0.700(0.308,1.592)
>40	42(24.3%)	131(75.7%)	1.282(0.623,2.639)	1.203(0.481,3.006)
Sex				
Male	58(21.6%)	210(78.4%)	1.578(1.089,2.312)	.746(0.396,1.404)
Female	79(14.8%)	454(85.2%)	1	
Wound type				
Clean	31(7.0%)	414(93.0%)	1	
Contaminated	106(29.8%)	250(70.2%)	5.662(3.684,8.704)	14.725(8.210,26.410)*
Pre-operative length of hospital stay				
<7days	118(15.8%)	630(84.2%)	1	
>=7days	19(35.8%)	34(64.2%)	2.984(1.646,5.408)	2.452(1.113, 5.402) *
Duration of surgical procedure				
Within 30 minutes	16(10.7%)	134(89.3%)	1	
31-60 minutes	29(12.6%)	202(87.4%)	1.202(0.629,2.299)	1.077(0.509,2.282)
>60 minutes	92(21.9%)	328(78.1%)	2.349(1.332,4.144)	2.598(1.217,5.546) *
Prophylactic antibiotics				
Received	87(13.4%)	560(86.6%)	1	
Not received	50(32.5%)	104(67.5%)	3.0951(2.062,4.644)	5.506(3.006, 10.084) *
ASA score				
<3	109(14.8%)	628(85.2%)	1	
=>3	28(43.8%)	36(56.2%)	4.481(2.627,7.644)	3.497(1.713,7.141) *
Presence of comorbid illness				
Present	27(30.7%)	61(69.3%)	2.426(1.477,3.987)	4.088(2.266, 7.375) *
Absent	110(15.4%)	603(84.6%)	1	
Cigarette smoking				
Yes	27(30.0%)	63(70.0%)	2.342(1.428,3.840)	1.210(0.560, 2.613)
No	110(15.5%)	601(84.5%)	1	
Chat chewing				
Yes	74(27.7%)	193(72.3%)	2.867(1.969,4.173)	2.884(1.322, 3.613) *
No	63(11.8%)	471(88.2%)	1	
Nutritional status				
Normal weight	97(14.8%)	558(85.2%)	1	
Underweight	22(33.3%)	44(66.7%)	2.876(1.651,5.012)	1.881(0.509,2.084)
Overweight	18(22.5%)	62(77.5%)	1.670(0.947,2.945)	1.030(0.724,2.738)

ASA- American Society of Anesthesiologists

Klebsiella species showed a higher (%) resistance to ceftriaxone, Ciprofloxacillin, and amoxicillin with clavulanic acid, however, better susceptibility to meropenam, gentamycin, and piperacillin with tazobactam. Escherichia coli demonstrated high resistance (%) to ceftriaxone and cotrimoxazole, however, they showed higher susceptibility to meropenam followed by gentamycin and piperacillin with tazobactam in a similar pattern.

In multivariate analysis, factors like wound type, pre-operative hospital stay, duration of surgical procedure, prophylactic/preventative antibiotics use, overall health (ASA score), presence of comorbidity, and khat chewing statistically remain significantly associated with SSI development (Table 1).

The level of good surgical site infection prevention practice was 56.4%. Taking infection prevention training (AOR=1.69, 95% CI:1.11-2.58), using infection prevention guidelines (AOR=2.45, 95% CI:1.34-4.47), having an adequate supply of wound care materials (AOR=1.81, 95% CI:1.21-2.71), having good knowledge (AOR=1.81, 95% CI:1.21-2.71), and having a good attitude (AOR=1.83, 95% CI:1.21-2.77) were significantly and positively associated with good practice of surgical site infection preventions.

Policy Recommendations

- Ministry of Health, Customs authority, and law enforcing agencies should implement and promote strategies that reduce multiple/substance use.
- Health institutions in collaboration with NGOs should establish rehabilitation centers and provide counselling services.
- Community leaders, religious institutions, universities, and schools should create awareness of the effects of substance use.
- Community and religious leaders should take the leading role to reduce stigma and promote social support.

HARAMAYA UNIVERSITY
OFFICE OF RESEARCH AFFAIRS

POLICY BRIEF 3.1
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THEME

III

Affordable and Nutrient-rich Complementary Food Formulations from Locally Available Commodities

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Key Messages

- Complementary foods can be prepared from locally available commodities such as germinated or roasted maize and groundnut, orange fleshed-sweet potato, and spinach with high nutrient density and sensory acceptability.

- Nutrient-rich complementary foods with protein content of 15.35-16.39%, essential micronutrients (iron: 7.16-10.36 mg/100 g, β-carotene: 113.40-197.53 mg/100g), diverse nutritional profiles (391.82-440 Kcal), and varying anti-nutrient levels (tannins: 2.22-5.79 mg/100 g) were formulated.

Introduction

Food and nutrition insecurity are critical in sub-Saharan Africa, particularly in Ethiopia, where malnutrition severely impacts women, children, and infants. Despite some progress, 21.6% of the population remains undernourished. Malnutrition in infants contributes to high mortality rates, as breastfeeding alone cannot meet their nutritional needs after six months. Many infants lack access to diverse, nutrient-rich diets, leaving them susceptible to infections and diseases. In Eastern Hararghe, where cereal-based diets dominate, the nutritional inadequacy of staple foods like sorghum exacerbates vitamin and mineral deficiencies, leading to widespread malnutrition. High-quality commercial complementary foods are often unaffordable for low-income households, making it essential to develop affordable and nutrient-dense alternatives using locally available ingredients. To this end, this study aimed to formulate complementary foods from locally available diverse crops cereals.

Approaches and Results

Nutrient-rich complementary foods were formulated from locally available ingredients, including maize, groundnut, orange-fleshed sweet potato, and spinach. The raw materials were obtained from Haramaya University and local farmers. Sample preparation involved processing the orange-fleshed sweet potato and spinach into flours, alongside roasted and germinated flours of maize and groundnut. These ingredients were blended in various proportions to create eight complementary food formulations with a half kg including 4.5% sugar and 0.5% salt. The formulations from F1 to F4 were produced from roasted ingredients while F5 to F8 were from germinated maize and groundnut, respectively. The selection was based on the performance of pre-treatments on exhibiting better chemical, physical, and functional properties of the flour (Table 1).

The formulations were designed based on established nutritional requirements for infants, incorporating precise ratios of each ingredient. The final products were enriched with 4.5% sugar and 0.5% salt, then packaged and stored appropriately. To evaluate the nutritional quality, the study utilized standard methods to analyze moisture, protein, fat, carbohydrate, energy density, minerals, and beta-carotene contents.

In addition, anti-nutritional factors such as tannins and phytic acids; functional properties such as water absorption and solubility; and sensory acceptability through taste tests were determined.

The nutritional analysis showed promising results, with formulations providing balanced macronutrients and essential vitamins and minerals (Table 2). Among the formulas produced, F1 and F5 were found better infant formulas with appreciable chemical and sensory acceptability.

The selected formulas (F1 and F5) were selected based on functional properties, anti-nutritional factors (primarily tannin), proximate, minerals, beta-carotene content, and sensory acceptability (integral characteristic of a new product). Although some of the formulations are better, a compromise in chemical composition was made to maintain formulae with reduced antinutritional components (tannin) and enhanced sensory acceptance.

The nutritional quality of the formulations was notably high, with protein content ranging from 15.35% to 16.57%, effectively meeting the dietary protein requirements of infants. The energy density of the formulations, measured between 383.82 and 412.56 Kcal per 100 g, was sufficient to support healthy infant growth. Additionally, the formulations were rich in calcium and beta-carotene, essential nutrients that promote strong bone development and enhance immunity.

The developed formulations significantly reduce anti-nutritional factors, such as tannins, phytic acids, and phenolic content, thereby enhancing nutrient bioavailability. Additionally, the formulations displayed improved functional properties, including better water absorption and solubility which facilitate easy preparation and digestion; particularly for infants. From a sensory perspective, formulas F1 (roasted maize and groundnut) and F5 (germinated maize and groundnut) stood out by receiving the highest scores for taste, texture, and overall acceptability, positioning them as ideal candidates for large-scale production. The formulations provide a cost-effective alternative to expensive commercial products, addressing the challenge of malnutrition among infants in resource-limited settings. The developed products are well-suited for widespread adoption due to their lower anti-nutritional factors and high sensory acceptability.

Table 1: Total blending combination.

Formula (F)	Blending Ratio (%)			
	Roasted Maize	**Roasted Groundnut**	**OFSP**	**Spinach**
F1	60	15	10	10
F2	55	10	15	15
F3	50	15	20	10
F4	45	10	25	15
	Germinated Maize	**Germinated Groundnut**	**OFSP**	**Spinach**
F5	60	15	10	10
F6	55	10	15	15
F7	50	15	20	10
F8	45	10	25	15

Table 2: Energy and proximate compositions of prepared infant formula.

Formula	Fat (%)	Protein (%)	Ca (mg /100g)	CHO (%)	Vit A (µg/g)	Energy (Kcal)
F1	**10.8±0.65[a]**	**16.39±0.71[a]**	**68.97±0.73[c]**	**60.35 ±0.81[c]**	**120.32±0.78[cd]**	**404.19 ±2.67[ab]**
F2	9.39±0.34[a]	16.18±1.31[a]	99.02±0.83[ab]	63.07 ±2.06[ba]	172.57±6.83[b]	401.60 ±6.77[ab]
F3	10.5±1.06[a]	15.68±0.52[a]	79.46±1.28[abc]	62.08 ±2.21[a]	126.99±5.89[c]	405.69 ±3.3[ab]
F4	8.10±0.39[a]	16.02±0.04[a]	90.98±0.97[abc]	61.69±0.87[c]	162.33±0.03[ab]	383.82± 2.77[b]
F5	**12.4± 0.43[a]**	**15.60±0.46[a]**	**66.75±0.619[c]**	**60.12 ±0.54[d]**	**113.4±16.9[d]**	**412.56± 4.87[a]**
F6	10.52±0.42[a]	15.35±0.38[a]	102.48±3.59[a]	61.42± 0.49[d]	186.07±5.47[ab]	401.87 ±4.55[ab]
F7	11.92±0.60[a]	16.14±0.83[a]	74.75±0.70[abc]	60.08±1.38[bc]	131.98±3.54[c]	412.21 ±4.78[a]
F8	11.31±0.24[a]	16.57±0.52[a]	84.63±0.96[ab]	59.61 ±0.08d	197.53±4.34[a]	406.64 ±1.05[ab]
CV (%)	*24.21*	*4.77*	*17.67*	*5.58*	*5.06*	*3.28*
LSD	*4.567*	*1.32*	*25.76*	*5.89*	*13.52*	*23.09*

Values represent means ± standard deviation, n=3, results are on a dry basis. Means with the same superscript on the same column are not significantly different (p>0.05).

Table 3: Comparison of nutritional composition formulated formula with selected commercial formulas.

Chemical composition	Formulations		Commercial formula	RDA*	% of RDA satisfied by the new formula
	F1	F5	Cerelac/Faffa		
Protein (%)	16.39	15.60	15.8/18	>15	100
Fat (%)	10.8	12.4	10.5/5.1	10-25	100
Carbohydrate (%)	60.35	60.12	68.4/70	64	93.9 - 94.3
Energy (Kcal/100g)	404.19	412.56	432/400	400-425	100
Calcium (mg/100g)	68.97	66.75	600/516	500	13.4 - 13.8
Beta-Carotene (µg/g)	120.32	113.40	400	60-180	100

*Recommended Daily Allowance for infants by FAO and WHO (Adopted in 1981. Revised in 2006. Amended in 2017, 2019,2023).

Policy Recommendations

- Universities and research institutes should provide technical training and support to the community, food processors, and producers to improve complementary food formulations and product quality using diverse local ingredients.
- The Ministry of Health and concerned stakeholders should scale up production and integrate these formulas into national nutrition programs, including maternal and child health initiatives. This includes educating communities and launching awareness campaigns to promote the adoption of these locally formulated complementary foods to improve child nutrition and health outcomes sustainably.
- The Ministry of Trade and Industry should support small-scale enterprises and cooperatives to produce affordable complementary foods, providing financial support through microloans, grants, and subsidies.

Knowledge Based-Systems for HIV-associated HBV Diagnosis Management in Resource-Limited Settings

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Key Messages

- An intelligent medical system was developed, combining data mining techniques with expert knowledge to improve the diagnosis and management of HIV-HBV co-infections in resource-limited regions like East Hararghe, Ethiopia.

- The system achieved a high diagnostic accuracy of 95.36% and received strong user acceptance.

Introduction

HIV-associated HBV co-infection poses a severe public health challenge globally, significantly increasing morbidity and mortality rates due to accelerated liver disease progression. In Ethiopia, co-infection rates vary from 5.9% to 42.8%, with regions like East Hararghe being particularly affected due to limited healthcare infrastructure and resources. Effective management requires comprehensive strategies, including routine HBV screening and Antiretroviral Therapy (ART) that targets both viruses and preventive measures such as vaccination and harm reduction programs. However, resource limitations make these interventions difficult to implement, leading to higher transmission rates and poorer health outcomes in vulnerable populations.

The integration of artificial intelligence (AI) and data mining (DM) techniques into healthcare has shown promise in addressing these challenges by enhancing diagnostic accuracy and reducing the burden on healthcare professionals. This study introduces an innovative medically intelligent system that combines data mining techniques with knowledge-based reasoning to improve the diagnosis and management of HIV-HBV co-infections. The system leverages data mining algorithms to extract hidden patterns from large datasets, creating a rule-based model that integrates expert insights. Compared to previous approaches that relied solely on expert knowledge, this system offers improved prediction accuracy and detailed decision-making. It incorporates attributes unique to HIV-HBV co-infection and utilizes a user-friendly prototype to enhance usability in resource-limited settings. By addressing gaps in current healthcare practices, the system aims to improve patient outcomes, support healthcare policies, and provide a scalable solution for managing HIV-HBV co-infections effectively.

Approaches and Results

The Design Science Research (DSR) methodology was employed, emphasizing the development and evaluation of an innovative intelligent medical system.

The system combined data mining techniques with expert knowledge to produce a rule-based reasoning model. The dataset used in this study was sourced from Haramaya University Hiwot Fana Comprehensive Specialized Hospital and consisted of 1,108 cases of HIV-associated HBV from 2016 to 2022. Key attributes included patient demographics, clinical measurements, and treatment histories, totaling 32 attributes. Rigorous data pre- processing ensured high-quality input for the classification algorithms, including the removal of outliers, imputation of missing values, and normalization. Feature selection using the Information Gain Ratio algorithm identified 19 key attributes for analysis. Four data mining classification algorithms (PART, JRip, J48, and REPTree) were applied to evaluate predictive accuracy. The PART classifier was identified as the most effective model, achieving the highest accuracy. The rules generated by the PART algorithm, combined with expert input, formed the knowledge base of the system. The system's usability and performance were further tested by domain experts to ensure practical implementation. The finding showed that the developed intelligent medical system demonstrated significant potential for improving diagnosis and management in resource-limited settings. The Key findings are shown in Table 1. The system performance analysis highlighted the superiority of the PART algorithm which achieved the highest accuracy at 95.36% and the lowest False Positive Rate (FPR) among all evaluated models, as shown in Table 1. The rule-based reasoning model integrated into the system demonstrated logical coherence and practical applicability, as validated by healthcare experts. Furthermore, the system exhibited high diagnostic reliability, correctly identifying 408 out of 432 HBV-positive cases and 641 out of 668 HBV-negative cases (Table 2).

The intelligent medical system developed in this study offers a promising solution for diagnosing and managing HIV-HBV co-infections in resource-constrained settings like East Hararghe, Ethiopia. By integrating data mining techniques and expert knowledge, the system improves diagnostic accuracy and reduces reliance on specialized personnel and advanced diagnostic tools. This is particularly critical in regions with limited healthcare resources. The developed system effectively integrates expert knowledge with data mining techniques, specifically the PART classification algorithm, achieving a high diagnostic accuracy of 95.36%, as validated through rigorous 10-fold cross- validation with a precision of 95.4%. It has been well-received by healthcare professionals, earning a user satisfaction score of 89.44%, due to its user-friendly interface and actionable recommendations that enhance usability. Additionally, the system addresses key challenges in resource-limited settings by reducing reliance on specialized personnel and advanced diagnostics, enabling timely and accurate diagnoses, improving patient outcomes, and alleviating healthcare burdens. The high accuracy and user acceptance of the system highlight its potential for real-world application. The PART classifier's 95.36% accuracy ensures reliable predictions, while the system's user-friendly interface facilitates adoption by healthcare providers. Additionally, the reduced False Positive Rate (5.0%) minimizes unnecessary treatments, optimizing resource use (Table 3). Addressing HIV-associated HBV co- infections requires innovative and scalable solutions. The proposed medical intelligent system offers a cost-effective and accurate diagnostic tool, well-suited for regions with limited healthcare resources.

Table 1: Performance metrics of the classification algorithms.

Algorithm	Accuracy (%)	Precision	True Positive Rate (TPR)	False Positive Rate (FPR)	F-Measure
PART	95.36	0.954	0.954	0.050	0.954
JRip	95.00	0.950	0.950	0.052	0.950
J48	95.09	0.951	0.951	0.060	0.951
REPTree	95.36	0.954	0.954	0.056	0.954

Table 2: Confusion matrix for the PART classifier.

Actual Class	Predicted HBV Positive	Predicted HBV Negative
HBV Positive	408	24
HBV Negative	27	641

Table 3: Performance metrics of the PART algorithm.

Metric	Value
Accuracy	95.36%
Precisions	95.4%
True Positive Rate (TPR)	95.4%
False Positive Rate (FPR)	5.0%
User Satisfaction Score	89.44%

Policy Recommendations

- The Ministry of Health should integrate AI- driven diagnostic tools into national HIV and HBV management programs to improve diagnostic efficiency and consistency.

- Regional health bureaus should prioritize and scale up AI-driven diagnostic tools in high HIV-HBV prevalence areas to improve healthcare outcomes, optimize resources, and reduce morbidity and mortality from co-infections.

- The Ministry of Health, Ethiopian Medical Association, and universities should provide comprehensive training for healthcare providers on the use of AI-driven tools to ensure effective adoption and utilization.

- The Ministry of Finance should prioritize funding and infrastructure development to support the deployment of knowledge- based systems in resource-limited settings.

Borana Women as Symbols of Active Feminine Power in Combating Structural Inequality and Transforming Conflict

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Key Messages

- Borana women are active agents of change, contributing to peacebuilding, leadership, and resistance to structural inequalities participating in Leadership and Decision-making.

- Borana women challenge patriarchal norms, engage in economic activities, and shape customary laws through different tools such as folk songs, sayings, and folktales.

- Borana women's role in society contributes to feminist theories indicating women's active and diverse roles in combating structural inequalities.

Introduction

The portrayal of African women as passive victims of conflict, and dependent on male protection, has been dominant in scholarly narratives. This narrative often overlooks the significant agency of women in African societies, where they have historically been strategists, advocates for equality, and architects of societal structures. Women have actively resisted structural inequalities and oppressive systems, leading social and political movements for equal rights, and challenging patriarchal power dynamics. But the role of women in addressing these inequalities has been underexplored, especially within the Oromo community. This study examines the roles of Borana Oromo women in addressing structural inequality, focusing on their participation in the Gadaa System and their efforts to tackle cultural violence and inequality during peace, conflict, and post-conflict times.

Approaches and Results

The study was conducted in the Borana zone of Oromia National Regional State, Southern Ethiopia using an ethnographic research design. It employed purposive and snowball sampling to identify key informants and focus group discussions. The data were transcribed from Afan Oromo into English and analyzed using thematic analysis technique and cross-verified against secondary data obtained from books, journal articles, and reports to enhance reliability and depth.

Folklore as a Tool for Addressing Inequalities, in Leadership and Decision-making: Borana women use folk songs, sayings, and folktales to challenge patriarchal norms and express dissent, subtly influencing political decisions, leadership, and power dynamics. Through kaarile songs, they address grievances, ridicule unjust decisions, and demand social change. For example, the traditional Kaarile song is used to express concerns and challenge unfair decisions. During activities like gathering firewood and fetching water, Borana women sing Kaarile songs to express their concerns and grievances.

These songs are attentively listened to by the elders, influencing their decisions. The women sang:

Lafa hamtuu karaa hinqabne	a dangerous place devoid of any access routes
Gumee hamtuu garaa hinqabne	a beautiful who does not envy
Nama haaloo baasii hinqanee	a person who is not asked to seek revenge and a person who is not asked to stop weeping.
booyee callisii hinqabe	
Ani booyee callise	I cried, but I stayed quiet and patient.

These cultural expressions serve as a form of resistance and empowerment, enabling women to critique poor governance and disrupt male-dominated structures.

Borana women significantly influence leadership by participating in the selection and approval of Gadaa leaders, rejecting unjust laws, and shaping community governance. Their perceptiveness and involvement in leadership and decision-making transform societal structures, fostering inclusion and empowerment. There was a folk tale about Dawwe Gobbo, Gadaa leader of Borana (1706–1714), who proposed banning exogamous marriages within the same moiety at the Gumii Gaayyo Assembly. His counselor, Dubbe, opposed the rule, gaining support from women through a folk song and the Assembly, preventing it from becoming law. The women's rejection of Dawwe's rule was indicated in the following verse.

"Kan Daawwee daawuma; Kan Dubbe Dubbuma;	Perhaps, Dawwee's suggestion is trash or foolishness;
Waan Daawwn jette nu dhageetuma"	Dubbe's idea is serious/valid eloquence.

The women considered Dubbe as a wise individual who recognized the value of inclusivity and gender equality. In contrast, Dawwe's suggestions were rejected by the women viewing him as lacking wisdom and understanding.

Then the Borana Gadaa council as well as Gumi Gaayo thought to consider the perspectives of women before making any law or decisions.

Sustaining Community Life: Borana women actively engage in herding, trading and livestock management challenging traditional gender norms. Their involvement fosters empowerment, inclusivity, and financial independence. Through initiatives like Marroo, they promote economic equality and food security, redefining traditional labor roles and contributing to community survival.

Customary Laws & Administrative Structures: Borana women challenge structural inequalities through customary laws that prioritize women's protection and rights, promoting true masculinity as supporting women, not dominating them. These laws hold individuals accountable for harming women and rejecting violence and discrimination. The Borana Gumi Gayyo (General Assembly) ensures women's voices are central in decision-making, fostering equal opportunities. By reshaping these laws, Borana women actively combat gender disparities and advocate for justice and equality.

Women's Role in Conflict Settings: During the war: Borana women in conflict defy gender norms, actively challenging inequalities. They've served as warriors and provided crucial support, including resources like food and water, disrupting traditional gender roles. This involvement empowers women, reshapes social hierarchies, and transforms gender dynamics, demonstrating their equal role in peace and conflict. Ceasefire: Borana women are crucial peace envoys (lichoo), mediating conflicts. By acting as intermediaries between hayyu (judges) of different groups, they travel into enemy territory to arrange peace talks, acting as intermediaries between judges to de-escalate tensions. This challenges traditional gender roles, showcasing their peace-making abilities and promoting long-term peace, reconciliation, and gender equality. As trusted peacebuilders, they connect ethnic groups, prevent escalation, and act as agents of social change.

Post-war: After conflicts, Borana women challenge inequalities through peacebuilding and economic participation. As lichoo, they facilitate peace talks, challenging gender norms.

Economically, their cattle breeding, trading, and milk production led to financial independence and greater decision-making power. Their social networks (Marroo) improve food security and community resilience. Thus, Borana women foster a more inclusive post-conflict society.

Challenges of Women in Addressing Structural Inequalities: Borana women face significant challenges in overcoming structural inequalities due to cultural norms, patriarchal systems, limited resources, climate change, and conflict. These barriers restrict their participation in decision-making, confining them to domestic roles and limiting their power to address inequalities despite their important behind-the-scenes contributions. Limited access to resources like land and credit hinders their economic independence and reinforces marginalization. In conflict zones, displacement, loss of livelihoods, and increased vulnerability to violence further restrict their ability to advocate for their rights. Impunity for violence against women perpetuates fear and silence, preventing progress in addressing gender-based injustices.

Policy Recommendations

- The Ministry of Peace should formally recognize and integrate Borana women's roles as mediators and peacebuilders into both informal and formal peace negotiations and decision-making processes at all levels. This could be enhanced by training programs to enhance their skills in conflict resolution, negotiation, and peacebuilding.

- The Ministry of Justice in collaboration with concerned stakeholders should enhance legal frameworks and enforcement mechanisms integrating women's perspectives into conflict and peace theories which can help reduce gender disparities and contribute to peacebuilding.

- Ministry of Agriculture should work in collaboration with financial institutions to increase Borana women's access to productive resources (land, credit, business opportunities) to foster economic independence.

Peace and Reconciliation in Conflict Zones: Role of the Borana Cross-Boundary Initiative for Peace Project

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Key Messages

- The Borana Cross-Boundary Initiative for Peace (BCIP) project considerably enhanced inter-community coordination and prevention of conflict in the Borana Zone and the neighboring areas.

- The BCIP interventions have facilitated mutual recognition, promoted sharing of resources, and increased local peacebuilding capacity through inclusive dialogue, sensitization campaigns, and direct community engagement.

- The project interventions increased the capacity of local institutions in conflict prevention, management, and resolution, as well as considerably enhanced the engagement of women and youth in peacebuilding activities.

Introduction

Ethnic conflict is a type of conflict where different ethnic groups compete for political authority, economic resources, cultural dominance, and control over land. These conflicts are caused by real or imagined inequalities, historical injustices, identity politics, and competition for scarce resources and can result in violence, discrimination, and societal fragmentation. The Horn of Africa is one of the most unstable regions of Africa with an array of factors and actors. Ethiopia's conflicts are political, economic, ethnic, religious, and regional in nature. Ethnic conflicts are especially common in southern Ethiopia's Borana Zone of the Oromia National Regional State and the surrounding border areas.

The region has numerous ethnic groups, such as the Borana, Gabra, Guji, Garri, Konso, Bhurji, Wagyu, Hammer, and Arbore. Such groups have had a history of being at odds over land, politics of identity, and limited natural resources. Conflict patterns in this region are multifaceted. The conflict has identifiable intergroup dynamics in addition to intractable drivers of conflict, such as cattle raiding. Methods employed to manage such conflicts are inclusive community dialogues, resource management agreements, and institutionalizing conflict prevention management and resolution systems sat the local level. Therefore, this project was aimed at alleviating the long-standing conflicts that have historically caused major disruptions in social cohesion and resource access in the Borana Zone of southern Ethiopia's Oromia National Regional State and the adjacent cross-border regions.

Approaches and Results

The project was implemented for a four-year period in the Borana Zone of the Oromia National Regional State, Ethiopia, and its contiguous cross-border areas. The study targeted approximately 17 districts (80 kebeles), engaging diverse ethnic groups including the Borana, Gabra, Guji, Garri, Konso, Burji, Wayyu, Hamar, and Arbore. The complex conflict dynamics within this region are categorized into four distinct systems: Moyale, Gomole, Sagan, and Marmaro. The USAID Borana Cross-Boundary Initiative for Peace (BCIP) project adopted a "people-to-people" approach which meant conducting dialogues with tens of thousands of community members, elders, customary leaders, and local administration representatives from various conflicting groups.
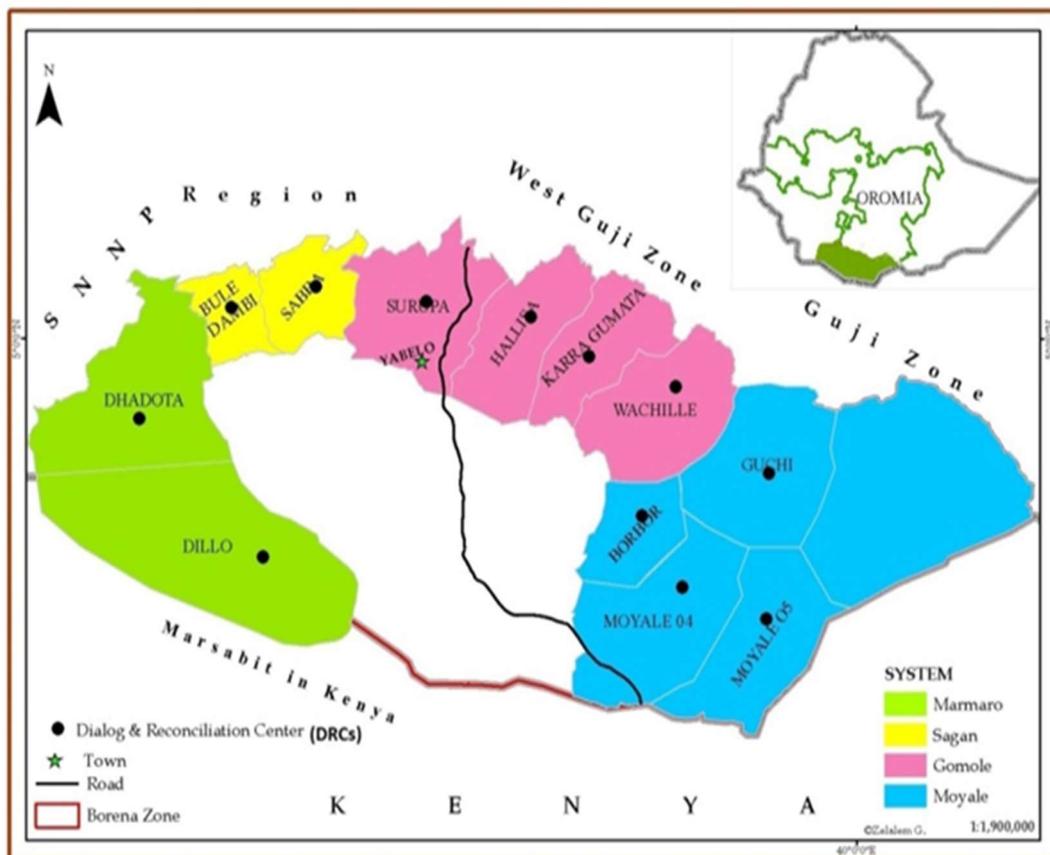
Figure 1. Map of the study areas

In order to understand the local contexts, as well as community priorities and to inform subsequent interventions, core activities included thorough baseline and targeted assessments: 1100 household surveys, 52 focus groups, and 34 key informant interviews were used to gather data. Comprehensive community discussions aimed at fostering cooperative natural resource management, enhancing intergroup attitudes, and creating community bylaws were essential to the project methodology. Together with intergroup interaction and reconciliation activities, like joint coffee ceremonies, cultural festivals, and youth camps, all these activities were supplemented with extensive awareness-generating campaigns through public meetings, radio discussions, and publications. Moreover, the program supported the legitimacy and collaboration of the official and traditional justice institutions through imparting peace committees, elders, and government officials advanced training and workshops in conflict prevention, management and resolution.

The results indicate that the program helped create stronger customary courts and local justice institutions, improved intergroup cooperation and sharing of natural resources, and created youth peace clubs and women's peace networks, which strengthened inter-group relations. The BCIP project was successful in promoting collaboration and rejuvenating intergroup understanding. For instance, it allowed reunions among hundreds of families and relatives, especially Borana, Gabra, and Garri group members who had been separated from one another for decades. The socioeconomic interactions of such groups were restored and enabled families to re-unite and communities to access resources and markets previously closed off due to conflict. As a result, closed communities which had previously been excluded from accessing major markets were able to re-access important markets, as demonstrated by the return of the Garri group into the Borbor town market. Intermarriages and agreements permitting vital livestock movements in times of drought were the outcomes of parallel dialogue processes between the Borana, Arbore, and Wayyu communities.

Additionally, the initiative greatly improved natural resource sharing and intergroup cooperation. Negotiated agreements for the cooperative use of shared resources were signed by community leaders and local government officials. This led to the opening of thousands of hectares of contentious communal grazing areas and water points, such as the "Chabbi grazing area and Argile water points," for cooperative management and negotiated access. Joint community bylaws were developed and approved as a result of discussions that encouraged cooperation over contestation. In order to address serious livelihood challenges, the initiative also made it possible for Konso households and communities in nearby areas to access essential farmlands and forest resources in nearby Borana kebeles. Importantly, support for customary courts and the shift in focus of peace committees from crisis management to proactive measurements enhanced local capacity and institutions for conflict prevention, management and resolution. In order to promote better communication and community reconciliation, the project also reorganized peace committees and supported the creation and operation of customary courts. As a result, the formal and traditional justice systems became more legitimate and cooperative. Lastly, the project significantly increased the constructive role and involvement of women and young people in conflict resolution and reconciliation. The project established youth peace clubs and women's peace networks in recognition of their innate role in both causing and averting conflict. These networks effectively transformed women and youth from potential conflicting groups into local change agents by empowering them to actively participate in peacebuilding, fostering attitudinal change, and establishing sustainable intergroup interactions through awareness campaigns, joint cultural events, and "seeds-of-peace" summer youth camps.

Approaches and Results

- The Ministry of Peace and local administration offices should endeavor to support community dialogues and initiatives, as well as ongoing intergroup discussions and reconciliation efforts to preserve and enhance understanding, cooperation, and peacebuilding efforts.

- The Ministry of Justice and regional justice bureaus ought to improve the capabilities of regional institutions, such as peace committees and customary courts, align their methods with official legal systems, and create channels for cooperation and information exchange.

- The Ministry of Women and Social Affairs should expand the participation of women and youth in peacebuilding by creating and assisting women's peace networks (WPNs) and youth peace clubs (YPCs), incorporating their operations into larger community projects, and offering focused training and resources.

- The Ministry of Peace and the Ministry of Agriculture should collaborate to create cooperative natural resource management agreements and connect peacebuilding initiatives with sustainable livelihood strategies to decrease resource-based conflict and improve community conflict resilience.

Urban Agriculture Improves Households' Welfare in Eastern Ethiopia

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Key Messages

- Participation in one or more forms of urban agricultural practices increases income by 13-27%, consumption expenditure by 13-36%, and dietary energy intake by 8-34% thereby enhancing overall welfare.

- Access to credit, training, and perception were key factors that influenced households' participation in urban agricultural practices.

Introduction

Rapid population growth and urbanization are driving factors for the reduction of agricultural land, high demand for food in urban centers, and the rise of unhealthy diets. The 2030 Sustainable Development Goals provide a transformative vision to address these challenges, aiming for a future free of hunger, food insecurity, and malnutrition in all its forms. Urban food insecurity, a growing phenomenon, differs substantially from rural food insecurity in its causes and solutions. Urban agriculture has emerged as a practical response to address food insecurity, offering a source of food and income for the urban poor while improving the environment and reducing pressure on limited farmland. This study aims to investigate the impact of urban agriculture on households' welfare in Eastern Ethiopia.

Approaches and results

A cross-sectional data was collected from five urban centers in Eastern Ethiopia, namely, Haramaya, Kulubi, and Kersa towns in the Eastern Hararghe Zone (Oromia Region), Harar City (Harari Region), and Dire Dawa City (Dire Dawa City Administration). A multi-stage sampling technique was employed to select 385 households, with 270 participating and 115 not participating in urban agriculture (UA). Data were analyzed using descriptive statistics, and econometric models such as the Multivariate Probit (MVP) model to identify the determinants of participation in UA practices and the Multinomial Endogenous Switching Regression (MESR) model to assess welfare impacts.

The results indicated that there is a positive and significant interdependence between households' decision to participate in livestock and vegetables, crop/fruit and vegetables, and crop/fruit and livestock practices. The MVP analysis results demonstrate that various factors impact the decision to adopt each UA practice, with varying levels of significance for each factor (Table 1).

The significant factors influencing participation in vegetable production include the sex and age of the household head, land size, credit access, and access to UA-related training. Participation in livestock rearing was significantly associated with

the sex of the household head, occupation, perception of UA benefits, community group participation, and market distance. Crop fruit production was significantly influenced by the perception of UA benefits, market distance, training, and dependency ratio.

The average treatment effect showed significant differences between the actual outcomes and the counterfactual scenarios (Table 2).

This indicates that households engaging in UA practices experience substantial welfare improvements compared to non-participants.

The results showed that, depending on the combination of practices adopted, UA participation increased the income per adult equivalent by 13-27%. In addition, compared to the counterfactuals, households engaging in UA practice exhibited higher consumption expenditure per adult equivalent (13-36% increase), and calorie intake per adult equivalent (8-34% increase). These findings emphasize that urban agriculture significantly enhances household welfare by transforming agricultural production into higher income, greater consumption, and improved dietary energy intake.

Table 1: Factors affecting participation in urban agricultural practices.

Variables	Vegetables		Livestock		Crop-fruit	
	Coef. (SE)	ME	Coef. (SE)	ME	Coef. (SE)	ME
Sex	0.46**(0.23)	0.073	0.61* (0.34)	0.099	-0.02 (0.18)	-0.004
Age	-0.02**(0.01)	-0.003	-0.00 (0.02)	-0.000	-0.01 (0.01)	-0.002
Education	0.02 (0.02)	0.004	-0.02 (0.04)	-0.003	-0.00 (0.02)	-0.000
Occupation	0.18 (0.24)	0.030	0.47* (0.28)	-0.076	0.04 (0.18)	0.006
Family size	-0.09 (0.06)	-0.014	-0.15 (0.10)	-0.023	0.06 (0.05)	0.010
Land size	-1.24**(0.48)	-0.200	0.08 (0.58)	0.013	-0.10 (0.38)	-0.016
Extension	0.12 (0.09)	0.020	0.02 (0.12)	0.003	0.05 (0.06)	0.008
Perception	-0.47 (0.30)	-0.075	7.40***(0.74)	0.192	0.54** (0.21)	0.087
Credit	0.69***(0.26)	0.110	0.44 (0.42)	0.072	-0.23 (0.18)	-0.037
Experience	-0.01(0.02)	-0.002	0.01 (0.02)	0.002	0.00 (0.01)	0.001
Group participation	0.44 (0.29)	0.071	3.35***(0.42)	0.540	-0.15 (0.23)	-0.024
Market distance	0.08 (0.09)	0.012	0.25***(0.10)	0.040	0.15**(0.06)	0.024
Training	0.95***(0.27)	0.154	0.27 (0.33)	0.044	0.45**(0.21)	0.073
Non-farm income	0.64 (0.41)	0.102	0.64 (0.59)	0.103	0.13 (0.35)	0.021
Dependency ratio	0.42 (0.35)	0.067	0.16 (0.36)	0.027	-0.49**(0.25)	-0.078
Constant	-5.80 (4.40)		-9.77 (6.37)		-1.45 (3.86)	
Predicted probability		0.873		0.519		0.629
Joint Probability (Success)				0.4389		
Joint Probability (Failure)				0.0206		
Draw Number (#)				100		
Log Likelihood				-269.62		
Wald $\chi^2(45)$				670.08		
Prob > χ^2				0.000***		

Source: Model results (2022); Standard errors are shown in parentheses; ME refers to marginal effects

Table 2: The impact of urban agricultural practices on the welfare of households.

Outcome	Urban Agricultural Practices	To practice	Not to practice	Average Treatment Effects for Treated	
		Actual	Counterfactual	ATT	Change (%)
Income	$V_1L_0C_0$	34357.67	27656.42	6701.25***(2330.35)	24.23
	$V_0L_1C_0$	26733.96	21763.27	4970.69**(1935.03)	22.84
	$V_0L_0C_1$	29971.74	24972.04	4999.70**(2135.36)	20.02
	$V_1L_1C_0$	29878.32	26392.86	3485.46*(2071.21)	13.21
	$V_1L_0C_1$	32253.22	25720.22	6532.63***(1341.69)	25.40
	$V_0L_1C_1$	28743.20	25220.25	3522.95* (1822.93)	13.97
	$V_1L_1C_1$	32366.11	25446.05	6920.06***(810.64)	27.20
Consumption expenditure	$V_1L_0C_0$	16852.75	12414.90	4437.86*** (1113.5)	35.75
	$V_0L_1C_0$	16096.08	12659.88	3436.20*** (851.30)	27.14
	$V_0L_0C_1$	16172.69	13233.23	2939.45** (1132.86)	22.21
	$V_1L_1C_0$	16060.12	13321.63	2738.49*** (711.48)	20.56
	$V_1L_0C_1$	15901.55	13319.91	2581.64*** (722.90)	19.38
	$V_0L_1C_1$	14120.83	12517.95	1602.88** (703.89)	12.80
	$V_1L_1C_1$	15314.74	13408.28	1906.47*** (378.30)	14.22
Kilocalories	$V_1L_0C_0$	2934.83	2191.60	743.24***(133.87)	33.91
	$V_0L_1C_0$	3146.30	2900.25	246.05* (123.58)	8.48
	$V_0L_0C_1$	2916.06	2834.81	81.25 (160.41)	2.87
	$V_1L_1C_0$	2914.44	2875.13	39.30 (123.05)	1.37
	$V_1L_0C_1$	2863.82	2236.29	627.52***(103.60)	28.06
	$V_0L_1C_1$	2628.20	2186.81	441.39***(109.50)	20.18
	$V_1L_1C_1$	2708.28	2093.09	615.19***(52.59)	29.39

Source: Model results (2022) Note: Standard errors are shown in parentheses.

Policy Recommendations

- Ministry of Agriculture should provide policy for urban agriculture to ensure urban food security and household welfare.
- Agricultural bureaus and municipalities should promote urban agriculture while addressing barriers to UA adoption.
- Different offices in towns and cities, universities, research institutes, and schools should practice and demonstrate UA.
- Financial institutions should set financial packages for households participating in UA.

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[1]የእጽዋት ሳይንስ ትምህርት ቤት፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፤ [2]ኢትዮጵያ ግብርና ምርምር ኢንስቲትዩት፣ አዲስ አበባ, ኢትዮጵያ፤ [3] የብዝሃ ሕይወት ዓለም አቀፍ እና CIAT፣ ILRI፣ ሊሎንግዌ፣ ማላዊ፤

ቁልፍ መልዕክቶች

- የቬርሚኮምፖስት መጠቀም እና በተከተረ ቦይ መዝራት የአፈርን እርጥበት እና ለምነት ይጨምራል፣

- ማሽላንና ለውዝን አስባጥሮ ቦይ በመከተር መዝራትና ቬርሚኮምፖስትን በሄክታር 4.5 ቶን በመጠቀም የማሽላ ምርትን በ60 በመቶ ያሳድጋል፣ እንዲሁም የአቀንጭራ አረምን መጠን በ85.71 በመቶ እና ወረራውን ደግሞ በ77 በመቶ ቀንሷል።

መግቢያ

ማሽላ እና ለውዝ ከሰሃራ በስተደቡብ ላሉ ከ100 ሚሊዮን ለሚበልጡ አነስተኛ ማሳ ተጠቃሚ አርሶ አደሮች ኢኮኖሚያዊ እና የስነምግብ ጥቅሞች እየሰጡ ነው። እነዚህ ሰብሎች ለድርቅ ተጋላጭ በሆኑ አካባቢዎች የመላመድ አቅም ቢኖራቸውም ምርታማነታቸው ዝቅተኛ ሆኖ የቆየው በዋነኛነት በቂ የአፈር ለምነት ባለመኖሩ እና በድርቅ ምክንያት በሀገር አቀፍ ደረጃ የማሽላ ምርት በሄክታር በአማካይ ከ1.8 ቶን በታች ሲሆን ይህም በሄክታር መስጠት ከሚችለው እምቅ ከ 3 እስከ 6 ቶን በጣም ያነሰ ነው (CSA, 2021)። ስለሆነም ምርታማነቱን ለማሻሻል ልማቱን እና ዘላቂ የግብርና አሠራሮችን ማስተዋወቅ፣ አንደ ቬርሚኮምፖስት፣ የእህልና የጥራጥሬ ሰብሎችን በመስመራዊ የዘር ስብጠር መዝራት እና የአፈር ጥበቃ አሠራሮችን መተግበር ወሳኝ ናቸው። ቬርሚኮምፖስት በጣም ተስፋ ሰጭ እና ለአካባቢ ተስማሚ የሆነ የተፈጥሮ ማዳበሪያ ሲሆን በአካባቢው ከሚገኙ ቁሳቁሶች በቀላሉ ሊመረት ይችላል። ምንም እንኳን የቬርሚኮምፖስት፣ መስመራዊ የዘር ስብጠር መደብ ዓይነት

አጠቃቀምና እና አዝርዕትን የሚያሰባጠር (ብዝ ዘር) እርሻ ጠቀሜታ ቢኖረውም ከኬሚካል ማዳበሪያዎች እና (ሞኖክሮፕ) ነጠላ ዘር አጠቃቀም ጋር ሲነፃፀር አሁንም ውስን ነው። ቬርሚኮምፖስት እስትራ አረም ቁጥጥር ላይ የሚያሳድረው ተጽዕኖ እና የብዝ ዘር አጠቃቀም የኢኮኖሚ ትስስር ላይ የተደረጉ ጥናቶች ውስን ናቸው። በእንፍሩ በምስራቅ ሀርጌ አብዛኛው የብዝ ዘር እርሻ አሰራር ዘዴ ባለመሆኑ የአፈር ለምነት እና የሰብል ምርት መቀነስን ያስከትላል። በመሆኑም ይህ ጥናት የቬርሚኮምፖስት፣ የጥበቃ አሰራር እና የአዝመራ ስርዓቶች በማሽላ ምርታማነት ላይ የሚያደርሱትን ተፅዕኖ እንዲሁም በአፈር ለምነት እና በእስትራ አረም መከላከል ላይ ያለውን ተፅዕኖ ለመገምገም ያለመ ነው።

አቀራረቦች እና ውጤቶች

በ2021 እና በ2022 የምርት ዘመን ሁለት የመስክ ሙከራዎች በኪሌ (ቁሌ) የገበራዎች ማሳ እና በባቢሌ የሐረማያ ዩኒቨርሲቲ የምርምር ማሳ ላይ ተካሂደዋል። ሙከራዎቹ (ምርጠቶቹ) የሚያካትቱት መልካም ማሽላ ዝርያን ከሁለት የለውዝ ዝርያዎች (ባቢሌ-1 እና ባቢሌ-2) ጋር በተለያየ የቬርሚኮምፖስት መጠን (0፣ 1.5፣ 3 እና 4.5 ቶን በሄክታር) እና ሁለት የዘር ስብጠር ዓይነቶች (በከፍት-ፈር እና እርከን መስመር ንድፍን) ያጠቃለላል። ውጤቱ እንደሚያሳየው ቬርሚኮምፖስት በሄክታር 4.5 ቶን በመጠቀምና በማሽላ መሐል ለውዝን በስብጠር መዝራት የተሻሻለ የአፈር ኦርጋኒክ ካርቦን (1.45 ግ ሴሜ-3)፣ አጠቃላይ-ናይትሮጅን (0.247%) ፣ ጥቅም ላይ የሚውል ፎስፈረስ (38.46%) ፣ ሊለዋወጥ የሚችል - ብረት (27%) ፣ ሊለዋወጥ የሚችል- ዚንክ (40%) እና የማሽላ ምርት በ 58% እንድሻሻል አድርጓል። (ሠንጠረዥ-1)።

ሠንጠረዥ 1፡ የቨርሚኮምፖስት ቅሪት እና የሰብል አማራጮ ዘዴ በአፈር ውስጥ ናይትሮጅን እና ፎስፎረስ ላይ ያለው ውጤት

ቨርሚኮምፖስት (ቶን/ሄክ)	የናይትሮጂን መጠነ ድምር (N%)				ያለ ፎስፎረስ (Olsen P mg kg⁻¹)			
	ሰብል ስብጥር	አንድ ሰብል	ነፃ ፈር	እርከን ፈር	ሰብል ስብጥር	አንድ ሰብል	ነፃ ፈር	እርከን ፈር
0	0.008[ef]	0.007[f]	0.008[e]	0.009[e]	3.868[e]	3.573[e]	3.748[f]	3.693[f]
1.5	0.093[de]	0.099[d]	0.094[d]	0.098[d]	4.762[d]	4.582[d]	4.727[e]	4.617[e]
3	0.135[c]	0.125[c]	0.13[c]	0.13[c]	7.04[c]	6.935[c]	7.457[c]	6.518[d]
4.5	0.247[a]	0.208[b]	0.242[a]	0.213[b]	9.822[a]	8.93[b]	9.677[a]	9.075[b]
ትንሹ ጉልህ ልዩነት	0.014				0.495			

ቨርሚኮምፖስት (ቶን/ሄክ)	ዚንክ (mg kg⁻¹)		ብረት (mg kg⁻¹)		ማንጋኒዝ (mg kg⁻¹)	
	ዘር ስብጥር	ነጠላ ዘር	ዘር ስብጥር	ነጠላ ዘር	ዘር ስብጥር	ነጠላ ዘር
0	0.62[f]	0.28[g]	3.65[f]	3.73[f]	2.01[bcd]	2.47[a]
1.5	0.86[d]	0.74[e]	4.17[e]	4.22[e]	1.98[cd]	2.16[b]
3	1.18[b]	1.08[c]	5.16[c]	4.72[d]	1.89[d]	2.08[bc]
4.5	1.45[a]	1.18[b]	6.37[a]	5.7[b]	1.90[d]	1.97[cd]
ትንሹ ጉልህ ልዩነት	**0.08**		**0.38**		**0.18**	

LSD = ትንሹ ጉልህ ልዩነት (በእያንዳንዱ ተለዋዋጭ ስር ተመሳሳይ ፊደሎች መካከል ልዩነት የሌቸውም)

ማሽላን ከለውዝ ጋር አሰባጥሮ ቨርሚኮምፖስት በመጠቀም መዝራት ማሽላን ብቻ ያለ ማዳበሪያ መዝራት ጋር ሲነጻጸር ከፍተኛ የቨርሚኮምፖስት መጠን (4.5 ቶን በሄክታር) እና ማሳን በቦይ ማሰር ከፍተኛ መጠን ያለው የማሽላ አገዳ (14.2 ቶን በሄክታር) እና የአህል ምርት (6.0 ቶን በሄክታር) (ምስል 2) በሌላ መንገድ ደግሞ የአቀንጭራ ቁጥር እድገት ክርቪ በከፍተኛ ደረጃ የቀነሰ (77%) ።
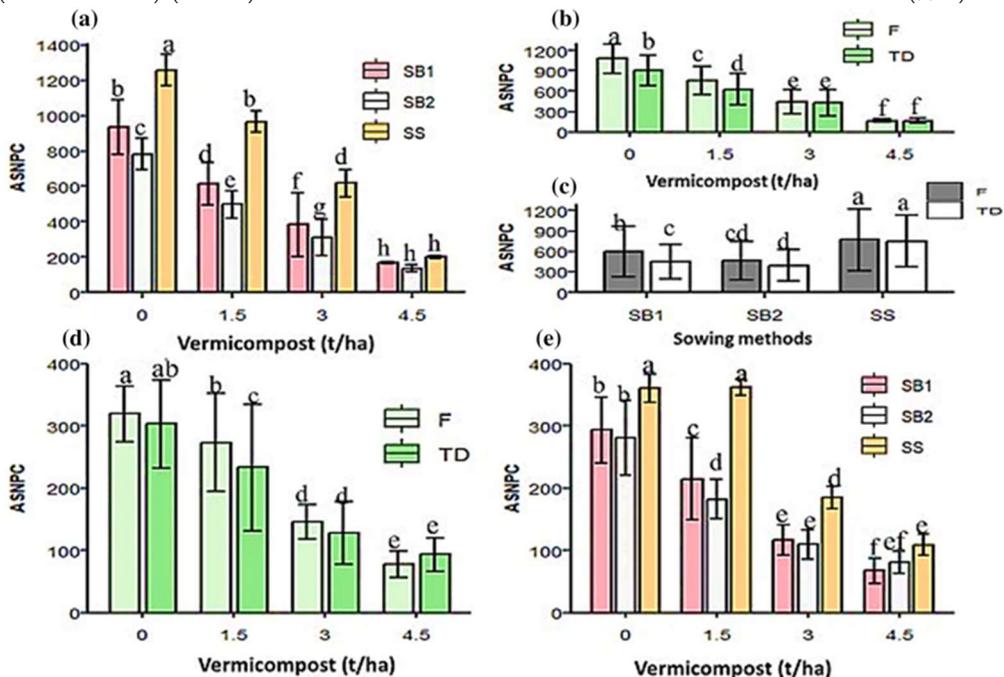
ምስል 2፡ የቨርሚኮምፖስት የሁለትዮሽ መስተጋብር ውጤት ከሰብል ስብጥር ዘዴዎች እና የመዝሪያ መደብ እንዲሁም የሰብል ስብጥር ዘዴና የመዝሪያ መደብ የሁለትዮሽ መስተጋብር ውጤት በ ASNPC 2021 (A, B እና C) እና በ 2022 (D እና E) ዓመታት ላይ ያለው ጥምር መስተጋብር ውጤት። SS=ማሽላ ብቻ፣ SBı/SB2 = ማሽላ ከ ባቢሌ-1 እና ባቢሌ-2 የለውዝ ዝርያዎች ጋር በመስመር ስብጠር፤ F= በከፍት-ፈር ተከላ፣ TD = በቦይ ማሰር፣ ተመሳሳይ ፊደላትን የሚጋሩ ቁሚ ግራፎች በ5% ደረጃ ጉልህ ልዩነት የሌቸውም።

ሠንጠረዥ 2፡ በ 2021 እና 2022 ሁለት ዓመታት ውስጥ የቨርሚኮምፖስት፣ የዘር ስብጥር ተከላ ዘዴ እና የእዘሩር ዘዴዎች በኪሊ ቀበሌ የማሽላ ተረፈ ምርት እና የእህል ምርት ላይ ያለው መስተጋብር ውጤት፣

(ሀ) የአገዳ ምርት (ቶን/ሄክ)

የሰብል	ቨርሚኮምፖስት(ቶን/ሄ)							
ስርዓት	2021 year				2022 year			
	0	1.5	3	4.5	0	1.5	3	4.5
SB1F	3.149[h]	3.947[gh]	6.852[d]	8.34[bc]	4.93[jklm]	4.794[klm]	8.918[f]	12.152[b]
SB1TD	3.590[gh]	5.490[e]	8.177[c]	10.81[a]	4.79[klm]	6.404[gh]	10.770[d]	12.01[bc]
SB2F	3.273[gh]	4.339[fg]	6.194[de]	9.275[b]	5.29[ijkl]	5.953[hi]	9.905[e]	12.619[b]
SB2TD	3.940[gh]	5.856[de]	8.578[bc]	10.95[a]	5.14[ijkl]	7.181[g]	11.22[cd]	14.205[a]
SSF	3.213[h]	5.804[de]	3.264[gh]	8.073[c]	3.549[n]	2.723[h]	8.117[f]	12.207[b]
SSTD	3.766[gh]	6.018[de]	8.206[bc]	8.83[bc]	4.214[m]	5.536[ijk]	8.349[f]	11.28[cd]
LSD	1.092				0.814			

(ለ) የእህል ምርት (ቶን/ሄክ)

የሰብል	ቨርሚኮምፖስት(ቶን/ሄ)							
ስርዓት	2021 year							
	0		0		0		0	
SB1F	1.503[n]	2.49[ijk]	3.54[d]	4.782[c]	1.981[j]	2.689[h]	3.413[g]	5.033[cd]
SB1TD	2.29[jkl]	2.728[ij]	3.236[gh]	5.350[b]	2.171[j]	2.836[h]	4.719[de]	5.602[b]
SB2F	1.84[lmn]	2.39[ijk]	3.470[fg]	4.35[cd]	2.074[j]	2.635[h]	4.419[e]	5.584[b]
SB2TD	2.05[klm]	2.819[hi]	4.20[de]	5.817[a]	2.228[ij]	2.931[h]	4.813[de]	6.014[a]
SSF	1.445[n]	2.538[ij]	3.264[gh]	4.16[de]	1.549[k]	2.723[h]	3.562[fg]	4.605[e]
SSTD	1.627[mn]	2.44[ijk]	3.839[ef]	5.285[b]	1.885[jk]	2.592[hi]	3.941[f]	5.286[bc]
LSD	0.456				0.403			

SB1TD=ማሽላ ከ ባቢሌ-1 ማሰባጠርና በቦይ ማሰር ተከላ ዘዴ መዘራት፤SB2F=ማሽላ ከ ባቢሌ-2 ማሰባጠርና በከፍት-ፈር ተከላ ዘዴ መዘራት፤SB2TD=ማሽላ ከ ባቢሌ-2 ማሰባጠርና በቦይ ማሰር ተከላ ዘዴ መዘራት፤SSF= ማሽላ ብቻ በከፍት-ፈር ተከላ ዘዴ መዘራት፤ SSTD= ማሽላ ብቻ በቦይ ማሰር ተከላ ዘዴ መዘራት፤VC = ቨርሚኮምፖስት፤ ማለት ተመሳሳይ ፊደላትን መጋራት ትርጉም፣ በ 5% ደረጃ ላይ ጉልህ ልዩነት ለዉም፤ LSD = ትንሹ ጉልህ ልዩነት።

የፖሊሲ ምክሮች

- የግብርና ሚኒስቴር አርሶ አደሮ ቨርሚኮምፖስት እንዲያመርትና ከተፋሰስ እርከን መሞ እና የዘር ስብጥር ተከላ ዘዴ ጋር እንዲጠቀም ለማነሳሳት የታለመ ዘመቻና ስልጠና ሊከፍት የማሽላ ምርትን ማሻሻልና የአቀንጭራ አረምን መከላከል ይገባል።

- ወጣቶች የቨርሚኮምፖስት ምርትን ወደ ንግድ እንዲያስገቡ ለማድረግ በሠራተኛና ክህሎት ሚኒስቴር፣ መንግሥታዊ ያልሆኑ ድርጅቶች እና ሌሎች ባለድርሻ አካላት የተቀናጀ ስራ ያስፈልጋል።

- ባለሀብቶች፣ ዩኒየኖች እና የህብረት ስራ ማህበራት ቨርሚኮምፖስትን በስፋት በማምረት እና ወደ ግብይት በማሸጋገር ላይ ሊሳተፉ ይገባል።

ውጤታማ የሆኑ ተጨማሪ ደቂቅ ዘአካልን ምግብ ላይ መጨመር አጫጭር ጆሮ ያላቸው የሶማሌ ፍየሎችን እድገት ይጨምራል

ፈይሳ ሁንዴሳ[1]*፣ መሰረት ግርማ[1]

[1]የእንስሳትና ግጦሽ ሳይንስ ትምህርት ቤት፣ ግብርናና አካባቢ ሳይንስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ሐረማያ፣ ኢትዮጵያ

ቁልፍ መልዕክቶች

- በ 7% ውጤታማ የሆኑ ደቂቅ ዘአካል ቦካሺን ተጨማሪ ምግብ የተመገቡ ባለ አጫጭር ጆሮ የሶማሌ ፍየሎች 50% የሰውነት ክብደት ሲጨምሩ ይህን ያልተመገቡት ፍየሎች ግን 7.4% ብቻ ክብደት ጨምረዋል።

- የአንድ አመት የፍየል ግልገል 7% ውጤታማ የሆኑ ደቂቅ ዘአካል ቦካሺ የተጨመረበት ምግብ ሲመገብ 19.5 በመቶ ምጣኔ ህዳግ አሳይቷል።

መግቢያ

በኢትዮጵያ የፍየል ብዛትና ጠቀሜታ ቢኖርም በዋናነት በቂና ጥራት ያለው መኖ ባለመኖሩ ምርታማነታቸው አሁንም ዝቅተኛ ነው። በጥራት ጉድለት የሚታወቀው አሰር/ግባስ/ የእንስሳት ዋነኛ መኖ ምንጭ ነው። ውጤታማ በማይክሮብ-የታከመ የስንዴ ገለባ (EM-ቦካሺ) አማካኝነት ምግብን እና አመጋገብን ማሻሻል የጨጓራ ፍልልት/መብላላት ማትባትና ለጨንጓራን ደቂቅ ዘአካል የፕሮቲን አቅርቦትን ይጨምራል። ውጤታማ ደቂቅ ዘአካሎች የተፈጥሮ አካባቢን እንዲያገግም የሚያደርጉ ደቂቅ ዘአካሎች ቡድን ድብልቅ ሲሆን በግምት 80 የሚሆኑ የተመረጡ የባከቴሪያ ተህዋስያን ዝርያዎች እንደ ላክቲክ ሲዳ ባክተሪያ፣እርሾ፣ እና አክቲኖማይዶችን ያጠቃልላል። የስንዴ አሰር ቦካሺ የሚዘጋጀው ውጤታማ የሆኑ ማይክሮቦችን ከስንዴ አሰር ጋር በመቀላቀል በእንስሳት አካል ውስጥ የሚገኙ ንጥረ ነገሮችን ጥራት፣ መጣኝት፣ መፈጨት እና ውህደትን የሚጨምሩ ፕሮባዮቲኮችን ለመፍጠር የረዳል። ውጤታማ የሆኑት ረቂቅ ተህዋሲያን በእንስሳቱ አንጀት ውስጥ የሚገኘውን ማይክሮ ፍሎራ በማመጣጠን የምግብ ለውጥ እና የክብደት መጨመርን ያሻሽላ። ስለዚህ፣ እንደ ፍየሎች ያሉ የእንስሳት እርባታዎችን የአሰር ጠቀሜታ ለማሻሻል ውጤታማ የሆኑ ማይክሮቦች-ቦካሺን መጠቀም አስፈላጊ ነው። ይህ ጥናት በወፍራሙ የተደባለቀ የስንዴ አሰር ቦካሺን በአስፈላጊ የድርቆሽ ምግብ መስጠት በሶማሌ ፍየሎች የዕድገት ብቃትና ተረፈ ስጋ ላይ የሚያመጣውን ውጤት ለመገምገም ነው።

አቀራረቦች እና ውጤቶች

በምስራቅ ኢትዮጵያ በሚገኘው የሀሮማያ ዩኒቨርስቲ የፍየል ምርምር የፍየል መመገብ ሙከራ ተካሄደ። በድምሩ 20 አጫጭር ጆሮ ያላቸው ወንድ ወጠጤ የሶማሌ ፍየሎች ከአገር ውስጥ ገበያ ተገዝተው ለ 90 ቀናት የመመገብ ሙከራ ተደርጎባቸዋል። እንስሳቱ በመጀመሪያ የሰውነት ክብደታቸው መሰረት በቡድን ታግደዋል። የፍየሎቹ ናሙና (bucks) በአምስት ምድብ (ብሎክ) እና በአራት የሙከራ ምድቦች ተከፋፍለዋል (ሠንጠረዥ 1)።

ሠንጠረዥ 1. የፍየሎቹ የምርምር ናሙና ስራ አደረጃጀት

ሙከራዎች	ባሳል ምግብ	የሙከራ ምግቦች ድብልቅ ወይም ምጣኔ
ሙከራ 1 (ማወዳደሪያ/መነሻ)	Ad libitum የሳር ድርቆሽ	የስንዴ ገለባ ቦካሺ ወፈር ያለ 100% ድብልቅ ምግብ
ሙከራ 2	Ad libitum የሳር ድርቆሽ	3% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 97% ወፈር ያለ ድብልቅ ምግብ
ሙከራ 3	Ad libitum የሳር ድርቆሽ	5% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 95% ወፈር ያለ ድብልቅ ምግብ
ሙከራ4	Ad libitum የሳር ድርቆሽ	7% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 93% ወፈር ያለ ድብልቅ ምግብ

EM WB= ውጤታማ ደቂቅ ዘአካል የስንዴ ገለባ; CMs= ወፈር ያለ ድብልቅ (የኑግ ዘር ኬክ+ WB + ብዙ የቫይታሚን ፕሪሚክስ)

ከስንዴ ገለባ የኑግ ዘር ኬክ እና የቫይይታሚንና ማዕድን ፕሪሚክስ የተቀመረው ወፍራም ድብልቅ ለእንስሳቱ DM ላይ የሚመገቡት በሰውነታቸው ክብደት 2.5% ነው። የግጦሽ ሳር መሰረታዊ አመጋገብ ad libitum (ለእንስሳቱ በሚያስፈልጋቸው መጠን) ቀርቧል። ውጤቱ እንደሚያመለክተው ውጤታማ የሆኑ ደቂቅ ዘአካል ቦካሽ (EM Bokashi) የማካተት ደረጃ ከ 3% ወደ 7% ሲጨምር ደረቅ ቁስ ፣ ኦርጋኒክ ቁስ እና ድፍድፍ ፕሮቲን አወሳሰድ ጨምሯል። በሌላ በኩል አወሳሰዱ ከ 3 ወደ 7 በመቶ ሲጨምር የገለለተኛ መንጽህ (detergent) አሰር (fiber)፣ እና የአሲድ መንጽህ ሊግኒን ይቀንሳል (ሠንጠረዥ 2)።

ሠንጠረዥ 2. በ ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺ የሚመገቡ የሶማሌ ፍየሎች ዕለታዊ ንጥረ ነገር አወሳሰድ

የንጥረ ነገር አወሳሰድ (ግ/ቀን)	የክብካቢ ሙከራዎች				
	T1	T2	T3	T4	አማካይ
ደረቅ ነገር መውሰድ	589.7[c]	686.6[b]	752[b]	824.5[a]	713.20
ኦርጋኒክ ማተር መውሰድ	558[d]	659.7[c]	749.7[b]	828.3[a]	698.93
ያልተጣራ ፕሮቲን መውሰድ	97.7[d]	113[c]	139.6[b]	159[a]	127.33
ነጺ ድተርጀንት ፋይበር መውሰድ	466[a]	432[ab]	398[b]	397.9[b]	423.48
አሲድ ድተርጀንት ፋይበር መውሰድ	191.8[a]	165.5[ab]	128[c]	148.5[bc]	158.45
አሲድ ድተርጀንት ሊግኒን መውሰድ	113.8[a]	92.8[b]	83.5[b]	89.5[b]	94.90

T1= የስንደ ገለባና 100% ወፈር ያለ ድብልቅ ምግብ፤T2= 3% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 97% ወፈር ያለ ድብልቅ ምግብ፤ T3= 5% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 95% ወፈር ያለ ድብልቅ ምግብ፤ T4= 7% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 93% ወፈር ያለ ድብልቅ ምግብ፤ [a-d]በእያንዳንዱ ተለዋዋጭ ስር ተመሳሳይ ፊደሎች መካከል ልዩነት የላቸውም። EM ቦካሺ ለሚመገቡ ፍየሎች የተመጣጠነ የምግብ መፈጨት ከተጨማሪ ምግብ ከሴላቸው ጋር ሲነፃፀር ተሻሽሏል (ሠንጠረዥ3)። ይህ ምናልባት በማይክሮባዊ አሚሚነት ወይም የሴል ሕዋስ ግድግዳ ክፍሎች ፍረስረሳ (degradation) በመጨመር ሊሆን ይችላል።

ሠንጠረዥ 3. ግልጽ የEM ቦካሺ ተመጋቢ የሶማሌ ፍየሎች የምግብ መፈጨት መጣኝ በመቶኛ (Coefficient (%))

ንጥረ ነገሮች	የምግብ ሙከራዎች				
	T1	T2	T3	T4	SEM
ደረቅ ቁስ	72.29[b]	78.55[ab]	80.34[a]	83.50[a]	1.82
ኦርጋኒክ ቁስ	73.2[b]	77.1[ab]	80.5[a]	82.4[a]	1.73
ያልተጣራ ፕሮቲን	57.3[c]	68.0[bc]	77.7[ab]	81.9[a]	2.99
ነጺ ድተርጀንት ፋይበር	63.9[b]	71[ab]	80.3[a]	77.4[a]	2.78
አሲድ ድተርጀንት ፋይበር	42.9[b]	45.5[ab]	56[ab]	61[a]	4.69

T1= የስንደ ገለባና 100% ወፈር ያለ ድብልቅ ምግብ፤T2= 3% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 97% ወፈር ያለ ድብልቅ ምግብ፤ T3= 5% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 95% ወፈር ያለ ድብልቅ ምግብ፤ T4= 7% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 93% ወፈር ያለ ድብልቅ ምግብ፤ [a-d]በእያንዳንዱ ተለዋዋጭ ስር ተመሳሳይ ፊደሎች መካከል ልዩነት የላቸውም

7% EM ቦካሺ የተጨመረበት ምግብ ከሴላው አማ ጋብ ጋር ሲነፃፀር ከፍተኛውን የመጨረሻ የሰውነት ክብደት (27.9 ኪ.ግ)፣ አማካይ የቀን መጨመር እና የምግብ መለዋወጥ አለባ/ቅልጥፍና (efficiency) አሳኪቷል (ሠንጠረዥ 4)።

ሠንጠረዥ 4. EM ቦካሺየተሰጣቸው FCE የሶማሌ ፍየሎች የሰውነት ክብደት ለውጦች

የልኬት ባህሪት	የክብካቢ ሙከራ				SEM
	T1	T2	T3	T4	
መነሻ ክብደት (ኪ.ግ)	17.5	18.2	18.2	18.6	0.56
መጨረሻ ክብደት (ኪ.ግ)	18.8[c]	23.2[b]	25.6[ab]	27.9[a]	0.72
አማካይ የቀን የክብደት ጭማሪ (ግ/ቀን)	13.3[c]	54.9[b]	82.6[a]	103.3[a]	5.98
የምግብ መለወጥ ውጤታማነት (FCE)	0.02[c]	0.08[b]	0.1[ab]	0.124[a]	0.01

T1= የስንደ ገለባና 100% ወፈር ያለ ድብልቅ ምግብ፤T2= 3% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 97% ወፈር ያለ ድብልቅ ምግብ፤ T3= 5% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 95% ወፈር ያለ ድብልቅ ምግብ፤ T4= 7% ውጤታማ የሆኑ ደቂቅ ዘአካልን ቦካሺ + 93% ወፈር ያለ ድብልቅ ምግብ፤ [a-d]በእያንዳንዱ ተለዋዋጭ ስር ተመሳሳይ ፊደሎች መካከል ልዩነት የላቸውም

የ EM-ቦካሺ ተጨማሪ አመጋገብ፣ ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺን እንደ ተጨማሪ ማግኒያ ምግብ ከሊቻቸው አመጋገቦች ጋር ሲነጻጸር ትኩስ እና የዘገየ በድን ሥጋ ከብደት እና ደንዳና ውፍረት እየጨመረ የመሄድ አዝማሚያ አሳይቷል (ሠንጠረዥ 5)። ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺ የሚሚኒያ ምግብ የተመገቡት ያለተሟላ EM ቦካሺ የሚሚኒያ ምግብ ካልተመገቡት ቡድኖች የበለጠ ሥጋና ተረፈ ሥጋ ስብጥር (ስብ፣ ቀይ ሥጋ እና አጥንት) አላቸው። በመጨረሻም፣ በ ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሽ ማማኒያ ተመገቢ ቡድን ውስጥ ያሉ ፍየሎች በቁጥር ቡድኑ ውስጥ ካሉት እንስሳት የበለጠ የነድን አጥንት እና የጀርባ ስብ ውፍረት ነበራቸው።

ሠንጠረዥ 5. በውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺ የሚመገቡ የሶማሌ ፍየሎች ተረፈ ሥጋ እና የስብ ውፍረት

መስፈርቶች	የክብበቤ ሙከራዎች				አማካይ
	T1	T2	T3	T4	
ትኩስ ስጋ (ካርካስ) ክብደት (ኪ.ግ)	6.6	10.3	11.9	13.7	10.63
የተንጠፈፈ ሙሉ ስጋ (ካርካስ) ክብደት (ኪ.ግ)	6.2	9.6	11.1	12.8	9.93
ቀይ ስጋ (ኪ.ግ)	1.90	2.76	3.10	3.20	2.74
አጥንት (ኪ.ግ)	0.88	1.27	1.39	1.55	1.27
ስብ (ኪ.ግ)	0.36	0.66	0.77	1.00	0.70
ያልተጣራ ስጋ (ካርካስ) በመቶኛ	44.9	54.3	58.7	61.6	54.88
የሽንት ስጋ ውፍረት (ስኩየር ኢንች)	0.54	0.601	0.63	0.71	0.62
የሽንት ስብ ውፍረት (ሚ.ሜ)	1.40	2.81	2.94	3.30	2.61

T1= የስንደ ገለባና 100% ወፈር ያለ ድብልቅ ምግብ፤T2= 3% ውጤታማ የሆነ ደቂቅ ዘአካልን ቦካሽ + 97% ወፈር ያለ ድብልቅ ምግብ፤ T3= 5% ውጤታማ የሆነ ደቂቅ ዘአካልን ቦካሽ + 95% ወፈር ያለ ድብልቅ ምግብ፤ T4= 7% ውጤታማ የሆነ ደቂቅ ዘአካልን ቦካሽ + 93% ወፈር ያለ ድብልቅ ምግብ፤

የፖሊሲ ምክሮች

- ዩኒቨርሲቲዎች፣ የምርምር ማዕከላት፣ የግብርና ቢሮዎች፣ መንግሥታዊ ያልሆኑ ድርጅቶችና ሌሎች ባለድርሻ አካላት እና ለልማት ወኪሎች የውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺ ተጨማሪ ምግብን አስፈላጊነት፣ ዝግጅትና አጠቃቀም ላይ ለአርሶ አደሩና ስልጠና ሊሰጡ ይገባል።

- በመካከለኛ እና በትልቅ ደረጃ የማድለብ ሥራ ላይ የተሰማሩ ግለሰቦች እና የህብረት ስራ ማህበራት ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺ ተጨማሪ ምግብን እንዲጠቀሙ ይመከራሉ።

- የግብርና ሚኒስቴር እና መንግሥታዊ ያልሆኑ ድርጅቶች ውጤታማ የሆነ ደቂቅ ዘአካል ቦካሺን በስፋት ለማሳደግ መስራት አለባቸው።

የሥልጠና እገዛ ማድረግ በምስራቅ ኢትዮጵያ ስጋ ቤቶች የንፅህና እና የስጋ ደህንነትን አሻሽሏል

አደም ሂካ[1]* ፤ ጌታቸው ሸልፋ[1;4] ፤ ሲሳይ ግርማ[1]፤ ሲሀይ ዮሱፍ[2; 3] እና ዳባሲ ታደሰ[3]

[1]የእንስሳት ህክምና ኮሌጅ፤ ሐረማያ ዩኒቨርሲቲ፤ ኢትዮጵያ፤ [2]የግብርና እና ተፈጥሮ ህብት አስተዳደር ኮሌጅ፤ ሐረማያ ዩኒቨርሲቲ፤ ኢትዮጵያ፤ [3]የጥናትና አጋርነት ጽ/ቤት ዩኒቨርሲቲ፤ ኢትዮጵያ፤ [4]የእንስሳት ህክምና ትምህርት ቤት ደምብ-ዶሎ ዩኒቨርሲቲ ኢትዮጵያ

ቁልፍ መልዕክቶች

- ለስጋ ቤት ሠራተኞች የሚሰጠው ሥልጠና የስታፊሎኮከስ አሬዩስ ብክለትን እና ስርጭትን ከ 52.4% ወደ 11.9% በመቀነስ የንፅህና አጠባበቅ ልምዶችን በማሻሻል ውጤታማነትን አሳይቷል።

- ከስልጠና መስጠት በኋላ በሁለቱም በአካባቢያዊ (41.66%) እና በስጋ ናሙኖች (26.7%) የ ስታፊሎኮከስ አሬዩስ ብክለት በከፍተኛ መጠን ቅነሳ ታይቷል።

- በተለይ ስታፊሎኮከስ አሬዩስ መካከል የታየው ከፍተኛ የተጋትሮ ምጥነት (resistance rate) ፣ በአምፒሳሊን (88.68%) እና በፔኒሲሊን (79.25%) ፣ ጥንቃቄ የተሞላበት የአንቲባዮቲክ አጠቃቀም እና ቀጣይነት ያለው ክትትል እንደሚያስፈልግም ያሳያል።

መግቢያ

ደካማ የምግብ አያያዝ እና የንፅህና አጠባበቅ ተግባራት፤ በቂ ያልሆነ የምግብ ደህንነት ህጎች፣ ደካማ የቁጥጥር ስርዓቶች፣ ደህንነቱ በተጠበቀ መሳሪያ ላይ ኢንቨስት ለማድረግ የሚያስችል የገንዘብ አቅም አጥረት እና የምግብ ተቆጣጣሪዎች በቂ ትምህርት አለማግኘት ለምግብ ወለድ በሽታዎች ዓይነተኛ ምክንያቶች ናቸው ። እንደ ስጋ ያሉ የእንስሳት ተዋጽኦዎች በአጠቃላይ በቂ ያልሆነ አሞጫ ተወስያንን በተመለከተ ከፍተኛ ተጋላጭነት ያለቸው ምርቶች ተደርገው ይወሰዳሉ። ደካማ የስጋ መሸጫ ሱቆች፤ የአካባቢ (የመቁረጫ ጣውላዎች፤ ሥጋ መሥሪያ ዕቃዎች፤ መስናዶ ጠረጴዛዎች፤ ሚዛኖች እና የስጋ ቁርጥራጭ) የንፅህና

አጠባበቅ፤ የሰራተኛ ንፅህና አጠባበቅ እና በአውቀት ዝቅተኛ መሆን በኢትዮጵያ ሪፖርት ተደርጓል። በኢትዮጵያ ስጋ ቤቶች የቀን ሙቀት መጨመር በስጋ ቤቶች ውስጥ በተፈጫ ስጋ እና ከሥጋ ጋር ንክኪ ያላቸው ቁሶች ላይ ከፍተኛ የሆነ የማይክሮባል ጫና እንደሚጨምር ተዘግቧል። በተጨማሪም በስጋ እና በአካባቢው ላይ በሚገኙ ጥቃቅን ተህዋሲያን ምክንያት በዝብረተሰብ ጤና ላይ አደጋ መከሰቱ ተዘግቧል። ከስጋ ጋር ንክኪ ያላቸው ዕቃዎች ናሙናዎች ላይ ያሉት ኢ.ኮሊ፤ ሳልሞኔላ እና ኤስ አውሬስ 29.17%፤ 4.17% እና 37.5% ሲሆኑ የተፈጨ ስጋ ደግሞ 43.75%፤ 6.25% እና 37.5% ከስጋ ቤቶች ሪፖርት ተደርጓል። በተጨማሪም መድሃኒት የሚቋቋም በሽታ አምጪ ተህዋሲያን በስጋ መሸጫ ሱቆች ውስጥ የመኖር ከተለያዩ የኢትዮጵያ አካባቢዎች ተዘግቧል። የስጋ ብክለትን ለመቀነስ የሰራተኞች ስልጠና አስፈላጊነት በበርካታ ጥናቶች የማግብ ንጽህና ስልጠና ውጤታማነት የፍተሻ ዝርዝሮች፤ የማይክሮባዮሎጂ ምርመራዎች እና መጠይቆችን በመጠቀም ተገምግሟል። ስለዚህም የዚህ ጥናት አላማ በኢትዮጵያ ስታፊሎኮከስ አውረስን በመጠቀም ስጋ ቤቶችን የንጽህና አጠባበቅን ለማሻሻል ነው።

አቀራረቦች እና ውጤቶች

ከህዳር 2020 እስከ ሰኔ 2023 በተመረጡ የምስራቅ ኢትዮጵያ ከተሞች ስጋ ቤቶች (ሀረማያ፤ አዋዳይ፤ ማልክ-ራፉ እና ሐረር ከተሞች) ላይ ዕፈ ጥናት ተካሂዷል። የመጀመሪያው ዙር ናምና ለተመረጡ 30 የስጋ ቤቶች ሠራተኞች የንፅህና አጠባበቅ ስልጠና ከመሰጠቱ በፊት እና ሁለተኛው ስልጠናው ከተሰጠ በኋላ ነው። በአ፳ንዳ፳ንዱ ዙር በአጠቃላይ 210 የተለያዩ ናሙናዎች (ከሽንጥ ፤ ከደረት ፤ የክፉች እና የጡት ቦታዎች) እና የአካባቢ ናሙኖች

ማለትም ከመቁረጫ ሳንቃ/ጠረጴዛ/ ፣ ከቢላዋ ፣ ከመንጠቆ ፣ ከወለል እና ከግል እቃዎች) ጥራ፤ ናሙናዎች ተሰብስበዋል ። ኤስ አውሬስ ከስጋ ቤቶች ከተሰበሰቡ የተለያዩ ናሙናዎች ተነጥሎ ለሁለት ቀናት ለስጋ ሰራተኞች የንፅህና ስጋ አያያዝ ስልጠና ስጥቷል። በ Vaz et al. (2005) በተሰራት ምክሮች መሰረት ለምግብ (ስጋ) ተቆጣጣሪዎች የክትትል እና የማደስ ስራዎች አስፈላጊነትን በተመለከተ ለተመረጡት ተወካይ የስጋ ሱቆች ሰራተኞች የንድፈ ሃሳብ እና የተግባር ስልጠና ተሰጥቷል። ከሁለት ወራት በኋላ፣ ተመሳሳይ ቁጥር እና የናሙና ዓይነቶች እንደገና ተሰብስበው ለ ስታፊሎኮከስ አሬዮስ ተፈትኗል። የፀረ-ተህዋሲያን የመቋቋም ሙከራ የኪርቢ-ባወር ዲስክ የንጓኝት (diffusion) ዘዴን በመጠቀም በዘፈቀደ በተመረጡ 53 ስታፊሎኮከስ አሬዮስ በአንደኛው ዙር ታይቷል።

ከተወሰዱት 210 የተመረጡ የስጋ ቤት ናሙናዎች በአጠቃላይ የኤስ አውሬስ ስርጭት 51.4% እና 11.90% ከስልጠናው በፊት እና በኋላ በተከታታይ ታይቷል። ይህም (39.5%) ከፍተኛ ቅናሽ አሳይቷል ። በአካባቢያዊው (41.66%) እና በስጋ (26.70%) ጉልህ የሆነ የስታፊሎኮከስ አሬዮስ ብከለት መቀነስ ተስተውሏል፡

፡ በአካባቢ እና በስጋ ናሙናዎች ላይ ስልጠና ከመሰጠቱ በፊት የስታፊሎኮከስ አሬዮስ ስርጭት ተመሳሳይ ነው። ነገር ግን ከስልጠናው በኋላ ከፍተኛ ልዩነት ታይቷል (P = 0.03)። በአጠቃላይ አካባቢያዊ ናሙናዎች፣ ከስልጠና በኋላ ከፍተኛ ቅነሳ ታይቷል (p <0.001)። በአጠቃላይ የኤስ አውሬስ ቅነሳ ከስልጠናው በኋላ ከሃኢስት ፣ ከጠጠኝ እና ሰባት እጥፍ በላይ በአካባቢ ፣ በስጋ እና በአጠቃላይ ናሙናዎች ላይ ነበሩ ። ሁሉም 30 ምላሽ ሰጪዎች (የስጋ ሥራተኞች) (100%) ወንዶች ናቸው። ከተጠያቂዎቹ 11 (36.67%) የመጀመሪያ ደረጃ ትምህርት ያላቸው፣ 12 (40%) ከ26-30 አመት የእድሜ ክልል ውስጥ የሚገኙ እና 13 (43.33%) በስጋ ቤቶች ውስጥ ከ እስከ 2 አመት የስራ ልምድ ያላቸው ናቸው። የስጋ ቤቶች ስነ-ጥናት እና የኤስ አውሬስ ስርጭትን በተመለከተ ከስልጠናው በፊት እና በኋላ በተከታታይ 50% እና 46.7% ስርጭት ታይቷል ። የሰራተኞቹ እድሜ እና የትምህርት ደረጃ ግምት ውስጥ በማስገባት, ከባል ዲግሪዎች በስተቀር ስታፊሎኮከስ አሬዮስ በሁሉም ውስጥ ታይቷል።

በተለየት 53 የስታፊሎኮከስ አሬዮስ የፀረ-ተህዋሲያን ተጋትሮ ግለታሪክ ጥናቶችም ተደርገዋል። የመጥበሻዉ ተጋላጭነት ለሁሉም ሙከራ የተሠራባቸው ፀረ-ተህዋሲያን ወኪሎች (ጀንታሚሲን) እና ለከባድ የባክቴሪያ ኢንፌክሽኖች (ቫንኮሚሲን) አንቲዮኦቲኮትን አልፎ ተስተውሏል።

አብዛኛዎቹ ለጥናቱ የተለያዩ አንቲባዮኢቲኮች እንደ chloramphenicol (83.02%) ፣ sulfamethoxazole-trimethoprim (69.81%) እና erythromycin (60.38%) ተጋላጭ ናቸው። በድጋሚ፣ የተገለሉት አብዛኛዎቹ ለአምክሲሲሊን (88.68%) እና ለቴኒሲሊን-ጂ (79.25%) ተጋትሮ ነበራቸው። ለተጋትሮ ሥርጭት የተለዩት (n = 53) ናሙናዎች በአጠቃላይ ተመሳሳይ ስነ-ስሪት ያላቸው መድኃኒቶችን መቋቋማቸው ታይቷል። ለተጋትሮ ልዩታ የተመረጡት የሁለት ተመሳሳይ ስነ-ሥሪት መድኃኒቶች ቡድን (ቤታ ላክታም እና ግላይኮል-ፔፕታይድ) 67.92% ተጋትሮ ነበራቸው። ብዙ መድሃኒት (≥ 3 መድህኒቶች አጠቃላይ) 16 (30.19%) ተጋትሮ (ሬሲስታንት) ነበራቸው።

የፖሊሲ ምክሮች

- የጤና ጥበቃ ሚኒስቴር እና የክልል ጤና ቢሮዎች በስጋ ንፅህና አጠባበቅ፣ ፀረ ተህዋሲያንን የሚቋቋሙ በሽታ አምጪ ተህዋሲያን ስርጭትን ለመቀነስ ግንዛቤ በመፍጠር ቀጣይነት ያለው ስልጠና ሊሰጡ ይገባል።

- የጤና ጥበቃ ሚኒስቴር፣ መንግሥታዊ ያልሆኑ ድርጅቶችና ሌሎች ባለድርሻ አካላት ጉልህ፣ዘላቂ እና የረዥም ጊዜ የስጋ ንጽህና አያያዝን ለማሻሻል የሎጂስቲክስ ድጋፍ እና ተደጋጋሚ ቁጥጥር ማድረግ አለባቸው።

| የፖሊሲ መግለጫ 2.1 ግንቦት **2017** | የምርምር ትኩረት መስክ | II |

የጉበት በሽታ ከአፍላቶክሲን B₁ ጋር ያለው ጠንካራ ጉድኝት በምስራቅ ኢትዮጵያ

አብርሃም መኩሪያ [1,2]*፣ ላይ ዚያ[3]፣ ተካባ አብዲሼ አህመድ[3]፣ ሰለሞን ቢሻው[2]፣ ዘላለም ተክለማርያም[3]፣ ተሾመ ነዲ[1]፣ ተፈራ አቡላ[1]፣ ኤፍሬም እንጋዳወርቅ[1]፣ ዩን ዩን ጎን[2]

[1]የጤና ሳይንስ ኮሌጅ ፤ አዲስ አበባ ዩኒቨርሲቲ ፤ አዲስ አበባ ፤ ኢትዮጵያ፤ [2]የምግብ ሳይንስ እና የተመጣጠነ ምግብ ትምህርት ቤት፣ የሊድስ ዩኒቨርሲቲ፣ ሊድስ፣ ዩናይትድ ኪንግደም፤ [3]የጤና እና ህክምና ሳይንስ ኮሌጅ፣ሐረማያ ዩኒቨርሲቲ፣ሀረር፣ ኢትዮጵያ፤

ቁልፍ መልዕክቶች

- አፍላቶክሲን ቢ ₁ አልቡሚን አዳክት ከፍተኛ ደረጃ ባላቸው ታካሚዎች ላይ የተገኘው (≥8.6 pg/mg) ከጉበት ሲርሲስ ጋር በጥብቅ የተያያዘ ሆኖ ተኝቷል::

- ከፍ ያለ የ AF-alb ደረጃዎች የጉበት ለኮምትሬ የመጋለጥ እድላቸው ከፍ ያለ ሲሆን እንደ እርጅናና የእርሻ ሥራ፣ የጉበት በሽታ የቤተሰብ ታሪክ እና የኤች. ቢ. ቪ. ኢንፌክሽን ካሉ ምክንያቶች ጋር ተያይዘዋል::

መግቢያ

በጉበት *መዋቅር ለውጥ እና በተያደሶ አጤዎች መፈጠር* የሚታወቀው የጉበት በሽታ (Cirrhosis) የጉበት በሽታ ላለባቸው ታካሚዎች ለበሽታ እና ለሞት መንስኤ ነው:: በ2019 ከምዮት 2.4% ሰዎች (ሁዋንግ እና ሌሎች፣ 2023) ከፍተኛ የሆነ አለም አቀፍ የጤና ጉዳይ ነው:: ኢትዮጵያ ውስጥ ጉበት ሲርሆሲስ በማኘቸት ስባዛኛ ደረጃ ላይ የሚገኝ ሲሆን ይህም ከ100,000 ሀዘብ ውስጥ 24 ሞትን ይሸፍናል:: በቅርብ ዓመታት ውስጥ የጉበት ሲርሆሲስ ሕክምና በከፍተኛ ሁኔታ የተሻሻለ ቢሆንም የታካሚዎች አመለካከት አሁንም ደካማ ነው:: ስለዚህ ፣ ሊከላከሉ የሚችሉ የአደጋ መንስኤዎችን መለየት እና አያያዝ ቅድሚያ መስጠት አስፈላጊ ነው:: የጉበት ለኮምትሬ ከተለያዩ የአደጋ መንስኤዎች ጋር የተገናኝ፣ ከመጠን ያለፈ ውፍረት፣ አልኮል ያልሆነ የሰባ ጉበት በሽታ፣ አልኮል ከመጠን በላይ መጠጣት እና ከሄፓታይተስ ቢ ወይም ሲ ቫይረስ (ኤችቢቪ ወይም ኤችሲቪ) የሚመጡ ኢንፌክሽኖች (Huang et al., 2023፣ Wang et al., 2022) ናቸው::

በተጨማሪም፣ ራስን ቤሪስ የሚከላከሉ በሽታዎች፣ ኮሌስታቲክ በሽታዎች፣ እና የቦረት መብዘት አስተዋጽኦ ከሚያደርጉት መካከል ናቸው:: ስለዚህ በሽታ ያለንን ግንዛቤ አስደናቂ አመርታ ቢኖረውም ከሰሃራ በታች ባሉ አፍሪካውያን የሲርሆሲስ በሽታ አንድ ሶስተኛው አሁንም ምክንያቱ ባልታወቀ የጉበት የጉበት በሽታ (Mokdad et al., 2014) ተመድቧል:: ቀደም ሰል በምስራቅ ኢትዮጵያ የተደረገ ጥናት እንደሚያሳየው 55 በመቶው የጉበት ሲርሆሲስ በሽታ መንስኤ ምንጩ በእርግጠኝነት ያልታወቀ ነው:: የሕብረ ሕዋስ ምርመራዎች እንደሚያሳዩት እነዚህ ጉዳዮች ብዙውን ጊዜ ተጨማሪ ጥናት እና ጣልቃገብነትን የሚጠይቅ መርዘማ የጉበት ጉዳት ያካትታሉ::

በአፍላቶክሲን B₁ (AFB₁)፣ በአስፐርጊለስ ፍላቨስ እና አስፐርጊለስ ፓራሲቲከስ የሚመረተው ኃይለኛ የፈንገስ መርዝ ለጉበት ለኮምትሬ ከፍተኛ አስተዋፅ እንዳለው እየታወቀ ነው:: በቅርብ ጊዜ በቻይማ የተደረገ ጥናት በ AFB₁ ተጋላጭነት እና በጉበት ሲርሶሲስ መካከል ያለውን ጠንካራ ግንኙነት አሳይቷል:: በምስራቅ ኢትዮጵያ፣ በርካታ ጥናቶች በማሽላ እና በለውዝ ላይ ያለው የ AFB₁ ብክለት አሳሳቢ ደረጃ አሳይተዋል:: ይሁን እንጂ የ AFB₁ መጋለጥ ከጉበት ሲርሆሲስ እድገት ጋር የሚያገናኘው የተወሰነ መረጃ አለ:: ስለዚህ ይህ ጥናት በምስራቅ ኢትዮጵያ የአፍላቶክሲን ተጋላጭነት እና የጉበት ሲርሆሲስ ትስስር ስጋትን ለመመርመር ያለመ ነው::

አቀራረቦች እና ውጤቶች

በምስራቅ ኢትዮጵያ ሀረር ህይወት ፋና ኮምፕረሄንሲቭ ስፔሻላይዝድ ዩኒቨርስቲ ሆስፒታል (HFCSUH) ከጥር 1 ቀን 2020 እስከ ጁላይ 31 ቀን 2021 የጤና ቁጥጥር ጥናት ተካሄደል::

በአጠቃላይ 127 የጤና ጉዳዮች እና 253 ግት መቆጣጠሪያዎች (controls) ላይ በአልትራሳውንድ ላይ የተመሰረተ የሲርሆሲስ ልኬት ምርመራ ተካቲል። የተቀናጀ መጠይቅ እና ደረጃቸውን የጠበቁ መስፈርቶች የሕዝብ ነክ ጥናትን፣ የአኗኗር ዘይቤን እና የሕክምና መረጃዎችን ለመሰብሰብ ጥቅም ላይ ውለዋል። በተጨማሪም ጉበት ተግባርን፣ የሄፓታይተስ ቢ ቫይረስ (HBV)፣ የሄፓታይተስ ሲ ቫይረስ (HCV) እና የአፍላቶክሲን-አልቡሚን ምርመራን ለመመርመር ከኢያንዳንዱ ግት መቆጣጠሪያዎች ላይ ተሰብስቧል። በጉበት cirrhosis እና ኢጥገኛ ተለዋዋጮች መካከል ያሉ ግንኙነቶች በስታቲስቲክስ ተተንትነዋል።

ግኝቶቹ እንደሚ ያሳዩት የ AF-alb ደረጃዎች በ75% የጉበት cirrhosis ጉዳዮች በ 64% ግት መቆጣጠሪያዎች ላይ ተገኝተዋል።

AF-alb ጉዳዮች በአማካይ ደረጃ 11 pg/mg (IQR: 5.5-25) ነበር፣ በተላይም ከ7.0 pg/mg (IQR: 4.3-20.5) በስታ ስቲክስ ጉልሀ በሆነ በግት መቆጣጠሪያዎች ውስጥ ከሚገኙት (p<0.05) (ሠንጠረዥ 1) ከፍ ያለ ነው። ዕድሜያቸው 35 ዓመት እና ከዚያ በታች የሆኑ ታካሚዎች ዕድሜያቸው 55 ዓመት እና ከዚያ በላይ በሆኑ በሽተኞች ጋር ሲነፃፀር በጉበት ሲርሆሲስ በሽታ የመያዝ እድሉ በ 60% ቀንሷል። በሙያያቸው አርሶ አደር የነበሩ እና የቤተሰብ ታሪካቸው የጉበት በሽታ ያለባቸው ከእነሱ ተቃራኒ ህይቀት ካላቸው ይልቅ በቅደም ተከተል ከ 3 እና 2.9 ጊዜ በላይ የጉበት በሽታ የመያዝ እድላቸው ከፍተኛ ነው። የሄፓታይተስ ቢ ቫይረስ ሴሮፓዚቲቭ ታማሚዎች የጉበት ሲርሆሲስ የመጋለጥ እድላቸው ከሴሮኔጋቲቭ ታካሚዎች በ4 እጥፍ ከፍ ያለ ነው። እንዲሁም ከፍተኛ መጠን ያለው AF-alb ባላቸው ታካሚዎች ላይ የጉበት ሲርሆሲስ በሽታ የመጋለጥ እድላቸው ምንም ጥቁመት ካልታየባቸው (undetected) በ2 እጥፍ ይበልጣል።

ሠንጠረዥ 1. ሁለገብ የሁለትዮሽ ሎጂስቲክስ ሪግሬሽን ትንተና በምስራቅ ኢትዮጵያ የጉበት ለኮምኅስ በሽታ የሚገመቱ ምክንያቶች፤ 2020/21

Variables/ የጥናት ተለዋዋጭ	ምድብ	Cases n (%)	Control/ጎድ C n (%)	COR (95% CI)	AOR (95% CI)
ጾታ	ወንድ	84 (66)	144 (57)	1.5 (0.9, 2.3)	1.0 (0.6, 1.9)
	ሴት	43 (34)	109 (43)	1.00	1.00
የዕድሜ ክልል	<35	65 (51)	125 (49)	1.00	1.00
	35-44	23 (18)	48 (19)	0.9 (0.5, 1.6)	0.5 (0.3, 1.1)
	45-54	18 (14)	32 (13)	1.1 (0.6, 2.1)	0.7 (0.3, 1.5)
	55 እና በላይ	21 (17)	48 (19)	0.8 (0.5, 1.5)	0.4 (0.2, 0.8) *
መኖሪያ	ከተማ	20 (16)	78 (31)	1.00	1.00
	ገጠር	107 (84)	175 (69)	2.4 (1.4, 4.1)	1.0 (0.5, 2.0)
የጋብቻ ሁኔታ	የላገባ	14 (11)	52 (20)	0.5 (0.3, 0.9)	0.7 (0.3, 1.6)
	የገባ	110 (87)	194 (77)	1.00	1.00
	የተፋታ/ የሞተባት	3 (2)	7 (3)	0.8 (0.2, 3.0)	1.4 (0.3, 7.6)
መደበኛ ትምህርት	አይ	102 (80)	140 (55)	1.00	1.00
	አዎ	25 (20)	113 (45)	0.3 (0.2, 0.5)	0.6 (0.3, 1.3)
ሥራ	ገበሬ አይደለም	23 (18)	120 (47)	1.00	1.00
	ገበሬ	104 (82)	133 (53)	4.0 (2.4, 6.8)	3.0 (1.5, 6.0) *
ጫት መቀም	አይ	48 (38)	132 (52)	1.00	1.00
	አዎ	79 (62)	121 (48)	1.8 (1.2, 2.8)	1.3 (0.7, 2.4)
የትምባሆ አጠቃቀም	አይ	99 (78)	221 (87)	1.00	1.00
	አዎ	28 (22)	32 (13)	2.0 (1.1, 3.4)	1.4 (0.7, 2.8)
የስውነት መረጃ	መደበኛ	73 (58)	162 (64)	1.00	1.00
ጠቋሚ	ከመደበኛ ክብደት በታች	45 (35)	82 (32)	1.2 (0.8, 1.9)	1.4 (0.8, 2.3)
	ከመደበኛ መጠን በላይ ክብደት	9 (7)	9 (4)	2.2 (0.8, 5.8)	1.8 (0.6, 5.7)
የጉበት በሽታ	የለም	111 (87)	245 (97)	1.00	1.00
የቤተሰብ ታሪክ	አለ	16 (13)	8 (3)	3.5 (1.5, 8.0)	2.9 (1.1, 7.9) *
HBV /የጉበት በሽታ	የለም	100 (79)	239 (94.5)	1.00	1.00
	አለ	27 (21)	14 (5.5)	4.6 (2.3, 9.2)	4.0 (1.9, 8.8) *
AF-alb adduct ደራጀ	የማይታይ	32 (25)	91 (36)	1.00	1.00
	ዝቅተኛ	38 (30)	91 (36)	1.2 (0.7, 2.1)	1.2 (0.6, 2.2)
	ከፍተኛ	57 (45)	71 (28)	2.3 (1.3, 3.9)	2.0 (1.1, 3.7) *

Note: *p value < 0.05; AF-alb, aflatoxin B$_1$ (AFB$_1$)-albumin adduct; AOR, Adjusted Odds Ratio COR, Crude Odds Ratio; HBV, Hepatitis B Virus.

የፖሊሲ ምክሮች

- የግብርና ሚኒስቴር እና የሚመለከታቸው ባለድርሻ አካላት የ AFB1 ብከላ በመቀነስ የምግብ እሴት ሰንሰለትን በተገቢው የቅድመ እና ድህረ ምርት አያያዝ ላይ አጠቃላይ ስትራቴጂ ነድፈው ተግባራዊ ሊያደርጉ ይገባል።

- አፍላቶክሲ�ን ለመቀነስ የግብርና ሚኒስቴር እና ሌሎች ባለድርሻ አካላት የ AFB1 የምግብ እና የምግብ ሸቀጥ ምርቶች ደረጃ ላይ መደበኛ ክትትል ማድረግ አለባቸው።

- የጤና ጥበቃ ሚኒስቴር የሄፐታይተስ ቢ ቫይረስ የሴሮፖዚቲቭ በሽታ ያለባቸውን በሽተኞች እና የጉበት በሽታ ታሪክ ያላቸውን ቤተሰብ የጉበት ሲርሆሲስ በሽታ የልየታ ምርመራ ማድረግ ይኖርበታል።

- የሚመለከታቸው ባለድርሻ አካላት አርሶ አደሮችን፣ ነጋዴዎችን እና ሸማቾችን ደህንነቱ የተጠበቀ የምግብ አያያዝ አሰራርን እና ለ AFB1 ተጋላጭነት እና ከጉበት ሲርሆሲስ ጋር ያለውን ግንኙነት ለማስተማር የግንዛቤ ፈጠራ ስራ መስራት አለባቸው።

በምስራቅ ኢትዮጵያ የስኪዞፈሬንያ/የአእምሮ ሕመም መስፋፋት

ፈትያ መሀመድ[*]፣ ቢፍቱ ገዳ[2]፣ ተስፋዬ አሰበ ያደታ[3]፣ ያደታ ደሴ[4]

[1]የጤና እና ህክምና ሳይንስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፤ [2]የጤና ሳይንስ ትምህርት ቤት፣ ማዳ ወላቡ ዩኒቨርሲቲ ሻሻሜኔ፣ ኢትዮጵያ፤ [3]የጤና እና ህክምና ሳይንስ ኮሌጅ ፣ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፤ [4]የጤናና ህክምና ሳይንስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ኢትዮጵያ

ቁልፍ መልዕክቶች

- በምስራቅ ኢትዮጵያ የስኪዞፈሬንያ (ከባድ የአእምሮ ሕመም) በ 2016 ከነበረበት 57% በ2020 ወደ 65 % ከፍ ብሏል።

- ስኪዞፈሬንያ ከሥራ አጥነት፣ የትምህርት ደረጃ፣ የቤተሰብ አእምሮ ሕመም ታሪክ እና ሁለት ወይም ከዚያ በላይ ንጥረ ነገሮችን አጠቃቀም ጋር የተያያዘ ነበር።

- 44.57% ስኪዞፈሬንያ ካለባቸው ታካሚዎች ሳይኮቲክ ሕክምናን አለማከበር ተስተውሏል፣ እነዚህም ከወቅታዊ ንጥረ ነገር አጠቃቀም ጋር የተቆራኙ፣ በመጀመሪያው ትውልድ ፀረ-ሳይኮቲክ መድኃኒቶች የታከሙ፣ ስለ ሕመማቸው ደካማ ግንዛቤ እና የመድኃኒት የጎንዮሽ ጉዳቶች አጋጥሟቸዋል።

- ሁለት ወይም ከዚያ በላይ ንጥረ-ነገር ተጠቃሚዎች እና ራስን መግለል ያጋጠማቸው በማህበራዊ ኑሮ ውስጥ ዝቅተኛ የህይወት ጥራት ያሰዩ ናቸው።

መግቢያ

ስኪዞፈሬንያ በሀሳብ፣ በ�>ፀ እና በአሉታዊ ምልክቶች የሚታወቅ ከባድ የአእምሮ መታወክ ነው (Patel et al., 2014)። ብዙውን ጊዜ በጉልምስና መጀመሪያ ላይ ብቅ ይላል። ምንም እንኳን እንኳን በጄኔቲክ ፣ በአካባቢያዊ እና በባህ ሁኔታዎች ተጽዕኖ ቢደረግም ትክክለኛው መንስኤው አልታወቀም (Bruijnzeel & Tandon, 2011)። ይህ ችግር በዓለም ዙሪያ ወደ 24 ሚሊዮን የሚጠጉ ሰዎችን ይነዳል (WHO, 2022)። በዓለም አቀፍ ደረጃ ለበሽታ ጫና ከሚዳርጉ አሥር ዋና ዋና ምክንያቶች መካከል ይመደባል። ህሙሙ ጤናማ ካልሆነ የአኗኗር ዘይቤ ምርጫዎች ጋር የተቆርኛ ነው። ለምሳሌ ከመጠን ያለፈ ውፍረት እና አደንዛዥ እጾችን መጠቀም፣ እና ከፍተኛ ራስን የማጥፋት አደጋን የሚያስከትል ሲሆን ይህም ከ10 እስከ 25 አመት የህይወት ዕድሜ እንዲቀንስ አስተዋጽኦ ያደርጋል (አልፍሬድሰን እና ሌሎች፣ 2017)። አንቲሳይኮቲክ መድኃኒት የረጅም ጊዜ ሕክምና ነው። ነገር ግን ደካማ ክትትል ወደ ማገገሚያ፣ ሆስፒታል መተኛት እና ራስን ማጥፋትን የመሳሰሉ አሉታዊ ውጤቶችን ሊያስከትል ይችላል (A. Orrico-Sánchez et al., 2020)። ስኪዞፈሬንያ በህይወት ጥራት ላይ ከፍተኛ ተጽዕኖ ያሳድራል፣ በቅዝፎች፣ በውሸት፣ በግንዛቤ እክሎች እና በማህበራዊ መገለል (Vassileva et al., 2014)። በመጨረሻ ኢትዮጵያ እንደ ስኪዞፈሬንያ ያሉ የአእምሮ ህመሞችን ለመቀነስ የ2030 የዘላቂ ልማት አጀንዳን ተቀብላ አጠቃላይ ሀገራዊ የአእምሮ ጤና እቅድ አዘጋጅታለች (የኢትዮጵያ ፌዴራል ጤና ጥበቃ ሚኒስቴር፣ 2020)።

አቀራረብ እና ውጤቶች

ከ2016 እስከ 2020 ባለው ጊዜ ውስጥ በ29,184 የአዕምሮ ህመምተኞች የህክምና መዛግብት ውስጥ በሆስፒታል ላይ የተመሰረተ የጥናት ውጤት ተካሂዷል። ከመግቢያ ጋር የተዛመደ የጉዳይ ቁጥጥር ጥናት 218 ስኪዞፈሬንያ ያለባቸው ታካሚዎች እና ≥ 18 አመት የሆናቸው 218 ጤናማ ግለሰቦች በተመሳሳይ ጊዜ ውስጥ ሆስፒታሎችን የጎበኙ ናቸው። የተጣቀረ መጠይቅ ስለ ሶሺዮ-ስነ-ሕዝብ ባህሪያት፣ ክሊኒካዊ ሁኔታዎች እና ንጥረ ነገር አጠቃቀም ጋር የተያያዙ ጥያቄዎችን በአልኮል፣ ማጨስ እና ንጥረ ነገር ተሳታፊ የማጣሪያ ምርመራ (ASSIST) መረጃ ለማግኘት ጥቅም ላይ ውሏል (ቡድን፣ 2002)።

ሥነ- አእምሮ ሕክምናን መከተተልን የሚለካው በተሻሻለው የሜዲኪሽን መታዘዝ ደረጃ አሰጣጥ ስኬል (MARS) የተጠመነ ሲሆን ይህም ባለ 10 ንጥል ነገር ራስን ሪፖርት ማድረጊ ነው። የMARS ነጥብ 3 ወይም ከዚያ በላይ መጣበቅን ያሳያል፣ ከ 2 ያነሰ ወይም እኩል የሆነ የMARS ነጥብ የፀረ-አእምሮ ህክምናን አለመከተል ያሳያል (ቶምፕሰን እና ሌሎች፣ 2000)።

ማስተዋል የሚለካው ለሳይኮሲስ (አይኤስፒ) የራስ-ሪፖርት ማስተዋል ሚዛንን በመጠቀም መልስ ለመስጠት ቀላል እና ሶስት ንዑስ ደረጃዎችን የሚወክል ባለ 8 ንጥል ነገር ነው: የሕመም ግንዛቤ (2 ንጥሎች) ፤ የምልከት ምልክቶች (2 ንጥሎች) እና የሕክምና ፍላጎት (4 ንጥሎች)። ጥሩ ግንዛቤን በሚያሳይ 9 ወይም ከዚያ በላይ ነጥብ (Birchwood et al.፣ 1994)።

የህይወትን ጥራት ለመገምገም የአለም ጤና ድርጅት የህይወት ጥራት ግምገማ አጭር እትም (WHOQOL-BREF) ጥቅም ላይ የዋለው 26 በራሱ የሚተዳደር አጠቃላይ መጠይቅ እና አጭር እትም WHOQoL-100 ጥቅም ላይ ወሷል (ድርጅት, 1998)። መሣሪያው አራት የነጋ ውጤቶች አሉት: አካላዊ ጤና (7 ንጥሎች)፣ ስነልቦናዊ ጤና (6 ንጥሎች)፣ ማህበራዊ ግንኙነቶች (3 ንጥሎች)፣ የአካባቢ ጤና ነጋ (8 ንጥሎች) እንዲሁም ግለሰቦቹ ስለ ህይወታቸው ያላቸውን ሁነኛ ግንዛቤ በተመለከተ ሁለት የተለዩ ነጥቦች። ስለዚህ፣ የነጋ ውጤቶች በአዎንታዊ አቅጣጫ ይለካሉ (ማለትም ከፍተኛ ውጤቶች ከተሻለ አነጋር ጋር ይዛመዳሉ(Skevington et al., 2004)።

ምስል 1። አጠቃላይ የስኪዞፈሬንያ (schizophrenia) በሽተኞች ከ2016-2020

ግኝቱ እንደሚያመለክተው የተሳታፊዎቹ አማካይ ዕድሜ 34.18 ዓመታት (SD=+10.43) ከ18 እስከ 65 ዓመት ነው። አብዛኞቹ ምላሽ ሰጪዎች ወንዶች ሲሆኑ፣ ናሙናው 706 (77.67%) እና ከግማሽ በላይ (56.55%) የሚሆኑት ተሳታፊዎች ከከተማ የመጡ ናቸው። ከዚህም በላይ ከፍተኛ መጠን ያለው (42.57%) የተሳታፊዎች መደበኛ ትምህርት ያልነበራቸው ሲሆን ወደ ግማሽ የሚጠጉ (40.70%) ምንም የሚከፈልበት ሥራ አልነበራቸውም።
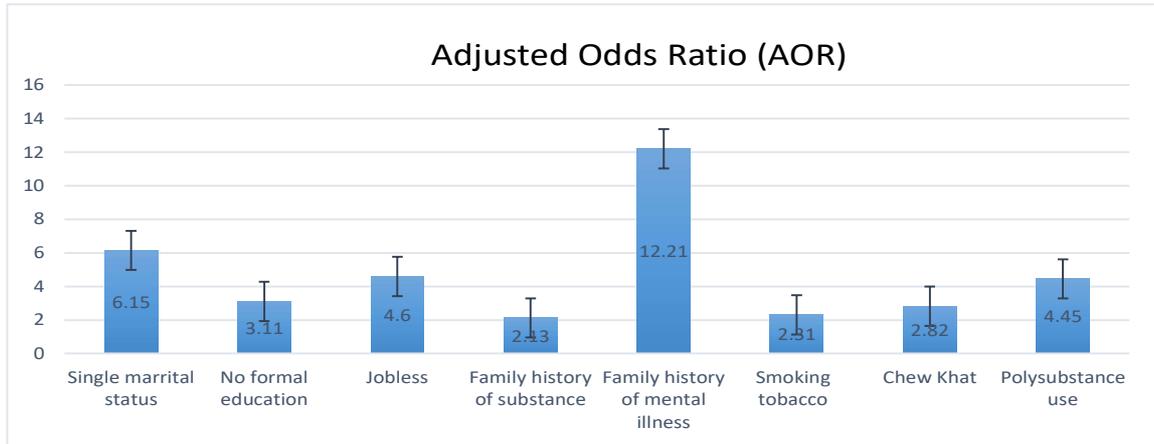
ምስል 2. በምስራቅ ኢትዮጵያ በተመረጡ የህዝብ ሆስፒታሎች ውስጥ የስኪዞፈሬንያ (schizophrenia) ማሳያዎች

ስኪዞፈሪንያ ባለፉት አምስት ዓመታት (ከ2016 እስከ 2020) ከ57% ወደ 65% እድገት አሳይቷል (ምስል 1)። ስኪዞፈሪንያ ከመደበኛ ትምህርት (AOR: 3.11; 95% CI: 1.30-7.42)፣ ነጠላ የጋብቻ ሁኔታ (AOR: 6.15; 95%CI: 2.47-15.28) እና የሥራ አጥነት ሁኔታ (AOR: 4.60; 95.0.1-11.8) የአአምሮ ሕመም (AOR: 4.60; 95.0.1) የአአምሮ ሕመም (CI: 11.8)፣ 12.21; 95% CI: 4.83-30.00), የአሁን የትምባሆ ተጠቃሚዎች (AOR: 2.31; 95% CI: 1.08-4.91), ጫት ቃሚ (AOR: 2.82; 95% CI: 1.23-6.45), እና 45% የ polysubstance ተጠቃሚዎች 1.28-15.45) (ምስል 2)።

በ 44.57% የ E ስኪዞፈሪንያ በሽተኞች የፀረ-ሳይኮቲክ መድኃኒቶችን አለመከተል ተስተውሏል. መድሃኒትን አለማክበር በነጠላ ጋብቻ ሁኔታ (AOR=2.478; 95% CI (1.713-3.855), አሁን ያለው የሲጋራ አጫሽ (AOR= 2.034; 95% CI (1.496- 2.674), የአልኮል ተጠቃሚዎች (AOR: 1.954.7.-9) የጫት ተጠቃሚዎች (AOR= 2.836፣ 95% CI (2.0601-3.902) እና የሕመም ቆይታ ከ 5 ዓመት ያነሰ ወይም እኩል ነው) (AOR 1.446፣ 95 % CI (1.049- 1.993) (ምስል 3)።
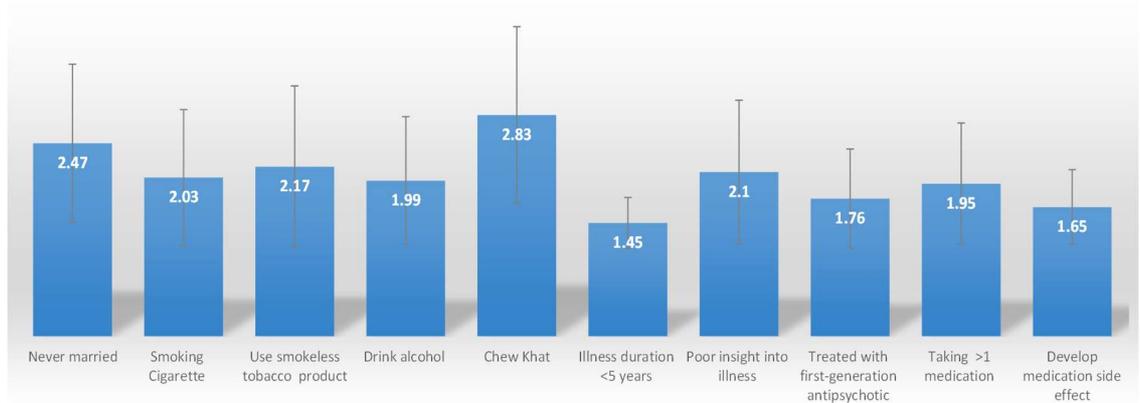
ምስል 3: ከፀረ-አእምሮ መድሃኒቶች ጋር ተያይዘው የሚመጡ ምክንያቶች። በምስራቅ ኢትዮጵያ ከታህሳስ 1 ቀን 2022 እስከ ጥር 31 ቀን 2023 ድረስ በሕዝብ ሆስፒታሎች ስኪዞፈሪንያ ካለቸው ታካሚዎች መካከል።

ከአራቱ የተሸለ የህይወት ኖር ኖራዎች መካከል፣ ምላሽ ሰጪዎች በአካባቢ ጤና ኖራ ከፍተኛውን አማካይ 23.39 (± 3.64) እና ዝቅተኛውን በማህበራዊ ጤና ኖራ 9.52 (± 2.57) አስመዝግበዋል። ዝቅተኛ ማህበራዊ ድጋፍ ካለቸው መካከል የካላዊ ጤና የህይወት ጥራት በ 0.86 (p-value=0.040) ቀንሷል። የስነ ልቦና ጤና የተሸለ የህይወት ኖር በ 0.77(β = -0. 768, P =0.001) በ polysubstance ተጠቃሚዎች መካከል እና በ 0.48 ደካማ ማህበራዊ ድጋፍ ካላቸው ግለሰቦች ቀንሷል። የማህበራዊ ግንኙነት ኖራ የተሸለ የህይወት ኖር በ -0.7(β = -0. 71, P =0.001) በ polysubstance ተጠቃሚዎች መካከል ቀንሷል እና በ 0.57 (β = -0.57, P =0.0001) ራስን ማግለል ከሚገነዘበት መካከል ቀንሷል። ደካማ ማህበራዊ ድጋፍ ካላቸው ታካሚዎች መካከል የአካባቢ ጤና ኖራ የተሸለ ኖር በ 0.532 (β = 1.125, p-value=0.0001) ቀንሷል።

የፖሊሲ ምክሮች

- የጤና ጥበቃ ሚኒስቴር፣ የጉምሩክ ባለስልጣን እና ህግ አስከባሪ ኤጀንሲዎች የፖሊ/ንጥረ ነገር አጠቃቀምን የሚቀንሱ ስልቶችን መተግበር እና ማስተዋወቅ አለባቸው።
- የጤና ተቋማት ከመያዶች ጋር በመተባበር የማገገሚያ ማዕከላትን በማቋቋም የምክር አገልግሎት መስጠት አለባቸው።
- የማህበረሰብ መሪዎች፣ የሀይማኖት ተቋማት፣ ዩኒቨርሲቲዎች እና ትምህርት ቤቶች በአደንዛዥ እፅ አጠቃቀም ላይ ግንዛቤ መፍጠር አለባቸው።
- የማህበረሰብና የሃይማኖት አባቶች መገለልን በመቀነስ ማህበራዊ ድጋፍን በማስፋት ግንባር ቀደም ሚና ሊጫወቱ ይገባል።

በምስራቅ ኢትዮጵያ በሚገኙ ሆስፒታሎች ውስጥ ከፍተኛ የሆነ ከቆዶ ህክምና በኋላ ኢንፌክሽን እና ዝቅተኛ የመከላከል ተግባር በጤና አገልግሎት ሰጭዎች ላይ ይታያል

መሀመድ የሱፍ፣ ቡርቃ መሀመድሳነ፣ ጀማል አብደላ፣ አህመድመዋወር አብዱ፣ ሁሴን መሀመድ፣ መሀመድ አብዱርኪ፣ አሜ መሀዲ፣ ፋአድ አደም፣ አብዲ አሚን

የጤና እና ህክምና ሳይንስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ

ቁልፍ መልዕክቶች

- በምስራቅ ኢትዮጵያ የሚገኙ ሆስፒታሎች ቀላል የማይባሉ (13.98%) ታካሚዎች በቆዶ ሕክምና ጋር የተያያዘ ከቆዶ ሕክምናው በኋላ ኢንፌክሽን ይይዛቸዋል፡ ግራም-ኔጋቲቭ ባክቴሪያዎች ለበሽታው በይበልጥ መንስኤ (66.10%) እነደሆኑ ተገኝተዋል።

- ከቆዶ ሕክምና በፊት የሆስፒታል ቆይታ ጊዜ፣ የቅድመ-ህመም፣ የቆዶ ጥገና ላይ የቆይታ ጊዜ፣ የኤንቲባዮቲክ መከላከያ / ኢንፌክሽን መከላከያ አንቲባዮቲክስ/መድሃኒት፣ ፣ አጠቃላይ ጤንነታቸው እና ከቆዶ ጥገናው የሚመጣ የቁስል አይነት ከቆዶ ሕክምናው በኋላ ኢንፌክሽኑ መንስኤዎች ሆነዋ ተይተዋል።

- ለመድኃኒት የተጋላጭነት መሰረት በመደበኛነት በቆዳ ላይ የሚኖሩ ባክቴሪያዎች (ስቴፍሎ ኮከስ ዝርያዎች) ፣ ክሌብሲየላ ዝሪያ እና በመደበኛነት በሆድ ዉስጥ የሚኖሩ ባክቴሪያዎች (ኢ. ኮላይ) ከሁላትና ከዚያ በላይ መድኃኒቶች የተለመዱ/የሚቋቋሙ ሆነዉ ተገኝተዋል።

- በቆዶ ጥገና እና በወሊድ ክፍል ውስጥ ያሉ ነርሶች ብዙውን ጊዜ የቆዶ ጥገና ቦታን ኢንፌክሽን ለመከላከል ጥሩ ልምዶችን አይከተሉም።

መግቢያ

የቆዶ ጥና ቦታ ኢንፌክሽን (SSI) ከጤና አጠባበቅ ጋር የተያያዘ ኢንፌክሽን አይነት ነው። በቆዶ ጥገናው ቦታ በ30 ቀናት ውስጥ ቆዶ ጥገናበተሰራበት ቦታ እና/ወይም ስር ያለ ቦታዎች እና የአካል ክፍሎች አካባቢ የሚከሰት ኢንፌክሽን ነው። በህክምና ተቀማጥ/ ሁኔታ ውስጥ አስጊ የመሀበራሰብ ጤና ፈተና ሆኖ ይቆያል። በሆስፒታል ከሚያዙት ኢንፌክሽኖች አጠቃላይ ቁጥርከፍተኛዉን ድርሻ ይይዛል። ዙሪላያም በበሽተኛኙ የጤና አጠባበቅ ወጪዎች፣ በህመም እና በአለም አቀፍ ሞት ላይ ትልቅ ተጽእኖ አለው። በቆዶ ሕክምና ክፍል አሥራር፣ በመሳሪያዎች

የማምከን ዘዴዎች፣ የተሻሉ የቆዶ ሕክምና ዘዴዎች እና የኢንፌክሽን መከላከል ስትራቴጂዎች የተሻሻሉ ቢሆንም፣ በቆዶ ሕክምና ጣበረ የሚከሰቱ ኢንፌክሽኖች በማደግ ላይ ባሉ አገሮች ውስጥ ከጤና አጠባበቅ ጋር የተያያዙ ኢንፌክሽኖች ዋኛ መንስኤ ሆነው ቀጥለዋል። ከሌሎች የጤና ባለሙያዎች ይልቅ ነርሶች በቆዶ ሕክምና ቦታ ኢንፌክሽንን ለመከላከል ከፍተኛ ሚና መጫወት የሚችሉ አካላት ናቸው። ነገ ግን የቆዶ ጥገና ቦታ ኢንፌክሽን መጠን፣ መንስኤ የሆኑ ባክቴሪያዎች ፀረ ተዳዋስያን ተጋላጭነትን ፣ እና የነርሶቹ በቆዶ ሕክምና ቦታ ኢንፌክሽንን የመከላከል ልምምዶች በኢትዮጵያ በተለይም በምስራቅ የሀገሪቱ ክፍል ብዙም ጥናት አይደረግም።

አቀራሮች እና ውጤቶች

በምስራቅ ኢትዮጵያ በሚገኙ የመንግስት ሆስፒታሎች ውስጥ በሆስፒታል ላይ የተመሰረተ ጥናት ተካሂዷል። በድምሩ 801 ትላልቅ የቆዶ ጥገና ሂደቶችን ያደረጉ ታካሚዎች በዘፈቀዳ በሆነ መንገድ ተመርጠዋል እና የቆዶ ጥገና ቦታ ኢንፌክሽን (SSI) ውጤቶች ተከትለዋል። በተመሳሳይ መልኩ በምስራቅ ኢትዮጵያ በሚገኙ የመንግስት ሆስፒታሎች ውስጥ የሚሰሩ 476 በዘፈቀዳ የተመረጡ ነርሶች መካከል ዘረፈ ብዙ ጥናት ተካሂዷል። መረጃ የተሰበሰበው የታካሚ ካርዶችን በመመምምም፣ ታካሚዎችን እና ነርሶችን ቃለ መጠይቅ በማድረግ፣ ለውጤቶቹ የቆዶ ጥገና ቦታን በመመልከት እና የቁስል እንክብካቤ ልምምዶችን መደበኛ የፍተሻ ዝርዝሮችን በመጠቀም ነው። በዚህ ጥነት ለቆዶ ጥና ቦታ ኢንፌክሽን ተጋላጭ የሚያደርጉ መስራታዊ ጉዳዮች ለመገምገም ተችለዋል። ከተመከሩት ነሙናዎች መካከል 112 (13.98%) በቆዶ ሕክምና ቦታ ላይ ቁስሎች በላቦራቶሪ ላይ በተመሰረተ ምርመራ የባከቴሪያ እድገት አስገኝተዋል። ከእነዚህ ውስጥ አብዛኛዎቹ (66.1%) ግራም-ፖስቲቭ (gram-negative) ናቸው።

በመደበኛነት በቆዳ ላይ የሚኖሩ ባክቴሪያዎች(Saphylococcus species) በ36 (32.14%) እና በመደበኛነት በሆድ ዉስጥ የሚኖሩ ባክቴሪያዎች(Escherichia coli) 22 (19.6%) እና ክልበሴላ (Klebsiella) ዝርያዎች 21 (18.75%) በቅዳም ተከታል ዋናዎቹ ናቸው። የስታፊሎኮከስ ዝርያዎች በበዛት ጥቅም ላይ የዋሉ አንቲባዮቲክ መድኃኒቶች ከፍተኛ የመቋቋም ችሎታ አሳይተዋል (azithromycin(18/36), Gentamycin(16/36), cotrimoxazole(15/36), erythromycin(11/36),, tetracycline(10/36)) እና ፔኒሲሊን ጂ, ነገር ግን ለ vancomycin የተሻለ ተጋላጭነት አላቸው። Klebsiella ዝርያዎች ceftriaxone (15/21), Ciprofloxacillin (10/21) እና amoxicillin clavulanic አሲድ (8/21), ጋር ከፍ ያለ የመቋቋም

አሳይቷል, ነገር ግን ለ meropenam, Gentamycin እና piperacillin tazobactam የተሻለ ተጋላጭነት አላቸው። ኢሰቼሪቺያ ኮሊ (Escherichia coli) ለሴፍትሪአክሶን (13/22) እና ለኮትሪሞክስዞል (8/22), ከፍተኛ የመቋቋምን አሳይተ ነገርግን ለሜሮፔናም ከፍተኛ ተጋላጭነት ከዚያም ለጀንታማይሲን እና ለፒፔራሲሊን ከታዘከታምም በተመሳሳይ ተጋላጭነት አሳይቷል።

በብዝሃ-መለዋወጥ ትንተና፣ እንደ የቁስል አይነት፣ ከቀዶ ህክምና በፊት የሆስፒታል ቆይታ፣ በቀዶ ህክምና የሚቆይበት ጊዜ፣ የበሽታ መከላከያ አንቲባዮቲኮች አጠቃቀም፣ አጠቃላይ የጤና (ኤኤስኤ ዉጤት)፣ የበሽታ፣ ጫት መቃም ከኤስኤስአይ በስታቲስቲካዊ እድገት ጋር ጉልህ በሆነ መልኩ ይለያሉ (ሠንጠረዥ 1)።

ሠንጠረዥ 1. በምስራቅ ኢትዮጵያ ውስጥ በሕዝብ ሆስፒታል ውስጥ ትልቅ የቀዶ ጥገና ሕክምና ከተደረገላቸው ታካሚዎች ከ SSI ጋር የተያያዙ ምክንያቶች ሁለገብ ትንተና, 2024

ተለዋዋጭ	SSI status		COR(95%CI)	AOR(95%CI)
	Yes N(%)	No N(%)		
ዕድሜ በዓመት				
<=18	12(20.0%)	48(80.0%)	1	
19-40	83(14.6%)	485(85.4%)	0.685(0,349,1.343)	0.700(0.308,1.592)
>40	42(24.3%)	131(75.7%)	1.282(0.623,2.639)	1.203(0.481,3.006)
ያታ				
ወንድ	58(21.6%)	210(78.4%)	1.578(1.089,2.312)	.746(0.396,1.404)
ሴት	79(14.8%)	454(85.2%)	1	
የቁስል ዓይነት				
ንጹሕ	31(7.0%)	414(93.0%)	1	
የተበከለ	106(29.8%)	250(70.2%)	5.662(3.684,8.704)	14.725(8.210,26.410)*
ከቀዶ ጥገና በፊት የሆስፒታል ቆይታ				
<7ቀን	118(15.8%)	630(84.2%)	1	
>=7ቀናት	19(35.8%)	34(64.2%)	2.984(1.646,5.408)	2.452(1.113, 5.402)*
የቀዶ ጥገና ሂደት ቆይታ በ 30 ደቂቃዎች ውስጥ	16(10.7%)	134(89.3%)	1	
31-60	29(12.6%)	202(87.4%)	1.202(0.629,2.299)	1.077(0.509,2.282)
ደቂቃዎች				
>60 ደቂቃዎች	92(21.9%)	328(78.1%)	2.349(1.332,4.144)	2.598(1.217,5.546)*
የበሽታ መከላከያ አንቲባዮቲክስ				
የወሰደ	87(13.4%)	560(86.6%)	1	
ያልወሰደ	50(32.5%)	104(67.5%)	3.0951(2.062,4.644)	5.506(3.006, 10.084)*
የASA ቆጠራ				
<3	109(14.8%)	628(85.2%)	1	
=>3	28(43.8%)	36(56.2%)	4.481(2.627,7.644)	3.497(1.713,7.141)*
የኮሞራቢድ በሽታ መኖር				
የተገኘ	27(30.7%)	61(69.3%)	2.426(1.477,3.987)	4.088(2.266, 7.375)*
ያልተገኘ	110(15.4%)	603(84.6%)	1	
ሲጋራ ማጨስ				
አዎ	27(30.0%)	63(70.0%)	2.342(1.428,3.840)	1.210(0.560, 2.613)
አይ	110(15.5%)	601(84.5%)	1	
ጫት መቃም				
አዎ	74(27.7%)	193(72.3%)	2.867(1.969,4.173)	2.884(1.322, 3.613)*
አይ	63(11.8%)	471(88.2%)	1	
የአመጋገብ ሁኔታ				
መደበኛ	97(14.8%)	558(85.2%)	1	
ክብደት				
ዝቅተኛ ክብደት	22(33.3%)	44(66.7%)	2.876(1.651,5.012)	1.881(0.509,2.084)
ከመጠን በላይ	18(22.5%)	62(77.5%)	1.670(0.947,2.945)	1.030(0.724,2.738)
ክብደት				

ተለዋዋጮ	SSI status		COR(95%CI)	AOR(95%CI)
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የተበከለ	106(29.8%)	250(70.2%)	5.662(3.684,8.704)	14.725(8.210,26.410)*
ከቀዶ ጥገና በፊት የሆስፒታል ቆይታ				
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>=7ቀናት	19(35.8%)	34(64.2%)	2.984(1.646,5.408)	2.452(1.113, 5.402)*
የቀዶ ጥገና ሂደት ቆይታ በ 30 ደቂቃዎች ውስጥ				
	16(10.7%)	134(89.3%)	1	
31-60 ደቂቃዎች	29(12.6%)	202(87.4%)	1.202(0.629,2.299)	1.077(0.509,2.282)
>60 ደቂቃዎች	92(21.9%)	328(78.1%)	2.349(1.332,4.144)	2.598(1.217,5.546)*
የበሽታ መከላከያ አንቲባዮቲክስ				
የወሰደ	87(13.4%)	560(86.6%)	1	
ያልወሰደ	50(32.5%)	104(67.5%)	3.0951(2.062,4.644)	5.506(3.006, 10.084)*
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=>3	28(43.8%)	36(56.2%)	4.481(2.627,7.644)	3.497(1.713,7.141)*
የኮሞራቢድ በሽታ መኖር				
የተገኘ	27(30.7%)	61(69.3%)	2.426(1.477,3.987)	4.088(2.266, 7.375)*
ያልተገኘ	110(15.4%)	603(84.6%)	1	
ሲጋራ ማጨስ				
አዎ	27(30.0%)	63(70.0%)	2.342(1.428,3.840)	1.210(0.560, 2.613)
አይ	110(15.5%)	601(84.5%)	1	
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አዎ	74(27.7%)	193(72.3%)	2.867(1.969,4.173)	2.884(1.322, 3.613)*
አይ	63(11.8%)	471(88.2%)	1	
የአመጋገብ ሁኔታ				
መደበኛ ክብደት	97(14.8%)	558(85.2%)	1	
ዝቅተኛ ክብደት	22(33.3%)	44(66.7%)	2.876(1.651,5.012)	1.881(0.509,2.084)
ከመጠን በላይ ክብደት	18(22.5%)	62(77.5%)	1.670(0.947,2.945)	1.030(0.724,2.738)

ASA- American Society of Anesthesiologists

የጥሩ የቀዶ ጥገና ቦታ ኢንፌክሽን መከላከል ልምምድ ደረጃ 56.4% ነበር። የኢንፌክሽን መከላከያ ስልጠና መውሰድ (AOR=1.69, 95% CI:1.11-2.58), የኢንፌክሽን መከላከያ መመሪያዎችን በመጠቀም (AOR=2.45, 95% CI:1.34-4.47)፤ በቂ የሆነ የቀዶ እንክብካቤ ቁሶች (AOR=1.81፤ 95% CI:1.21-2.71, 19.91) ጥሩ እውቀት ያለው። CI: 1.21-2.71), እና ጥሩ አመለካከት (AOR=1.83, 95% CI: 1.21-2.77) ከቀዶ ጥገና ጣቢያ ኢንፌክሽን መከላከል ጥሩ ልምምድ ጋር ጉልህ በሆነ መልኩ የተቆራኙ ናቸው።

የፖሊሲ ምክሮች

- የሆስፒታል ህክምና/ክሊኒካዊ አስተዳደር የታካሚውን የሆስፒታል ቆይታ እና የቀዶ ጥገና ሂደቶችን ጊዜ ለመቀነስ ጠንክሮ *መሥራት* አለበት።

- የጤና አጠባበቅ ሰጭዎች ለክፍተኛ ተጋላጭነት ያላቸውን ታማሚዎች ስልታዊ በሆነ መንገድ መመርመር እና መለየት አለባቸው (የበሽታ ተውሳክ እና የባህሪይ ሁኔታ ያለባቸውን ታማሚዎች) እና በዚህ መሰረት ተገቢውን ጥንቃቄ ሁሉ በማድረግ በቀዶ ህክምና ቦታ የሚመጡ ኢንፌክሽኖች አደጋን ለመቀነስ፤ ለምሳሌ በቀዶ ህክምና ፀረ ተሕዋስያን መከላከል እና በቀዶ ጥገና ሂደት ሊከሰቱ የሚችሉ ጉዳቶችን መለየት ጠቀሚ ናቸዉ።

- የጤና ቢሮዎች በቀዶ ህክምና ቦታ የሚያያዙ ኢንፌክሽኖች ክትትል፣ ደረጃውን የጠበቀ የህክምና መመሪያን መከተል፣ የኢንፌክሽን መከላከል እና የሆስፒታሎችን ፀረ ተህዋሲያን አጠቃቀም ፖሊሲዎች መገምገም አለባቸው።

- የሆስፒታል አስተዳደር ደረጃውን የጠበቀ የኢንፌክሽን መከላከል መመሪያዎች መገኘት እና ተደራሽነት እና ከህክምና ቦታ የሚያዙ ኢንፌክሽኖች መከላከል ጋር የተያያዘ ቀጣይነት ያለው የአገልግሎት አሰጣጥ ስልጠና ማረጋገጥ አለባቸው።

በተመጣጣኝ ዋጋ እና በንጥረ-ምግብ የበለጸጉ ተጨማሪ የሕፃን ምግብ በከባቢ በቆላሉ ከሚገኙ ምርቶች

አንበሴ ግርማ**፣ ሰሎሞን አበራ[1]፣ ሸዋንግዛው ተከተል[1]፣ ሚኪያስ ከበደ[1]፣ ጀለኔ ገላን

[1]ሐረማያ የቴክኖሎጂ ኢንስትቲዩት ፣ ሐረማያ ዩኒቨርሲቲ ፣ ሐረማያ ፣ ኢትዮጵያ

ቁልፍ መልዕክቶች

- በአካባቢው ከሚገኙ ምርቶች ለምሳሌ በቆልት ወይም የተቀላ በቆሎ እና ለውዝ፣ ብርቱካናማው ስኳር ድንች (ሚጣጢስ)እና ቆስጣ ካሉ ከፍተኛ የንጥረ-ምግቦች ባላቸው ለሕፃናት ምግብነት ጣዕም ባለው መልኩ ሊዘጋጁ ይችላሉ።

- የፕሮቲን ይዘቱ ጥሩ የሆነ (15.35-16.39%) ፣ አስፈላጊ የሆኑ ማይክሮ ኤለመንቶች (ብረት: 7.16-10.36 mg/100g፣ β- carotene: 113.40-197.53 mg/100g)፣ የኃይል ይዘት (391.82- 440 Kcal), ፣ታኒን (2.22-5.79 mg / 100g) ተጨማሪ የሕፃናት ምግብ ተዘጋጅቷል።

መግቢያ

የምግብ እና የተመጣጠነ ምግብ እጦት ከሰሃራ በታች ባሉ የአፍሪካ ሀገራት በተለይም በኢትዮጵያ የምግብ እጥረት በሴቶች: ህፃናት እና ጨቅላ ህጻናት ላይ ከፍተኛ ጉዳት አያደርስ ነው። መጠነኛ መሻሻል ቢታይም 21.6% የሚሆነው ህዝብ የተመጣጠነ ምግብ ያላገኘ ነው። በጨቅላ ህጻናት ላይ ያለው የተመጣጠነ ምግብ እጥረት ለከፍተኛ የሞት መጠን አስተዋጽኦ ያደርጋል። ምክንያቱም ጡት በማጥባት ብቻ ከስድስት ወራት በኋላ የአመጋገብ ፍላጎታቸውን ማሟላት አይችሉም። ብዙ ጨቅላ ሕፃናት የተለያዩ፣ በንጥረ-ምግብ የበለጸጉ ምግቦችን አያገኙም፣ ኢንፌክሽኖች (infections) እና ለበሽታዎች(diseases) ተጋላጭ ይሆናሉ። በምስራቅ ሐረርጌ በብዛት በእህል ምግብ ላይ የተመሰረተ አመጋገብ በሚገኝበት እንደ ማሽላ ያሉ ዋና ዋና ምግቦች ያልተሟሉ አመጋገብን፣ የቫይታሚን እና ማዕድን እጥረትን በማባባስ የተመጣጠነ ምግብ እጥረትን ያስከትላል።

ከፍተኛ ጥራት ያላቸው ንጥረ-ነገር አሟይ የሸቀጥ ምግቦች ብዙውን ጊዜ ዝቅተኛ ገቢ ላላቸው ቤተሰቦች ሊገዙ የማይችሉ በመሆናቸው በአካባቢው የሚገኙ ንጥረ-ምግብ የበለጸጉ በቆላሉ ከሚገኙ የምግብ ዓይነቶችን በመጠቀም ተመጣጣኝ እና ገንቢ የሆኑ የምግብ አማራጮችን ማዘጋጀት አስፈላጊ ይሆናል። ለዚህም፣ ይህ ጥናት በአካባቢው ከሚገኙ የተለያዩ የምግብ ምንጮች ተጨማሪ ምግቦችን ለማዘጋጀት ያለመ ነው።

አቀራረብ እና ውጤቶች

በንጥረ-ምግብ የበለጸጉ ተጨማሪ ምግቦች የተዘጋጁት በአካባቢው ከሚገኙ ለምግብነት ከሚውሉ ነገሮች እንደ፣ የተቀላ በቆሎ፣ አቾሎኒ (ለውዝ)፣ ብርቱካናማው ሚጣጢስ (ድንች) እና ከቆስጣ ነው። ጥራ እቃው የተገኘው ከሐረማያ ዩኒቨርሲቲ እና ከሞዴል ገበሬዎች ነው። የናሙና ዝግጅት ከደቀቀና ከላመ ከተቀላ በቆሎ፣ ከለውዝ፣ ከብርቱካናማ ሚጣጢስ እና ከቆስጣ ዱቄት ጋር አብሮ በማደባለቅ መስራትን ያካትታል። እነዚህ በንጥረ ምግቦች የበለጸጉ ምግቦች በተለያየ መጠን በማደባለቅ 4.5% ስኳር እና 0.5% ጨው ተቀላቅሎበት በስምንት ተጨማሪ የምግብ ቅመራ በግማሽ ኪሎ ግራም ተዘጋጅተዋል። ከF1 እስከ F4 ያሉት ቀመሮች ከተቀላ እና ከ F5 እስከ F8 ደግሞ ከበቆልት በቆሎ እና ለውዝ በቅደም ተከተላቸው ተዘጋጅተዋል። ምርጫው የተመሰረተው ዱቄቶቹ በሙቀር ላይ በሚያሳዩት የተሻለ ኬሚካላዊ እና አካላዊ ጠባይ ብቃት ላይ ነው (ሠንጠረዥ 1)።

ሠንጠረዥ 1: አጠቃላይ ድብልቅ ጥምረት የሚያሳይ

ቀመር (F)	የማዋሀድ ሬሾ (%)			
	የተቀላ በቆሎ	የተቀላ አንጎሎኒ	OFSP	Spinach
F1	60	15	10	10
F2	55	10	15	15
F3	50	15	20	10
F4	45	10	25	15
	በቆልት በቆሎ	በቆልት አንጎሎኒ	OFSP	Spinach
F5	60	15	10	10
F6	55	10	15	15
F7	50	15	20	10
F8	45	10	25	15

ሠንጠረዥ 2: የተዘጋጀው የጮቅላ ህጻን ምግብ ቀመር የሃይል ሰጭነት እና የንጥረ ነገር ይዘት

ቀመር	ስብ (%)	ፕሮቲን (%)	ካልሲየም (mg /100g)	ካርቦሃይድሬት (%)	ቫይታሚን A (µg/g)	ሃይል (Kcal)
F1	10.8±0.65[a]	16.39±0.71[a]	68.97±0.73[c]	60.35 ±0.81[c]	120.32±0.78[cd]	404.19 ±2.67[ab]
F2	9.39±0.34[a]	16.18±1.31[a]	99.02±0.83[ab]	63.07 ±2.06[ba]	172.57±6.83[b]	401.60 ±6.77[ab]
F3	10.5±1.06[a]	15.68±0.52[a]	79.46±1.28[abc]	62.08 ±2.21[a]	126.99±5.89[c]	405.69 ±3.3[ab]
F4	8.10±0.39[a]	16.02±0.04[a]	90.98±0.97[abc]	61.69±0.87[c]	162.33±0.03[ab]	383.82± 2.77[b]
F5	12.4± 0.43[a]	15.60±0.46[a]	66.75±0.619[c]	60.12 ±0.54[d]	113.4±16.9[d]	412.56± 4.87[a]
F6	10.52±0.42[a]	15.35±0.38[a]	102.48±3.59[a]	61.42± 0.49[d]	186.07±5.47[ab]	401.87 ±4.55[ab]
F7	11.92±0.60[a]	16.14±0.83[a]	74.75±0.70[abc]	60.08±1.38[bc]	131.98±3.54[c]	412.21 ±4.78[a]
F8	11.31±0.24[a]	16.57±0.52[a]	84.63±0.96[ab]	59.61 ±0.08d	197.53±4.34[a]	406.64 ±1.05[ab]
CV (%)	24.21	4.77	17.67	5.58	5.06	3.28
LSD	4.567	1.32	25.76	5.89	13.52	23.09

Values represent means ± standard deviation, n=3, results are in dry basis. Means with the same superscript on the same column are not significantly different (p>0.05)

ቀመሮቹ የተነደፉት ለጮቅላ ህጻናት በተቀመጡት የአመጋገብ መስፈርቶች መሰረት የእያንዳንዱን ንጥረ ነገር ትክክለኛ ሬሾን በማካተት ነው። የሞጮረሻ ምርቶቹ በ 4.5% ስኳር እና 0.5% ጨው እንዲበለጽጉ ከተደረጉ በኋላ በትክክል ታሽገው ተከማችተዋል። የአመጋገብ ጥራቱን ለመገምገም ጥናቱ እርጥበት፣ ፕሮቲን፣ ስብ፣ ካርቦሃይድሬትስ፣ የምግብ ጉልበት (energy) እፍጋት፣ ማዕድናት እና የቤታ ካሮተን (ቫይታሚን ኤ) ይዘቶችን ለመተንተን መደበኛ ዘዴዎች ጥቅም ላይ ውለዋል። በተጨማሪም እንደ ታኒን እና ፋይቲክ አሲድ ያሉ ፀረ-አልሚ ምግቦች (anti-nutritional factors)፣ እንደ ከውሀ ጋር መዋሀድ ያሉ ጠባያት፣ እና የጣዕም መለያ ሙከራዎች ተደርገዋል።

የተመጣጠነ ማክሮ ኤለመንቶችን እና አስፈላጊ ቪታሚኖችን እና ማዕድኖችን በማቀርብ ጥናቱ ተስፋ ሰጪ ውጤቶችን አሳይቷል (ሠንጠረዥ 2)። ከተመረቱት ቀመሮች መካከል F1 እና F5 የተሻሉ የኬሚካል እና የጣዕም ተስማሚነት ያላቸው የተሻሉ የህፃናት ቀመሮች ተገኝተዋል።

ከተዘጋጁት ምግቦች ውስጥ F1 እና F5 የተመረጡበት ምክንያት በገበራዊ ባህሪያቶቻቸው፣ ዝቅተኛ ፀረ-ምግብ ይዘታቸው (በዋነኛነት ታኒን) ፣ በማዕድናት ይዘት፣ የቤታ ካሮቲን (ቫይታሚን ኤ) ይዘት እና የጣዕም ተስማሚነት ዋነኛ ባህሪያቸው ተመርጠዋል። ምንም እንኳን አንዳንድዎቹ ቀመሮቹ ከ F1 እና F5 የተሻለ ቢሆንም በኬሚካላዊ ይዘታቸው ውስጥ ያነሰ የፀረ-ምግብ ንጥረ ነገሮች (ታኒን) እና የተሻለ የጤና ተስማሚነት ስላላቸው እንዳለ እንዲቆዩ ተደርጓል።

ሠንጠረዥ 3፡ የተዘጋጀው ምግብ ከተመረጡት ገበያ ላይ ካሉ የሚሸጡ ቀመሮች ጋር ሲወዳደር

የኬሚካል ስብጥር	ቀመሮች		የንግድ ቀመር	RDA*	በአዲሱ ቀመር ከRDA ጋር ያለው ስምምነት በመቶኛ
	F1	F5	Cerelac/Faffa		
ፕሮቲን (%)	16.39	15.60	15.8/18	>15	100
ስብ (%)	10.8	12.4	10.5/5.1	10-25	100
ካርቦሃይድሬት (%)	60.35	60.12	68.4/70	64	93.9 - 94.3
ኃይል (Kcal/100g)	404.19	412.56	432/400	400-425	100
ካልሲየም (mg/100g)	68.97	66.75	600/516	500	13.4 - 13.8
ቫይታሚን A (μg/g)	120.32	113.40	400	60-180	100

በFAO እና WHO ለጨቅላ ህፃናት የሚመከር ዕለታዊ አወሳሰድ (በ1981 የተወሰደ፡ በ2006 የተሻሻለ። በ2017፣ 2019፣2023 የተሻሻለ)።

የአመጋገብ ቀመሮቹ ጥራት ከፍተኛነት በተለይ የፕሮቲን ይዘት ከ15.35% እስከ 16.57%፣የህፃናትን ፕሮቲን የአመጋገብ ይዘት በሚገባ ያሟላል። በ100 ግራም በ383.82 እና 412.56 Kcal መካከል የሚለካው የሃይል ሰጭነት መጠን ጤናማ የህፃናት እድገትን ለመደገፍ በቂ ነበር። በተጨማሪም፣ ቀመሮቹ በካልሲየም እና በቤታ ካሮቲን የበለፀጉ፣ ይህም ጠንካራ የአጥንት እድገትን የሚያበረታቱ እና በበቂ የመከላከል አቅምን የሚያነለብቱ ናቸው።

የተዘጋጁት ቀመሮች እንደ ታኒን፣ ፋይቲክ አሲድ እና ፎሊክ ይዘቶች ያሉ ፀረ-አልሚ ምግቦችን በዝቅተኛ መጠን የያዙ ናቸው ፣ በዚህም የንጥረ-ምግቡን ለሰውነት ዝግጁነትን አቅምን ያሳድጋል። በተጨማሪም፣ ቀመሮቹ የተሻሻለ ገቢር ባህሪያትን የተሻለ ከውሀ ጋር የመዋሀድ እና መሟሟትን ጨምሮ፣በተለይም ለጨቅላ ህፃናት በቀላሉ ለመዘጋጀት እና መፈጨት መቻሉን አሳይተዋል። ከጣዕም አይታ አንፃር ቀመር F1 (የተቆላ ቆሎ እና ለውዝ) እና F5 (የበቆሎ እና ለውዝ በቆልት) ለጣዕም፣ ለሸካራነት እና ለአጠቃላይ ተስማሚነት ከፍተኛ ውጤቶችን በማግኘት ነልተው የወጡ ሲሆን ይህም ለትልቅ ምርት ተስማሚ እጩዎች አድርጎ አስቀምጧል። ቀመሮቹ በዝቅተኛ ገቢ ውስጥ ባሉ ጨቅላ ሕፃናት ላይ የሚደርሰውን የተመጣጠነ ምግብ እጥረት ችግር ለመፍታት ውድ ከሆነ የሸቀጥ ምግብ ምርቶች በውጪ ቆጣቢነት አንፃር አማራጭ ይሆናሉ። የተዘጋጁት ምርቶች ዝቅተኛ ፀረ-አልሚ ምግብከታታቸው እና ከፍተኛ ለሰውነት ተስማሚነት ስላላቸው በሰፊው ተቀባይነት ይኖራቸዋል ።

የፖሊሲ ምክሮች

- ዩኒቨርሲቲዎች እና የምርምር ተቋማት የተለያዩ የሀገር ውስጥ ግብአቶችን በመጠቀም ተጨማሪ የምግብ አቀነባበር እና የምርት ጥራትን ለማሻሻል ለህበረተሰቡ፣ ለምግብ ማቀነባበሪያዎች እና ለአምራቾች የቴክኒክ ስልጠና እና ድጋፍ ሊያደርጉ ይገባል።

- የጤና ጥበቃ ሚኒስቴር እና የሚመለከታቸው ባለድርሻ አካላት ምርትን ማሳደግ እና እነዚህን ቀመሮች ከእናቶችና ህፃናት ጤና ነክ ውጥኖች ጋር በማዋሀድ ከአገር አቀፍ የስነ-ምግብ መርሃ ግብሮች ጋር ሊዋሀዱ ይገባል። ይህም የህፃናትን አመጋገብ እና የጤና ውጤቶችን በዘላቂነት ለማሻሻል ማህበረሰቦችን ማስተማር እና እነዚህን በአገር ውስጥ የተቀናጁ ተጨማሪ ምግቦች እንዲቀበሉ ለማድረግ የግንዛቤ ማስጨበጫ ዘመቻዎችን ያካትታል።

- የንግድና ኢንዱስትሪ ሚኒስቴር አነስተኛ ኢንተርፕራይዞችን እና የህብረት ስራ ማህበራትን በተመጣጣኝ ዋጋ ተጨማሪ ምግብ እንዲያመርቱ፣ በማይክሮ ብድሮች፣ በእርዳታ እና በድጎማ የገንዘብ ድጋፍ ማድረግ አለበት።

በቁ የጤና ባለሙያ እና የመመርመርያ መሳሪያ ውሱንነት ባላቸው ጠና ተቋማት ከኤችአይቪ ጋር የተገናኘ ሄፓታይተስ ቢ በሚባል ቫይረስ ለመለየት የበለጸገ የጤና ልሂቃንን እውቀት ያማከለ የሰው ሰራሽ አስተውሎት ቴክኖሎጂ

ወይንሸት ባዘዘው¹*፣ ደሳለኝ ወንድሙ¹፣ ቴዎድሮስ ጥላሁን¹፣ ሳባ ሃይሎ²፡

¹ኮምፒውተር እና ኢንፎርማቲክስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፤ ²የጤና እና ህክምና ሳይንስ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፡፡

ቁልፍ መልዕክቶች

- እንደ ምስራቅ ሀረርጌ ባሉ በቂ የጤና ባለሙያ እና የመመርመርያ መሳሪያ ውሱንነት ባላቸው አካባቢዎች የኤች አይ ቪ ጋር የተገናኘ የሄፓታይተስ ቢ በተለምዶ የጉበት በሽታን ለይቶ ለማወቅና መራጃ ላይ የተመሰረተ የምርመራ ዉሳኔ ለመስጠት ሰው ሰራሽ አስተውሎት ቴክኖሎጂን ከልሂቃን ባለሙያ ዕውቀት ጋር በማጣመር የሚከናወን የህክምና አሰራር ዜዴ ተዘርግቷል።

- የአሠራር ስርዓቱ 95.36% ከትተኛ የምርመራ ትክከለኝነት እና ከፍተኛ የተጠቃሚ ተቀባይነት አግኝቷል።

መግቢያ

ከኤች አይ ቪ ጋር የተገናኘ ኤች. ቢ. ቪ ተጓዳኝ ልክፈት በአለም አቀፍ ደረጃ ከባድ የሚሀበረሰብ ጤና ተግዳሮቶችን በመፍጠር፣ የተፋጠነ በተለምዶ የጉበት በሽታን በማስከተል የታማሚዎች እና የሞት መጠንን በከፍተኛ ሁኔታ እየጨመረ ይገኛል። በኢትዮጵያ፣ እንደ ምስራቅ ሀረርጌ ያሉ አካባቢዎች በተለይ በጤና አጠባበቅ መሠረት ልማት እና በሙያው የሰለጠነ የሰዉ ሀብት ውስንነት ምክንያት ኤች አይ ቪ ተጓዳኝ የጉበት በሽታ ልክፈት መጠን ከ 5.9% እስከ 42.8% እንደሚደርስ የምርመራ ውጤቶች ያሳያሉ። ውጤታማ አስተዳደር መደበኛ የኤችቢቪ ምርመራ፣ በሁለቱንም ቫይረሶች ላይ የሚያጣጥር የፀረ-ኤችአይቪ ቴራፒ (ART) እና የመከላከያ እርምጃዎችን እንደ የክትባት እና የጉዳት ቅነሳ ፕሮግራሞችን በመጠቆም እየተከናወኑ ይገኛል። ይሁን እንጂ የግብአት ውሱንነት ባላባቸው አካባቢዎች እነዚህን ግልጋሎቶች ለመተግበር አስቸጋሪ በማደረግ ከፍተኛ የስርጭትን ምጥነት እና ደካማ የጤና ውጤቶችን በተጋላጭ ህዝቦች ላይ ያመጣል።

ሰው ሰራሽ አስተውሎት (AI) ቴክኖሎጂ ሞዴሎችን ከጤና እውቀት ጋር በማናበብ እና በማጠናቀር የምርመራ ትክከለኝነትን በማሳደግ እና በጤና እንክብካቤ ባለሙያዎች ላይ ያለውን ጫና በመቀነስ ተግዳሮቶችን ለመፍታት ተስፋ ሰጪነቱን አሳይቷል። ይህ ጥናት የኤች አይ ቪ ተጓዳኝ የጉበት በሽታ ልክፈትን ለመመርመር እና አያያዝን ለማሻሻል የስነ-መረጃ ቴክኒኮችን በእውቀት ላይ በተመሰረተ አመክንዮት በማጣመር ፈጠራ ያለው የህክምና ብልህ አሰራርን ያስተዋውቃል። ስርዓቱ የተደበቁ ንድፎችን ከትልቅ የስነ-ውሂብ ስብስቦች ስልተ ቀመሮችን በመጠቀም የባለሙያዎችን ግንዛቤ የሚያሀይድ ደንብን መሰረት ያደረገ ሞዴል ተፈጥሯል።

በሊህቃን ዕውቀት ላይ ብቻ ከተመሠረቱ ከቀደምት አቀራሮቦች ጋር ሲነጻጸር፣ ይህ ስርዓት የተሻሻለ የትንበያ ትክከለኝነት እና ዝርዝር ውሳኔዎችን ያቀርባል። ለኤች አይ ቪ-ኤች ቢ ቪ ተጓዳኝ ልክፈት ልዩ ዳይነታዩን ያካተተ ለተጠቃሚ ምቹ የሆነ ፣ የባለሙያ እና የመርጃ ግባዓቶች ባላባቸው አካባቢዎች ውስጥ አጠቃቀምን ለማሻሻል ይዉላል። ስርዓቱ የታካሚ ውጤቶችን ለማሻሻል፣ በወቅታዊ የጤና አጠባበቅ ልምምዶች ላይ ከፍተኛ አስተዋጽዖ ለማድረግ ይረዳል።

አቀራረቦች እና ውጤቶች

የንድፍ ሳይንስ ጥናትና ምርምር (DSR) ዘዴ የፈጠራ የማሰብ ችሎታ ያለው የሕክምና ሥርዓት መነልበት እና መገምገም ላይ አፅንዖት ሰጥቶ ጥቅም ላይ ውሏል።

ስርዓቱ የስነ-መረጃ ቴክኒኮችን ከኤክስፐርት እውቀት ጋር በማጣመር ደንብን መሰረት ያደረገ የማመዛዘኛ ሞዴል አዘጋጅቷል። በዚህ ጥናት ውስጥ ጥቅም ላይ የዋለው መረጃ ከሀረማያ ዩኒቨርሲቲ ህይወት ፋና ኮምፒረሄንሲቭ ስፔሻላይዝድ ሆስፒታል ከ2016 እስከ 2022 በኤች አይ ቪ እና ኤች.ቢ.ቪ ጋር የተገናኘ የ1,108 ሕመምተኞችን ጉዳይ የተገኘ መረጃ ላይ የተመሰረተ ነው። ቁልፍ ባህሪያቱ ያካተተው የታካሚ ስነ-ሕዝብ፣ ክሊኒካዊ መስፈርቶች እና የአክምና ታሪኮች፣ በአጠቃላይ 32 ባህሪያትን አካት ዋል። ጥብቅ የውሂብ ቅድመ-ውብ ቅንበር ለምደባ ስልት ቀመሮች ከፍተኛ ጥራት ያለው ግብዓት አረጋግጧል፣ ይህም የጥፍ አጠር (outlier) ማስወገድን፣ የጎደሉ ዋጋዎችን መገመት እና እርቃ (normalization) ማድረግን ይጨምራል። የመረጃ ግኝት የማመዛዘኛ ስልት ቀመር በመጠቀም ለዛህ ምርጫ 19 ቁልፍ መለዮዎችን ለመተንተን ለይቷል። የተንበይ ትክክለኛነትን ለመገምገም አራት የስነ-መረጃ ምደባ ስልት ቀመሮች (PART፣ JRip፣ J48 እና REPTree) ተተግብረዋል። የ PART ክላሲፋየር ከፍተኛውን ትክክለኛነት በማሳየት በጣም ውጤታማው ሞዴል ተብሎ ተለይቷል። በ PART አልጎሪዝም የተፈጠሩት ደንቦች ከኤክስፐርት ግብአት ጋር ተጣምረው የስርዓቱን የእውቀት መሰረት ፈጥረዋል።

ተግባራዊ ትግበራን ለማረጋገጥ የስርዓቱ አጠቃቀም እና አፈፃፀም በልዩ ባለሙያያን የበለጠ ተፈትኗል። ግኝቱ እንደሚሳየው የዳበረው ብልሁ የሕክምና ሥርዓት በየባለሙያ ውሱን አካባቢዎች ውስጥ ምርመራንና አያያዝን

ለማሻሻል ከፍተኛ አቅም እንዳለው አሳይቷል። ዋናዎቹ ግኝቶች በሰንጠረዥ 1 ውስጥ ቀርበዋል።

ሠንጠረዥ 1 ላይ እንደሚታየው የስርአቱ የአፈጻጸም ትንተና የ PART ስልት-ቀመር ከፍተኛ ትክክለኛነት በ95.36% የላቀ ደረጃ አጉልቶ ያሳየ፣ እና ከሁሉም የተገመገሙ ሞዴሎች መካከል ዝቅተኛው አወንታዊ ውጤቶችን የሚሰጡ የሁሉም አሉታዊዎች ተመን (FPR) ያለው ነው። በስርአቱ አመክኑኦአዊ ሞዴል ደንብ ላይ የተመሰረተው ሎጂካዊ ቅንበር ተግባራዊነት እና ወጥነት በጤና አጠባባቅ ባለሙያያን መረጋገጡን አሳይቷል። በተጨማግሪም ስርዓቱ ከፍተኛ የመመርመሪያ አስተማማኝነት በትክክል ከ 432 ኤች ቢ ቪ ምርመራ 408 አዎንታዊ ዉጤቶች እና ከ 668 ኤች. ቢ. ቪ ምርመራ 641 አሉታዊ ዉጤቶች አሳይቷል። (ሠንጠረዥ 2)።

በዚህ ጥናት ውስጥ የተገነባው የሕክምና ልሕቀት ሥርዓት በኢትዮጵያ አንደ ምስራቅ ሐረርጌ የባለሙያ እና የመረጃ ግብዓቶች ውስንነቶች ባላቸው ቦታዎች ውስጥ የኤች አይ ቪ-ኤች. ቢ. ቪ ተጓዳኝ ልከፈት በሽታዎችን ለመመርመር እና ለመቆጣጠር ተስፋ ሰጥቷል። የስነ-መረጃ ቴክኒኮችን እና የባለሙያያንን እውቀት በማዋሀድ ስርዓቱ የመርመራ ትክክለኛነትን ያሻሽላል፣ በልዩ ባለሙያያን እና የላቀ የምርመራ መሳሪያዎች ላይ ያለውን ጥገኛነትንም ይቀንሳል። ይህ በተለይ ለጤና አጠባባቅ የባለሙያ እና የመረጃ ግብዓቶች ውስንነት ባለባቸው ክልሎች ውስጥ በጣም አስፈላጊ ነው።

ሠንጠረዥ 1፡ የምደባ ስልት ቀመር የአፈጻጸም መለኪያዎች

Algorithm	Accuracy (%)	Precision	True Positive Rate (TPR)	False Positive Rate (FPR)	F-Measure
PART	95.36	0.954	0.954	0.050	0.954
JRip	95.00	0.950	0.950	0.052	0.950
J48	95.09	0.951	0.951	0.060	0.951
REPTree	95.36	0.954	0.954	0.056	0.954

ሠንጠረዥ 2፡ የግራ መጋባት ማትሪክስ ለPART ክላሲፋየር

	የተገመተው ኤች. ቢ. ቪ አዎንታዊ (Predicted HBV Positive)	የተገመተው ኤች. ቢ. ቪ አዎንታዊ (Predicted HBV Negative)
ኤች. ቢ. ቪ አዎንታዊ (HBV Positive)	408	24
ኤች. ቢ. ቪ አሉታዊ (HBV Negative)	27	641

የተዘጋጀው ስርዓተ ሕክምና የባለሙያ እውቀትን ከስነ-መረጃ ቴክኒኮች ጋር በተለያየም የPART ምደባ ስልት-ቀመርን በማጣመር ከፍተኛ የምርመራ ትክክለኛነት በአስር እጥፍ በማስረገጥ 95.36% በማሳካት በ 95.4% ትክክለኛነቱን አረጋግጧል። በጤና አጠባበቅ ባለሙያያጦች ጥሩ ተቀባይነት ያገኘ ፤የተጠቃሚውንም እርካታ 89.44% ያስመዘገበ ሲሆን ይህም ለተጠቃሚ ምቹ የሆነ በይነገጽ እና አጠቃቀሙን የሚያሳሹሉ ተግባራዊ ምክንያት ነው። በተጨማሪም ስርዓቱ በልዩ ባለሙያያጦች እና የላቀ ምርመራዎች ላይ ያለውን ጥገኝነት በመቀነስ፣ ወቅታዊ እና ትክክለኛ ምርመራዎችን በማድረግ፣ የታካሚ ውጤቶችን በማሻሻል እና የጤና አጠባበቅ ሽክሞችን በማቃለል በባለሙያ ውሱንነት ባለባቸው ውስጥ ቁልፍ ተግዳሮቶችን ይፈታል።

የስርዓቱ ከፍተኛ ትክክለኛነት እና የተጠቃሚ ተቀባይነት ለገሃዱ አለም አተገባበር ያለውን አቅም ያሳያል። የ PART ክላሲፋየር 95.36% ትክክለኛነት አስተማማኝ ትንበያዎችን የሚያረጋግጥ ሲሆን ስርዓቱ ለተጠቃሚ ምቹ የሆነ በይነገጽ መሆኑ በጤና እንክብካቤ አቅራቢዎችም ዘንድ ተቀባይነት እንዲኖረው ያደርገዋል። በተጨማሪም፣ የተቀነሰው የውሸት አወንታዊ ተመን (5.0%) አላስፈላጊ ህክምናዎችን በመቀነስ የህብት አጠቃቀምን ያሻሻላል (ሠንጠረዥ 3)።

ከኤችአይቪ ጋር የተገናኙ የኤች.ቢ.ቪ. አዳዲስ እና ሊሰፉ የሚችል መፍትሄዎችን ይፈልጋል። የታቀደው የሕክምና ልህቀት ሥርዓት ወጪ ቆጣቢ እና ትክክለኛ የመመርመሪያ መሣሪያ በመሆን ለጤና አጠባበቅ ውሱን የባለሙያ እና የመረጃ ግባዓት ላላቸው ክልሎች ተስማሚ ነው።

ሠንጠረዥ 3: የPART አልጎሪዝም(ስነ-ቀመር) የአፈጻጸም መለኪያዎች

መለኪያ	ዋጋ
Accuracy	95.36%
Precision	95.4%
True Positive Rate (TPR)	95.4%
False Positive Rate (FPR)	5.0%
User Satisfaction Score	89.44%

የፖሊሲ ምክሮች

- የጤና ጥበቃ ሚኒስቴር ሰውሰራሽ አስተውሎት የመመርመሪያ መሣሪያዎችን ቅልጥፍናን እና ወጥነትን ለማሻሻል ከሀገር አቀፍ የኤች. አይ. ቪ. እና የኤች. ቢ. ቪ. አስተዳደር ፕሮግራሞች ጋር በማዋሃድ ሊሰራ ይገባል።

- የክልል ጤና ቢሮዎች የጤና አጠባበቅ ውጤቶችን ለማሻሻል፣ የህብት አጠቃቀምን ለማመቻቸት እና በኤች አይ ቪ-ኤች. ቢ. ቪ ከፍተኛ የስርጭት አካባቢዎች የሚከሰቱ በሽታዎችን እና የሞት መጠንን ለመቀነስ በሰውሰራሽ አስተውሎት ሕክምና ለሚታገዙ የምርመራ መሣሪያዎች ቅድሚያ መስጠት እና ማሳደግ አለባቸው።

- የጤና ጥበቃ ሚኒስቴር፣ የኢትዮጵያ ህክምና ማህበር እና ዩኒቨርሲቲዎች በሰውሰራሽ አስተውሎት ሕክምና ለሚታገዙ የምርመራ መሣሪያዎች አጠቃቀምን ውጤታማነት ለማረጋገጥ ለጤና አጠባበቅ ሰጭዎች ስሬ ስልጠና ሊሰጡ ይገባል።

- የገንዘብ ሚኒስቴር በሰውሰራሽ አስተውሎት እውቀት ላይ የተመሰረቱ ስርዓቶችን በሀብት ውሱን በሆኑ ቦታዎች ላይ ለመዘርጋት እና ዘላቂነትን ለማረጋገጥ የገንዘብ እና የመሰረተ ልማት ዝርጋታዎችን ቅድሚያ ሊሰጥ ይገባል።

ሐረማያ ዩኒቨርሲቲ
የምርምር ጉዳዮች ጽ/ቤት

የቦረና ሴቶች መዋቅራዊ አለኩላነት በመዋጋት እና ግጭትን በመለወጥ ረገድ የነቃ የሴቶች ኃይል ምልክቶች ናቸው

ተስፋዬ ጉደታ ገርባ[1]*፣ጉተማ ኢማና ቀኖ[1]፣ሙሉ ብርሃኑ ሁንዴራ[1]* ፣ ፍቃዱ አዳኛ ቱፋ[2]

[1]የሕብረተሰብ ሳይንስ እና ስነሰብ ኮሌጅ፣ ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ፣ [2]የማህበራዊ ሳይንስ ኮሌጅ፣ አዲስ አበባ ዩኒቨርሲቲ፣ ኢትዮጵያ

ቁልፍ መልዕክቶች

- የቦረና ሴቶች ለሰላም ግንባታ፣ አመራር እና መዋቅራዊ ተበላላጭነት/አለኩልነት/ በመቋቋም በአመራር እና ውሳኔ አሰጣጥ ውስጥ የሚሳተፉ ንቁ የለውጥ ወኪሎች ናቸው።

- የቦረና ሴቶች የቤተሰብ የነ� ደንቦችን ይሞግታሉ፣ በኢኮኖሚያዊ እንቅስቃሴዎች ይሳተፋሉ ፣ ልማዳዊ ህጎችን በተለያዩ አገላለጾች ለምሳሌ እንደ ህዝብ ዘፈኖች፣ አባባሎች እና ተረቶች ይቀርፃሉ።

- የቦረና ሴቶች በህብረተሰቡ ውስጥ ያላቸው ሚና የሴቶችን መዋቅራዊ ተበላላጭነት/አለኩልነት/ን በመዋጋት ረገድ ያላቸውን ንቁ እና የተለያዩ ሚናዎች የሚያመለክቱ የሴቶችን ፅንሰ-ሀሳቦችን ያበረክታሉ።

መግቢያ

የአፍሪካ ሴቶች የግጭት ሰለባ ተደርገው የሚታዩ እና በወንዶች ጥበቃ ላይ የተመሰረቱ እንደሆኑ መሳል በምሁራን ትርክቶች ውስጥ ዋነኛው ነው። ይህ ትርክት ብዙውን ጊዜ በአፍሪካ ማኅበረሰቦች ውስጥ የሴቶችን ጉልህ ሚና በታሪክ ስትራቴጂስቶች፣ የአኩላነት ተሟጋቾች እና የማኅበረሰብ መዋቅሮች ቀራጭ መሆናቸውን ቸል የተባለ ነው። ሴቶች መዋቅራዊ ተበላላጭነት/አለኩላነት/ ን እና ጨቋኝ ስርዓቶችን በመቃወም፣ ለአኩልነት ሙብቶች ማኅበራዊ እና ፖለቲካዊ እንቅስቃሴዎችን በመምራት እና የቤተሰብ የነነ ሚነ መሪነት ተለዋዋጭነትን ተገዳድረዋል።

ነገር ግን እንዚህን እኩልነት በመፍታት ረገድ የሴቶች ሚና (በተለይ በኦሮሞ ማህበረሰብ ውስጥ) በበቂ ሁኔታ አልተጠናም። ይህ ጥናትም የተገለጸውን ክፍተት ለመሙላት ያለመ ሲሆን የቦረና ኦሮሞ ሴቶች መዋቅራዊ አለመመጣጠንን በመቅረፍ በገዳ ስርዓት ውስጥ በሚኖራቸውተሳትፎ እና በ� ሠላም፣ በግጭት እና በድህረ-ግጭት ጊዜያት የባሀል ጥቃቶችን እና እኩልነትን ለመቅረፍ በሚያደርጉት ጥረት ላይ ያተኩ ነው።

አቀራረቦች እና ውጤቶች

ጥናቱ የተካሄደው በኦሮሚያ ብሄራዊ ክልላዊ መንግስት በቦረና ዞን በደቡብ ኢትዮጵያ የኢትኖግራፊ ጥናት ዲዛይን በመጠቀም ነው። ቁልፍ መረጃ ሰጭዎችን እና የትኩረት ቡድን ውይይቶችን ለመለየት አላዊ ናሙና እና እስኖ보ል ናሙናዎችን ተጠቅሜል። መረጃው ከአፋን ኦሮሞ ወደ እንግሊዘኛ የተተረጎመ እና የቴማቲክ ትንትና ቴክኒክን በመጠቀም የተተነተነ እና ከመፅሕፍት፣ ከመፅሄቶች፣ መጣጥፎች እና ከሪፖርቶች በተገኙ ሁለተኛ ደረጃ መረጃዎች ላይ ተሻጋ በሆነ መልኩ ተረጋግጦ አስተማማኝነትን እና ጥልቀትን ይጨምራል።

ፎክሎርን በአመራር እና በውሳኔ አሰጣጥ መዋቅራዊ ተበላላጭነት/አለኩልነት/ ለመፍታት እንደ መሳሪያ፡- የቦረና ሴቶች የቤተሰብና ነነ የወንዶች በላይነት ደንቦችን ለመቃወም እና ተቃውሟን ለመግለጽ በፖለቲካ ውሳኔዎች በአመራር እና በስልጣን ተለዋዋጭነት ላይ ተፅእኖ ለመፍጠር ባህላዊ ዘፈኖችን ፣ አባባሎችን እና ተረቶችን ይጠቀማሉ።

በቃሬ ዘፈኖች ቅሬታዎችን ይቀርባሉ፤ ኢፍትሃዊ ውሳኔዎችን ይሰላቃሉ፤ ማህበራዊ ለውጥንም ይጠይቃሉ። ለምሳሌ የቃሬ ባህላዊ ዘፈን ስጋቶችን ለመግለጽ እና ኢፍትሃዊ ውሳኔዎችን ለመቃወም ያገለግላል። እንደ ማገድ ለቀማ እና ውሃ መቅዳት ባሉ

ተግባራት ላይ የቦረና ሴቶች ስጋታቸውን እና ቅሬታቸውን ለመግለጽ የቃሬ ዘፈኖችን ይዘፍናሉ። እነዚህ ዘፈኖች በሻማግሌዎች በትኩረት የደመጣሉ። በውሳኔያቸውም ላይ ተጽዕኖ ያሳድራሉ። : ሴቶቹ እንዲህ ሲሉ ዘፈኑ:

Lafa hamtuu karaa hinqabne
Gumee hamtuu garaa hinqabne
Nama haaloo baasii hinqanee
booyee callisii hinqabe
Ani booyee callise

ምንም የመዳረሻ መንገዶች የሌሉበት አደገኛ ቦታ
የማይቀና ቁንጆ
ለመበቀል ያልተጠየቀ ሰው እና
ማልቀሱን እንዲያቆም ያልተጠየቀ ሰው.
አለቀስኩ፤ ግን ዝም አልኩና ታገስኩ።

እነዚህ ባህላዊ አገላለጾች ፤ሴቶች ደካማ አስተዳደርን ለመተቸት እና በወንድ የበላይነት የተሞሉ መዋቅሮችን ለማፋለስ እንደ ተቃውሞ እና ማበረታቻ ሆነው ያገለግላሉ።

የቦረና ሴቶች የገዳ መሪዎችን በመምረጥ እና በማፅደቅ፤ ኢፍትሃዊ ህጎችን በመቃወም እና የማህበረሰብ አስተዳደርን በመቅረፅና በማስተፍ በአመራር ላይ ከፍተኛ ተጽዕኖ ያሳድራሉ። በአማራ እና ውሳኔ አሰጣጥ ላይ ያላቸው ግንዛቤ እና ተሳትፎ የህብረተሰቡን መዋቅር ይለውጣል፣ ያካትታል እንዲሁም ያስለብጣል። ዳዋ ነቦ የተባለው የቦረና ጋዳ መሪ (1706-1714 እ አ አ) በጉሚ ጋዮ ጉባኤ ውስጥ በተመሳሳይ የነሳ አባላት መካከል ጋብቻን መከልከልን በተመለከተ እንደ ተረት ተረት ነበር። አማካሪው አቶ ዱቤ ህጉን ተቃውመው፤ ሴቶችን በህዝብ ዘፈን እና በጉባኤው ድጋፍ በማግኘታቸው፤ ህጉ እንዳይሆን ከለከሉ። ሴቶቹ የዳዋን አገዛዝ አለመቀበል በሚከተለው ጥቅስ ላይ ተጠቀሟል።

"Kan Daawwee daawuma;

Kan Dubbe Dubbuma;

Waan Daawwen jette nu dhageetuma"

የዳዋ አስተያየት ቆሻሻ ወይም ሞኝነት ነው።
የዱቤ ሃሳብ ከፍ ያለ/እንደበት ርቱዕ ነው።

ሴቶቹ ነጎቤን የመደመር እና የየታ እኩልነትን ዋጋ የተገነዘበ አስተዋይ ሰው አድርገው ይመለከቱት ነበር። በእንዱሩ፤ የዳዋን ሐሳቦች ሴቶች ጥበበ፣ ማስተዋል እንደጎደለው አድርገው በመመልከት ውድቅ አድርገውታል። ከዚያም የቦረና ገዳ ምክር ቤት እንዲሁም ጉሚ ጋዮ ማንኛውንም ህግ ወይም ውሳኔ ከማውጣቱ በፊት የሴቶችን አመለካከት እንዲያዳምጡ በማሰብ በህዝባዊ ዘፈኖች የተደገፉ እና የጆጁኤ እውቅና አግኝቶ በመጨረሻም ይፋዊ ህግ እንዳይሆን ተደረገ። የማህበረሰቡ ህይወትን ማቆየት፤ የቦረና ሴቶች በከብት እርባታ፣ ንግድ እና በከብት እርባታ ላይ በንቃት ይሳተፋሉ። የእነርሱ ተሳትፎ አቅምን ፣ ማካተትን እና የገንዘብ ነፃነትን ያስለብጣል። እንደ ማር ባሉ ባህላዊ አደረጃጀቶች የኢኮኖሚ እኩልነትን እና የምግብ ዋስትናን ያበረታታል። ባህላዊ የስራ ሚናዎችን እንደገና ይበይናሉ እንዲሁም ለማህበረሰብ ህልውና አስተዋፅኦ ያደርጋሉ።

የባህላዊ ህጎች እና የአስተዳደር መዋቅሮች፦- የቦረና ሴቶች መዋቅራዊ እኩልነትን የሚያሟሙትን ልማዳዊ ህጎችን በማውጣት ለሴቶች ጥበቃ እና መብት ቅድሚያ በመስጠት፤ የወንዶችን ጉልበተኝነት በመደገፍ ሳይሆን በሴቶች ላይ የበላይነትን እንዳይኖራቸው በማሳየት ነው። እነዚህ ህጎች ሴቶችን ለሚጎዱ፤ ጥቃትን እና መድልዎ በመቃወም ግለሰቦችን ተጠያቂ ያደርጋሉ።

የቦረና ጉሚ ጋይዮ (ጠቅላላ ጉባኤ) የሴቶች ድምጽ በውሳኔ አሰጣጥ ውስጥ ማዕከላዊ መሆናቸውን ያረጋግጣል። እኩል እድሎችን ይሰጣል። እነዚህን ህጎች በማስተካከል የቦረና ሴቶች የየታ ልዩነቶችን በንቃት ይዋጋሉ ። ለፍትህ እና ለእኩልነትም ይሟገታሉ።

በግጭት መ�``፤ጫ ወስጥ የሴቶች ሚና፦ በቦርነት ጊዜ፦- በግጭት ውስጥ ያሉ የቦረና ሴቶች የሥርዓተ-የታ ደንቦችን ይቃረናሉ። እኩልነትን በንቃት ይቃወማሉ። እንደ ተዋጊ ሆነው አገልግለዋል። ወሳኝ ድጋፍ ያደርጋሉ። እንደ ምግብ እና ውሃ ያሉ ሀብቶችን ጨምሮ፤ ባህላዊ የሥርዓተ-የታ ሚናዎችን ያፈልሳሉ። ይህ ተሳትፎ ሴቶችን ያበረታታል፣ ማህበራዊ ተዋረዶችን ይቀርፃል። የስርዓተ-የታ ተለዋዋጭነትን ይለውጣል። በሰላም እና በግጭት ውስጥ ያላቸው እኩል ሚና ያሳያል። የተኩስ አቁም፦- የቦረና ሴቶች ወሳኝ የሰላም መልእክተኞች (ሊቾ) ፣ ግጭቶችን አስታራቂ ናቸው። በሃይይ (ዳኞች) መካከል ያሉ የተለያዩ ቡድኖች አማላጅ በመሆን ወደ ጠላት ዝጋት በመግዛ የሰላም ንግግሮችን በማዘጋጀት ውጥረቱን ለማርገብ በዳኞች መካከል ማዕከላዊ ሆነው ይሥራሉ። ይህ ባህላዊ የሥርዓተ-የታ ሚናዎችን የሚገዳደር፣ ሰላም የማስፈን ችሎታቸውን በማሳየት የረጀም ጊዜ ሰላምን፣ እርቅን እና የየታ እኩልነትን የማስተዋወቅ ሚና አለው። የታሙኑ የሰላም ፈጣሪዎች

እንደመሆናቸው መጠን ብሔረሰቦችን ያጎናፅሉ፣ መባባስን ይከላከላሉ፣ የማህበራዊ ለውጥ ወኪሎች ሆነው ያገለግላሉ። ከጦርነቱ በኋላ፡- ከግጭት በኋላ የቦረና ሴቶች በሰላም ግንባታ እና በኢኮኖሚ ተሳትፎ ስል እኩልነት ይምግታሉ። እንደ ሊቆች የሥርዓተ-ፆታ ደንቦችን የሚገዳደሩ የሰላም ነገሮችን ያመቻቻሉ። በኢኮኖሚም ረገድ የክብቶቻቸው እርባታ፣ ግብይት እና የወተት ምርታቸው እና በገንዘቦቸው ነፃ ተጠቃሚነትና ለለፋ የውሳኔ ሰጪነት አቅም እንዲኖራቸው ያደርጋቸዋል። የእነሱ ማህበራዊ አውታረ መረቦች (ማሮ) የማግብ ዋስትናን እና የማህበረሰብን የመቋቋም አቅምን ያሻሽላሉ። ስለዚህ የቦረና ሴቶች ከግጭት በኋላ የበለጠ ሁሉንም ያሳተፈ ማህበረሰብን ያጎለብታሉ።

መዋቅራዊ ተበላላጭነት/አለኩልነት/ ለመፍታት የሴቶች ተግዳሮቶች:- የቦረና ሴቶች በባህላዊ ደንቦች፣ በአባቶች ስርአት፣ በሀብት ውስንነት፣ በአየር ንብረት ለውጥ እና በግጭት ምክንያት መዋቅራዊ ተበላላጭነት/አለኩልነት/ን ለማሽነፍ ትልቅ ፈተና ይገጥማቸዋል። እነዚህ መሰናክሎች በውሳኔ አሰጣጡ ላይ ያላቸውን ተሳትፎ ይገድባሉ፣ በቤት ውስጥ ሚናዎች ብቻ እንዲገደቡ እና ከጥረታቸው በስተጀርባ ጠቃሚ አስተዋፅዖዎች ቢኖራቸውም እኩልነትን ለማስፈን ያላቸው ሚና ይገድባሉ። እንደ መሬት እና ብድር ያሉ የሃብት አቅርቦት ውስንነት ኢኮኖሚያዊ ነፃነታቸውን ያደናቅፋል ፣ መገለልንም ያጠናክራል። በግጭት ቀጣናች መፈናቀል፣ የኑሮ ውድመት እና ለጥቃት ተጋላጭነት መጨመር ለመብታቸው መሟገት አቅማቸውን ይገድባል። በሴቶች ላይ ለሚፈጸሙ ጥቃቶች ያለመከሰስን፣ ፍርሀትን እና ዝምታን ያስፋፋል፣ በጾታ ላይ የተመሰረተ ኢፍትሃዊነትን የማስወገድ ተግዳሮትን ያስከትላል።

የፖሊሲ ምክሮች

- የሠላም ሚኒስቴር የቦረና ሴቶችን የሽምግልና እና የሰላም ገንቢነት ሚናን በየደረጃው ካሉ መደበኛ እና ኢ-መደበኛ የሰላም ድርድርና የውሳኔ አሰጣጥ ሂደቶች ጋር በማዋሃድ በይፋ ሊገነዘብ ይገባል። ይህም በግጭት አፈታት፣ በድርድር እና የሰላም ግንባታ እና ሰላም መፍጠር ክህሎቶቻቸውን ለማሳደግ ፕሮግራሞችን በመንደፍና በማስልጠን ማሻሻል ይችላል።

- የፍትህ ሚኒስቴር ከሚመለከታቸው ባለድርሻ አካላት ጋር በመተባበር የሴቶችን አመለካከት ከግጭት እና ከሰላማዊ ፅንሰ-ሀሳብ ጋር በማዋሃድ የህግ ማዕቀፎችን እና የማስፈጸሚያ ዘዴዎችን በማጎልበት የስርዓተ-ፆታ ልዩነቶችን በመቀነስ ለሰላም ግንባታ የበኩላቸውን አስተዋጽኦ ሊያደርጉ ይገባል።

- ግብርና ሚኒስቴር ከፋይናንስ ተቋማት ጋር በቅንጅት በመስራት የቦረና ሴቶችን ኢኮኖሚያዊ ነፃነትን ለማጎልበት የምርት ግብአት (መሬት፣ ብድር፣ የንግድ ዕድሎች) ተጠቃሚነትን ለማሳደግ ሊሰራ ይገባል።

ሰላምና እርቅ በግጭት ቀጠናዎች፡ የቦረና ድንበር ተሻጋሪ ለሰላም ፕሮጀክት ሚና

ጋዲሳ ተስፋዬ[*] እና ሪቻርድ ዌንትዘል[1]

[1]የህግ ኮሌጅ ፤ሐረማያ ዩኒቨርሲቲ፣ ኢትዮጵያ

ቁልፍ መልዕክቶች

- የቦረና ድንበር ተሻጋሪ ለሠላም ኢኒሼቲቭ ፕሮጀክት በቦረና ዞንና አጎራባች አካባቢዎች የህብረተሰቦችን ትብብርና የግጭት መከላከልን በእጅጉ አሻሽሏል።

- በፕሮጀክቱ በተወሰዱት እርምጃዎች የጋራ እውቅናን አመቻችተዋል፤ የህብት መጋራትን አሳድጓል፤ እንዲሁም የአካባቢ ሰላም ግንባታ አቅምን በውይይት፣ በግንዛቤ ማስጨበጫ ዘመቻዎች እና በህብረተሰቡ ቀጥተኛ ተሳትፎ ማሳደግ ችለዋል።

- ፕሮጀክቱ የአካባቢ ተቋማትን የግጭት መከላከል እና አፈታት አቅማቸውን ያሳደገ ከመሆኑም በላይ የሴቶችና ወጣቶችን በሰላም ግንባታ ተግባራት ላይ ያላቸውን ተሳትፎ በእጅጉ አሳድጓል።

መግቢያ

የብሔር ግጭት የተለያዩ ብሔረሰቦች ለፖለቲካዊ ሥልጣን፣ ለኢኮኖሚያዊ ሀብቶች፣ ለባህላዊ የበላይነት እና መሬትን ለመቆጣጠር የሚያካሂዱት የግጭት ዓይነት ነው። እነዚህ ግጭቶች የሚከሰቱት በተጨባጭ ወይም በሚታሰቡ እኩልነቶች፣በታሪካዊ ኢፍትሃዊነት፣በማንነት ፖለቲካ እና በጥቃቅን ሀብቶች መወዳደር እና ብጥብጥ፣መድልዎ እና የህብረተሰብ መከፋፈልን ሊያስከትሉ ይችላሉ። የአፍሪካ ቀንድ በብዙ ምክንያቶች እና ተዋናዮች ካሉት በጣም ያልተረጋጋ የአፍሪካ ክልሎች አንዱ ነው። የኢትዮጵያ ግጭቶች ፖለቲካዊ፣ ኢኮኖሚያዊ፣ ጎሳ፣ ሃይማኖታዊ እና ክልላዊ ተፈጥሮዎች ናቸው። በተለይ በደቡብ ኢትዮጵያ በቦረና ዞን በኦሮሚያ ብሔራዊ ክልላዊ መንግስት እና በአካባቢው አዋሳኝ አካባቢዎች ብሔር ተኮር ግጭቶች በብዛት እየታዩ ነው። ክልሉ እንደ ቦረና፣ ጋበራ፣ ጉጂ፣ ጋሪ፣ ኮንሶ፣ ቡርጂ፣ ዋዎዬ፣ ሀመር እና አርቦሬ የመሳሰሉ በርካታ ብሔረሰቦች አሉት።

እንደዚህ አይነት ቡድኖች በመሬት፣ በማንነት ፖለቲካ እና በተፈጥሮ ሃብቶች ውስንነት ግጭት ውስጥ የመቆየት ታሪክ አላቸው። በዚህ ክልል ውስጥ ያሉ ግጭቶች ዘርፈ ብዙ ናቸው። ግጭቱ የማይታለፉ የግጭት ነጂዎች እንደ ከብት ዘረፋ ካሉ በተጨማሪ ተለይተው የሚታወቁ የቡድኖች ተለዋዋጭ ለውጦች አሉት። መሰል ግጭቶችን ለመቆጣጠር የተመረጡ ዘዴዎች ሁሉን አቀፍ የማህበረሰብ ውይይቶች፣ የህብት አስተዳደር ስምምነቶች እና የግጭት መከላከል አያያዝና አፈታት ስርአቶችን በአካባቢ ደረጃ ተቀምጧል። በመሆኑም ይህ ፕሮጀክት በደቡብ ኢትዮጵያ የኦሮሚያ ብሔራዊ ክልላዊ መንግስት ቦረና ዞን እና አጎራባች ክልሎች በማህበራዊ ትስስር እና በማህበራዊ ትስስር ላይ ከፍተኛ እክል ያስከተሉትን የረኸም ጊዜ ግጭቶችን ለመቅረፍ ያለም ነበር።

አቀራረቦች እና ውጤቶች

ፕሮጀክቱ በኦሮሚያ ብሔራዊ ክልላዊ መንግስት ቦረና ዞን እና ድንበር ተሻጋሪ አካባቢዎች ለአራት ዓመታት ያህል ሲተገበር ቆይቷል። ጥናቱ ወደ 17 የሚጠጉ ወረዳዎች (80 ቀበሌዎች) ላይ ያነጣጠረ ሲሆን የተለያዩ ብሔረሰቦችን ማለትም ቦረና፣ ጋበራ፣ ጉጂ፣ ጋሪ፣ ኮንሶ፣ ቡርጂ፣ ዋዩ፣ ሀመር እና አርቦሬ ይገኙበታል። በዚህ ክልል ውስጥ ያለው ውስብስብ የግጭት ተለዋዋጭነት በአራት የተለያዩ ስርዓቶች ተከፍሏል፡ ሞያሌ፣ ንግሌ፣ ሳጋን እና ማርማር። የ የ ኤ አይድ የቦረና ድንበር ተሻጋሪ ለሰላም ኢኒሼቲቭ (ቢሲፒ) ፕሮጀክት ሐዘብ ለሕዝብ አካፊደን በመከተል ይህም ማለት በአሥር ሺዎች ከሚቆጠሩ የማኅበረሰብ አባላት፣ የአገር ሽማግሌዎች፣ የባህላዊ መሪዎች እና ከተለያዩ የተጋጭ ቡድኖች የተውጣጡ የአካባቢ አስተዳደር ተወካዮች ጋር ውይይት ማድረግ ነው።
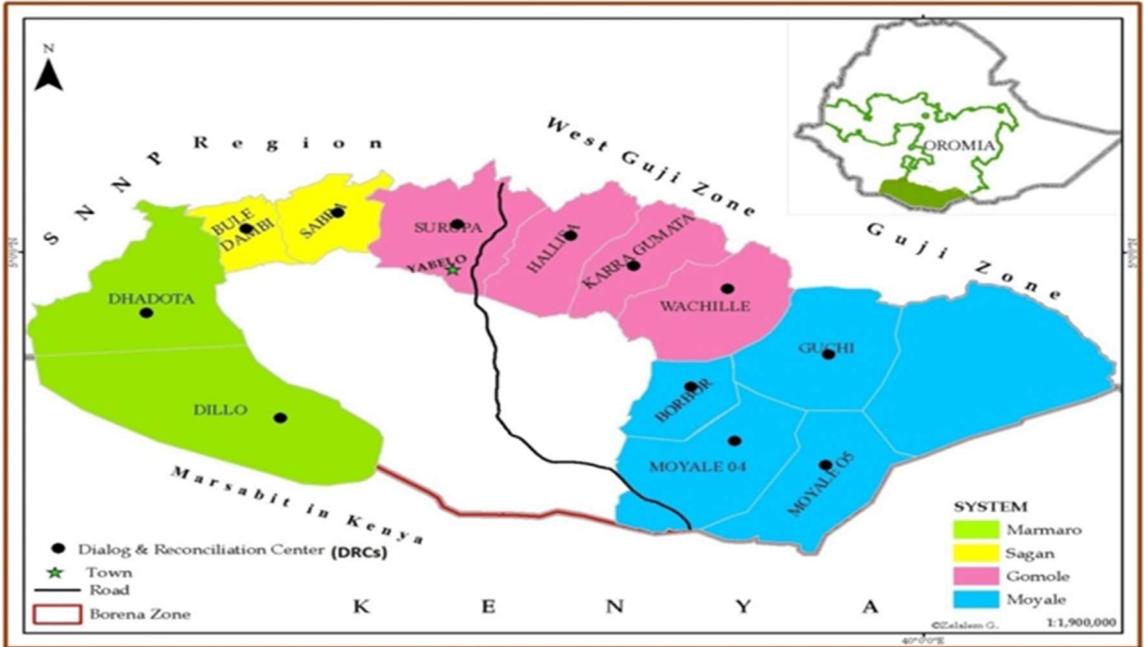
ምስል 1. የጥናት ቦታዎች የሚገልፅ ካርታ

የአካባቢ ሁኔታዎችን ለመረዳት እንዲሁም የህብረተሰቡን ቅድሚያ የሚሰጣቸውን ጉዳዮች ለመረዳት እና ቀጣይ ጣልቃ ገብነቶችን ለማሳወቅ ዋና ተግባራት ጥልቅ መሰረታዊ እና የታለሙ ግምገማዎችን ያካትታሉ። 1100 ለቤተሰብ ዳሰሳ ጥናቶች፣ 52 ለዉይይት እና 34 ቁልፍ የመረጃ ሰጭ ቃለ-መጠይቆች መረጃን ለመሰብሰብ ጥቅም ላይ ውለዋል።

የትብብር የተፈጥሮ ሀብት አስተዳደርን ለማሳልበት፣ የቡድን አመለካከቶችን ለማሳልበት እና የማህበረሰብ መተዳደሪያ ደንቦችን ለመፍጠር ያለም አጠቃላይ የማህበረሰብ ውይይቶች ለፕሮጀክቱ ዘዴ አስፈላጊ ነሩ። በቡድን መስተጋብር እና እርቅ ተግባራት እንደ የጋራ የቃና ሥነ ሥርዓት፣ የባሀል ፌስቲቫሎች እና የወጣቶች ካምፖች፣ እንዚህ ሁሉ ተግባራት በሕዝባዊ ስብሰባዎች፣ በራዲዮ ውይይቶች እና በጎብ ማቶች ላይ የግንዛቤ ማስጨበጫ ዘመቻዎች ተደግፈዋል። በተጨማሪም መርሃ ግብሩ የሰላም ኮሚቴዎችን፣ የሀገር ሽማግሌዎችን እና የመንግስት የስራ ኃላፊዎችን በግጭት መከላከል፣ አያያዝ አፈታት ዙሪያ ስልጠናዎችንና አውደ ጥናቶችን በመስጠት የባለስልጣኑ እና ባህላዊ የፍትህ ተቋማትን ህጋዊነት እና ትብብር ደግፈል። በፕሮግራሙ የተጠናከሩ የልማዳዊ ፍርድ ቤቶችና የአካባቢ የፍትህ ተቋማት እንዲጠናሩ የቡድን ትብብርና የተፈጥሮ ሀብት ልውውጥ እንዲሻሻል። የወጣቶች የሰላም ከበብትና የሴቶች የሰላም ትስስር በመጠር የቡድን ግንኙነቶችን ማጠናከር መቻሉን ውጤቱ ያመላክታል። የፕሮጀክት ትብብርን በማስተዋወቅ እና የቡድን መግባባትን በማደስ ረገድ ስኬታማ ነበር። ለምሳሌ፣ በመቶዎች የሚጮጠሩ ቤተሰቦች እና ዘመዶች በተለያየም የቦርና፣ የጉብራ እና የጋራ ቡድንን አባላት ለአስርት

ዓመታት ተለያይተው በበሩት መከከል እንደገና እንደገናኙ ተደርጓል። የአካዚህ ቡድኖች ማህበራዊ ኢኮኖሚያዊ መስተጋበር ወደነበረበት ተመልሷል እና ቤተሰቦች እንደገና እንደገናኙ እና ማህበረሰቦች ግብዓቶችን እንዲያገኙ እና ቀደም ሲል በግጭት ምክንያት የተዘጉ ገበያዎች ተከፍተዋል። በመሆኑም ቀደም ሲል ከፍና ዋና ገበያዎች ተቆርጠው የነበሩ ማህበረሰቦች ጠቃሚ ገበያዎችን ማግኘት ችለዋል። በዚህም ምክንያት የጋራ ቡድን ወደ ቦርቦር ከተማ ገበያ መመለስ ችሉል። በድርቅ ጊዜ የእንስሳት እርባታ እንቅስቃሴ መፈቀዱ። ጋብቻዎች እና ስምምነቶች በቦርና፣ አርቦሬ እና ዋዩ ማህበረሰቦች መካከል የፕሮጀክቱ የውይይት ሂደቶች ውጤቶች ናቸው።

በተጨማሪም ውጥኑ የተፈጥሮ ሃብት ልውውጥን እና የቡድን ትብብርን በኢጅት አሻሽሏል። የጋራ ሀብትን በጋራ ለመጠቀም ድርድር የተደረገባቸው ስምምነቶች በማህበረሰብ መሪዎች እና በአካባቢው የመንግስት ባለስልጣናት ተረጋግጠዋል። ይህም በሺህ የሚቆጠሩ ሄክታር መሬት አከራካሪ የሆኑ የጋራ የግጦሽ ቦታዎች እና እንደ "ጨቢ የግጦሽ ቦታ እና አርጊሌ የውሃ ቦታ የማሳሰ የውሃ ማጠራቀሚያዎች ለህብረት ስራ አመራር እና ድርድር እንዲከፈቱ አድርጓል። በውድድር ላይ ትብብርን በሚያበረታታ ውይይቶች ምክንያት የጋራ ማህበረሰቡ መተዳደሪያ ደንብ ተዘጋጅቶ ጸድቋል። ከበድ ያለ የኑሮ ተግዳሮቶችን ለመቅረፍም የኮንሶ አባወራዎችና ማህበረሰቦች በአቅራቢያው ባሉ የቦርና ቀበሌዎች አስፈላጊ የእርሻ መሬቶችን እና የደን ሀብቶችን እንዲያገኙ አስችሏል። በአስፈላጊ ሁኔታ፣ ለልማዳዊ ፍርድ ቤቶች የሚደረገው ድጋፍ እና የሰላም ኮሚቴዎች ትኩረት ከፍኃገር አያያዝ ወደ ንቁ ልኬቶች መሸጋገር የአካባቢ አቅም እና የግጭት መከላከል እና አፈታት ተቋማትን አሳድጓል።

የተሻለ ግንኙነት እና የማህበረሰብ እርቅን ለማስፋፋት ፕሮጀክቱ
የሰላም ኮሚቴዎችን በአዲስ መልክ በማደራጀት የባህል ፍርድ
ቤቶች እንዲፈጠሩ እና እንዲሰሩ ድጋፍ አድርጓል። በዚህ
ምክንያት መደበኛ እና ባህላዊ የፍትህ ስርአቶች የበለጠ ህጋዊ
እና ትብብር ሆነዋል። በመጨረሻም ፕሮጀክቱ የሴቶችንና
ወጣቶችን በግጭት አፈታት እና እርቅ ገቢ፣ ሚና እና ተሳትፎን
በእጅ አሳድጓል። ፕሮጀክቱ ግጭትን በመፍጠርና በመካከላክል
ረገድ ላበረከቱት የላቀ ሚና አውቆ በመስጠት የወጣቶች
የሰላም ክበቦችን እና የሴቶች የሰላም መረቦችን አቋቁሟል።
እነዚህ ኔትወርኮች ሴቶችን እና ወጣቶችን ሊያጋጩ ከሚችሉ
ቡድኖች ወደ አካባቢያዊ ለውጥ አራማጆች በመቀየር በሰላም
ግንባታ ላይ በንቃት እንዲሳተፉ በማበረታታት፤ የአመለካከት
ለውጥን በማጎልበት እና ቀጣይነት ያለው ቡድኖች መስተጋብር
በመፍጠር የግንዛቤ ማስጨበጫ ዘመቻዎች። የጋራ የባህል
ዝግጅቶች እና "የሰላም ዞሮች" የከረምት ወጣቶች ካምፖች
ተግባራዊ ተደርገዋል።

የፖሊሲ ምክሮች

- የሰላም ሚኒስቴር እና የአካባቢ አስተዳደር መሥሪያ ቤቶች
የህብረተሰቡን ውይይቶችና ውጥኖች እንዲሁም በቡድን
መካከል የሚደረጉ ውይይቶችንና የእርቅ ጥረቶችን
በመደገፍ መግባባትን፤ ትብብርን እና የሰላም ግንባታ
ጥረቶችን ለመደገፍ ጥረት ማድረግ አለባቸው።

- የፍትህ ሚኒስቴር እና የክልል ፍትህ ቢሮዎች የክልል
ተቋማትን ማለትም የሰላም ኮሚቴዎችን እና የባህላዊ
ፍርድ ቤቶችን አቅም ማሻሻል፤ አሰራራቸውን ከአፈሴላዊ
የህግ ስርዓቶች ጋር በማጣጣም የትብብር እና የመረጃ
ልውውጥ መንገዶችን መፍጠር አለባቸው።

- የሴቶችና ማህበራዊ ጉዳይ ሚኒስቴር የሴቶችን የሰላም
ትስስር በመፍጠርና በማገዝ፤ ስራቸውን ወደ ትላልቅ
የማህበረሰብ ፕሮጀክቶች በማካተት፤ ትኩረት ያደረገ
ስልጠናና ግብአት በማቅረብ የሴቶችና ወጣቶችን ተሳትፎ
በማስፋት ሰላም ግንባታ ላይ ሊሰሩ ይገባል።

- የሰላም ሚኒስቴርና የግብርና ሚኒስቴር በትብብር
የተፈጥሮ ሃብት አስተዳደር ስምምነቶችን በመፍጠር
የሰላም ግንባታ ውጥኖችን ከዘላቂ የመተዳደሪያ ስልቶች
ጋር በማስተሳሰር ሃብትን መሰረት ያደረጉ ግጭቶችን
ለመቀነስ እና የማህበረሰብ ግጭቶችን የመቋቋም አቅምን
ለማሻሻል ሊረባረቡ ይገባል።

የከተማ ግብርና ላይ መሳተፍ የቤተሰብን ደህንነት ለማሻሻል ይረዳል

ገብረግዚአብሄር ንጉስ[*]፣ መንግስቱ ከተማ[2]፣ ጀማ ሀጂ[1]፣ሚሊዮን ስለሺ[1]

[1]የግብርና ኢኮኖሚክስ ዲፓርትመንት ሐረማያ ዩኒቨርሲቲ ሐረማያ ኢትዮጵያ፣ [2]የኢትዮጵያ ኢኮኖሚክስ ማህበር፣ አዲስ አበባ፣ ኢትዮጵያ፣

ቁልፍ መልዕክቶች

- በአንድ ወይም በብዙ የከተማ የግብርና ተግባራት መሳተፍ ገቢን ከ13-27 በመቶ፣ የፍጆታ ወጪን ከ13-36 በመቶ፣ እና የምግብ ኢነርጂ አጠቃቀምን ከ8-34 በመቶ በማሳደግ አጠቃላይ ደህንነትን ያሳድጋል።

- የብድር አቅርቦት፣ ስልጠና እና ግንዛቤ በከተማ የግብርና ተግባራት ላይ የሚሳተፉ አባወራዎች ላይ ተጽዕኖ ያሳደረባቸው ቁልፍ ነገሮች ነበሩ።

መግቢያ

ፈጣን የህዝብ ቁጥር መጨመር እና የከተሞች መስፋፋት ለእርሻ መሬት መቀነስ፣ በከተሞች ውስጥ ያለው የምግብ ፍላጎት ከፍተኛ መሆን እና ጤናማ ያልሆነ አመጋገብ እንዲስፋፉ ምክንያት ናቸው። የዘላቂ ልማት ግቦች እነዚህን ተግዳሮቶች ለመቅረፍ የለውጥ ራዕይን በማመላከት ወደፊት በሉም መልኩ ከረሃብ ከምግብ እጦት እና ከተመጣጠነ ምግብ እጥረት ነፃ ያደርጋል። የከተሞች የምግብ ዋስትና ችግር፣ በማደግ ላይ ያለ ክስተት፣ በምክንያቶቹ እና በመፍትሄዎቹ ከገጠር የምግብ ዋስትና ችግር በእጅጉ ይለያል። የከተማ ግብርና የምግብ ዋስትና እጦትን ለመቅረፍ ተግባራዊ ምላሽ ሆኖ ለከተማ ድሆች የምግብና የገቢ ምንጭ በማቅረብ አካባቢን በማሻሻል እና በእርሻ መሬት ላይ የሚደረሰውን ጫና በመቀነስ ላይ ይገኛል። ይህ ጥናት በማስራቅ ኢትዮጵያ የከተማ ግብርና በቤተሰብ ደህንነት ላይ ያለውን ተጽእኖ ለመመርመር ያለም ነው።

አቀራረቦች እና ውጤቶች

በምስራቅ ኢትዮጵያ ከሚገኙ አምስት የከተማ ማዕከላት ማለትም ሀረማያ፣ ቁሉቢ እና ቀርሳ ከተሞች በምስራቅ ሐረርጌ ዞን (ኦሮሚያ ክልል)፣ ከሐረር ከተማ (ሐረሪ ክልል) እና ከድሬዳዋ ከተማ (ድሬዳዋ ከተማ አስተዳደር) የተለዩ መረጃዎች ተሰበሰበዋል። 385 አባወራዎችን ለመምረጥ ባለ ብዙ ደረጃ ናሙና ቴክኒክ ተቀጥሯል። 270 ተሳታፊ እና 115 በከተማ ግብርና (UA) አልተሳተፉም። መረጃ የተተነተነው ገላጭ ስታቲስቲክስ እና እንደ መልቲቫሪያት ፕሮቢት ሞዴል MVP) ያሉ ኢኮኖሚያዊ ሞዴሎችን በመጠቀም የሆነ አድራጎት ተፅእኖዎችን ለመገምገም በከተማ ግብርና ልምምዶች ውስጥ የተሳተፉ ውሳኔዎችን እና የMultinomial Endogenous Switching Regression (MESR) ሞዴልን ነው።

ውጤቱ እንደሚያመለክተው አባወራዎች በእንስሳትና አትክልት፣ በሰብል/ፍራፍሬ እና በአትክልት፣ በሰብል/ፍራፍሬ እና በከብት እርባታ ላይ ለመሳተፍ በሚወስኑት ውሳኔ መካከል አዎንታዊ እና ጉልህ የሆነ መደጋገፍ እንዳለ ነው። የመልቲቫሪያት ፕሮቢት ሞዴል ትንተና ውጤቶቹ እንደሚያሳየው እያንዳንዱን የከተማ ግብርና አሰራር ለመከተል በሚደረገው ውሳኔ ላይ የተለያዩ ምክንያቶች ተጽዕኖ ያሳድራሉ። ለእያንዳንዱ ጉዳይ የተለያዩ ጠቀሜታ ያላቸው (ሠንጠረዥ 1)። በአትክልት ምርት ውስጥ ተሳትፎን የሚነኩ ጉልህ ምክንያቶች ጾታ እና የቤተሰብ አስተዳደር እድሜ፣ የመሬት መጠን፣ የብድር አቅርቦት እና ከከተማ ግብርና ጋር የተያያዘ ስልጠና ማግኘትን ያካትታሉ። በከብት እርባታ ውስጥ መሳተፍ ከቤተሰብ አስተዳደር ጾታ፣ ስራ፣ ስለ ከተማ ግብርና ጥቅሞች ግንዛቤ፣ የማህበረሰብ ቡድን ተሳትፎ እና የገበያ ርቀት ጋር በእጅጉ የተያያዘ ነበር። የሰብል-ፍራፍሬ ምርት በከተማ ግብርና ጥቅሞች ግንዛቤ፣ የገበያ ርቀት፣ ስልጠና እና የትግኝነት ጥምርታ ከፍተኛ ተጽዕኖ አሳድራል።

ሠንጠረዥ 1. በከተማ ግብርና ተግባራት ውስጥ ተሳታፊን የሚነኩ ምክንያቶች

Variables	Vegetables Coef. (SE)	ME	Livestock Coef. (SE)	ME	Crop-fruit Coef. (SE)	ME
ጾታ	0.46**(0.23)	0.073	0.61* (0.34)	0.099	-0.02 (0.18)	-0.004
ዕድሜ	-0.02**(0.01)	-0.003	-0.00 (0.02)	-0.000	-0.01 (0.01)	-0.002
ትምህርት	0.02 (0.02)	0.004	-0.02 (0.04)	-0.003	-0.00 (0.02)	-0.000
ሥራ	0.18 (0.24)	0.030	0.47* (0.28)	-0.076	0.04 (0.18)	0.006
የቤተሰብ ብዛት	-0.09 (0.06)	-0.014	-0.15 (0.10)	-0.023	0.06 (0.05)	0.010
የመሬት ስፋት	-1.24**(0.48)	-0.200	0.08 (0.58)	0.013	-0.10 (0.38)	-0.016
ኤክስቴንሽን	0.12 (0.09)	0.020	0.02 (0.12)	0.003	0.05 (0.06)	0.008
አመለካከት	-0.47 (0.30)	-0.075	7.40***(0.74)	0.192	0.54** (0.21)	0.087
ክሬዲት	0.69***(0.26)	0.110	0.44 (0.42)	0.072	-0.23 (0.18)	-0.037
ልምድ	-0.01(0.02)	-0.002	0.01 (0.02)	0.002	0.00 (0.01)	0.001
የቡድን ተሳትፎ	0.44 (0.29)	0.071	3.35***(0.42)	0.540	-0.15 (0.23)	-0.024
የገበያ ርቀት	0.08 (0.09)	0.012	0.25***(0.10)	0.040	0.15**(0.06)	0.024
ስልጠና	0.95***(0.27)	0.154	0.27 (0.33)	0.044	0.45**(0.21)	0.073
ከእርሻ ውጪ ገቢ	0.64 (0.41)	0.102	0.64 (0.59)	0.103	0.13 (0.35)	0.021
Dependency ratio	0.42 (0.35)	0.067	0.16 (0.36)	0.027	-0.49**(0.25)	-0.078
Constant	-5.80 (4.40)		-9.77 (6.37)		-1.45 (3.86)	
Predicted probability		0.873		0.519		0.629
Joint Probability (Success)			0.4389			
Joint Probability (Failure)			0.0206			
Draw Number (#)			100			
Log Likelihood			-269.62			
Wald $\chi2(45)$			670.08			
Prob > $\chi2$			0.000***			

ምንጭ፡ የሞዴል ውጤቶች (2022); መደበኛ ስህተቶች በቅንፍ ውስጥ ይታያሉ; ME የጎዳግ ውጤቶችን ያመለክታል፡፡

ሠንጠረዥ 2. የከተማ ግብርና ተግባራት በቤተሰብ ደህንነት ላይ የሚያሳድረው ተጽዕኖ

ውጤት	የከተማ ግብርና ተግባራት	To practice Actual	Not to practice Counterfactual	Average Treatment Effects for Treated ATT	Change (%)
ገቢ	$V_1L_0C_0$	34357.67	27656.42	6701.25***(2330.35)	24.23
	$V_0L_1C_0$	26733.96	21763.27	4970.69**(1935.03)	22.84
	$V_0L_0C_1$	29971.74	24972.04	4999.70**(2135.36)	20.02
	$V_1L_1C_0$	29878.32	26392.86	3485.46*(2071.21)	13.21
	$V_1L_0C_1$	32253.22	25720.22	6532.63***(1341.69)	25.40
	$V_0L_1C_1$	28743.20	25220.25	3522.95* (1822.93)	13.97
	$V_1L_1C_1$	32366.11	25446.05	6920.06***(810.64)	27.20
የፍጆታ ወጪዎች	$V_1L_0C_0$	16852.75	12414.90	4437.86*** (1113.5)	35.75
	$V_0L_1C_0$	16096.08	12659.88	3436.20*** (851.30)	27.14
	$V_0L_0C_1$	16172.69	13233.23	2939.45** (1132.86)	22.21
	$V_1L_1C_0$	16060.12	13321.63	2738.49*** (711.48)	20.56
	$V_1L_0C_1$	15901.55	13319.91	2581.64*** (722.90)	19.38
	$V_0L_1C_1$	14120.83	12517.95	1602.88** (703.89)	12.80
	$V_1L_1C_1$	15314.74	13408.28	1906.47*** (378.30)	14.22
ኪሎካሎሪዎች	$V_1L_0C_0$	2934.83	2191.60	743.24***(133.87)	33.91
	$V_0L_1C_0$	3146.30	2900.25	246.05* (123.58)	8.48
	$V_0L_0C_1$	2916.06	2834.81	81.25 (160.41)	2.87
	$V_1L_1C_0$	2914.44	2875.13	39.30 (123.05)	1.37
	$V_1L_0C_1$	2863.82	2236.29	627.52***(103.60)	28.06
	$V_0L_1C_1$	2628.20	2186.81	441.39***(109.50)	20.18
	$V_1L_1C_1$	2708.28	2093.09	615.19***(52.59)	29.39

ምንጭ፡ የሞዴል ውጤቶች (2022) ማስታወሻ፡ መደበኛ ስህተቶች በቅንፍ ውስጥ ይታያሉ፡፡

አማካይ የጣልቃ ገብነት ውጤት በትክክለኛ ውጤቶች እና በተቃራኒ ሁኔታዎች መካከል ከፍተኛ ልዩነት አሳይቷል (ሥንጠረዥ 2)። ይህ የሚያመለከተው በከተማ ግብርና ተግባራት ውስጥ የሚሳተፉ አባ/እማወራዎች ከማይሳተፉትጋር ሲነፃፀሩ ከፍተኛ የሆነ የደህንነት ማሻሻያዎችን እንደሚያገኙ ያመለክታል። ውጤቶቹ እንደሚያሳዩት፣ በተወሰዱት የአሥራር ዘዴዎች ጥምር ላይ በመመስረት፣ የከተማ ግብርና ተሳትፎ የአንድ ነልማሳ ገቢን ከ3-27 በመቶ ጨምሯል። በተጨማሪም፣ ከተቃራኔዎቹ ጋር ሲነፃፀር፣ በከተማ ግብርና ልምምድ ላይ የተሰማሩ አባ/እማወራ ቤቶች በአንድ አዋቂ ከፍ ያለ የፍጆታ ወጪን አሳይተዋል (ከ3-36 በመቶ ጭማሪ) እና የካሎሪ ቅበላ በአዋቂ አቻ (8-34%)። እነዚህ ግኝቶች የከተማ ግብርና የግብርና ምርትን ወደ ከፍተኛ ገቢ፣ ፍጆታ እና የተሻሻሉ የምግብ ኢነርጂ አጠቃቀምን በመተርጎም የቤተሰብ ደህንነትን በእጅጉ እንደሚያሳድግ አጽንኦት ስጥተውበታል።

የፖሊሲ ምክሮች

- የግብርና ሚኒስቴር የከተሞችን የምግብ ዋስትና እና የቤተሰብ ደህንነትን ለማረጋገጥ ለከተማ ግብርና ፖሊሲ ሊሰጥ ይገባል።

- የግብርና ቢሮዎችና ማዘጋጃ ቤቶች የከተማ ግብርና ያለባቸውን ተግዳሮቶች በመፍታት የከተማ ግብርናን ማስተዋወቅ አለባቸው።

- በከተሞች የሚገኙ የተለያዩ መሠሪያ ቤቶች ፤ ዩኒቨርሲቲዎች፣ የምርምር ተቋማትና ትምህርት ቤቶች የከተማ ግብርናን ልምምድ በማድረግ ማሳየት አለባቸው።

- የፋይናንስ ተቋማት በከተማ ግብርና ውስጥ ለሚሳተፉ ቤተሰቦች የገንዘብ ፓኬጆችን ማዘጋጀት አለባቸው።

IBSA IMAAMMATAA
2016

Afaan Oromootti kan hiike: Daani'eel Bal'is (PhD)

YUUNIVARSIITII HARAMAAYAA
BIIROO DHIMMA QORANNOO

Xaa'oo Uumamaa (*Vermicompost*) Fayyadamuun Oomisha Bishingaa Ni Guddisa; Weerara Deegsoo (*Striga*) Hir'isa

Addisuu Ebbisaa[1*], Nigussee Dechassa[2], Zelalem Bekeko[1], Faayeraa Liiban[3]

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Ergaawwan Ijoo

- Xaa'oo uumamaa (Kompoostii Raammoon dikeessu) fi Daagaa-bishaan cimiisuu (tied-ridge) yoo midhaan tooraan facaasuu walitti hidhateen deeggaramee hojiirra yoo oole jiidhinsa fi gabbina biyyee (fertility) ni dabala.

- Adeemsa tooraan wal jala facaasuu keessatti hektaara tokkoof Komposostii raammoon dikeessuu toonii 4.5 daagaa walitti hidhate waliin tajaajilamuun, oomisha bishingaa 60% dabaluun yabbina aramaafi weerara isaa 85.71% fi 77% ni hir'isa.

Seensa

Hawaasa Sahaaraa gadii miiliyona 100 ol ta'aniif bishingaafi ochoolooniin madda galii fi nyaata madaalawaa ta'uun shoora olaanaa qaba. Gosoonni midhaanii kun ga'umsa naannoo goginsi jirutti madaqqu qabaatanis, hanqina gabbina biyyee (soil fertility) fi hongee irraa kan ka'e kan silaa akka biyyaatti hektaara tokko irraa toonii 3-6 argamuu male, amma toonii 1.8-tti oomishama (CSA, 2021). Bu'aa oomishtummaa dabaluuf, guddinaafi raawwilee qonnaa itti fufinsa qaban beeksisuuf raawwilee akka raammoon dikeessuu, midhaan wal jala facaasuufi muuxannoo bishaan cimmisuu hojiirra oolchuun kanneen murteessoodha. Raammoon dikeessuu tajaajilamuun ammoo

baay'ee abdachiisaa, xaa'oo uumamaa naannoo irratti dhiibbaa hinqabne, waantota naannootti argaman irraa baasii xiqqaan qophaa'uu kan danda'udha.

Bu'aa argamsiisu cinatti, itti fayyadamni raammoon dikeessuu, gosoonni sanyii addatti magarsuu (seedbed) fi wal jala facaasuu itti fayyadama xaa'oo hammayyaafi aadaa midhaan kopha kophaan facaasuun yoo madaalamu gadibu'aadha. Dhiibbaa raammessi-dikee aramaa deegsoo to'achuuf qabuufi mala wal jala facaasuun dinagdee fooyyessuu irratti qorannoon gaggeeffaman muraasa. Gama biraan, Harargeetti muuxannoon midhaan wal jala facaasuu itti fufinsa kan hinqabnne, gabbina biyyee kan hir'isuufi bu'aa argamu hir'isuun beekama. Kanaafuu, qorannoon kun gu'umsa raammoon dikeessuu, muuxannoo bishaan cimmisaniifi bu'aqabeessummaa bishingaaf haala itti facaasan, akkasumas dhiibbanni gabbina biyyee irratti qabuufi aramaa deegsoo itti to'atu irratti karoorfame.

Malaafi Argannoo

Tibba midhaan facaasuu bara 2021 fi 2022-tti ooyruu qoteebulaa Qileefi wiirtuu qorannoo Yuunivarsiitii Haramaayaa Baabbileetti qorannoon yaalii lama gaggeeffameera. Gosa sanyii bishingaa Malkaam, sanyii ochooloonii gara garaa lama

(Baabbilee-1 fi Baabbilee-2) wal jala facaasuun kunuunsa raammoon dikeessuu hanga adda addaa (hektaaraaf toonii 0, 1.5, 3, fi 4.5) fi mala sanyii itti biqilchan lama (boo'ii banaafi toora daagaarra facaasuu) hojiirra oolaniiru.

**Gabateee 1:** Dhiibbaa raammoon dikeessuu midhaan biyyee naaytroojiniifi foosferesii irratti faca'e

Raammoon dikeessuu (t/ha)	Naayitroojinii (N%)				Foosfarasii (Olsen P mg kg⁻¹)			
	Wal jala kan faca'e	Kophaa kan faca'e	Bo'oo keessa	Bo'oorra	Wal jala faca'e	Kophaa kan faca'e	Bo'oo keessa	Bo'oorra
0	0.008^{ef}	0.007^f	0.008^e	0.009^e	3.868^e	3.573^e	3.748^f	3.693^f
1.5	0.093^{de}	0.099^d	0.094^d	0.098^d	4.762^d	4.582^d	4.727^e	4.617^e
3	0.135^c	0.125^c	0.13^c	0.13^c	7.04^c	6.935^c	7.457^c	6.518^d
4.5	0.247^a	0.208^b	0.242^a	0.213^b	9.822^a	8.93^b	9.677^a	9.075^b
LSD	0.014				0.495			

Raammoon dikeessuu (t/ha)	Zinkii (mg kg⁻¹)		Ayiranii (mg kg⁻¹)		Manganezii (mg kg⁻¹)	
	Wal jala kan faca'e	Kophaa kan faca'e	Wal jala faca'e	Kophaa kan faca'e	Wal jala kan faca'e	Kophaa kan faca'e
0	0.62^f	0.28^g	3.65^f	3.73^f	2.01^{bcd}	2.47^a
1.5	0.86^d	0.74^e	4.17^e	4.22^e	1.98^{cd}	2.16^b
3	1.18^b	1.08^c	5.16^c	4.72^d	1.89^d	2.08^{bc}
4.5	1.45^a	1.18^b	6.37^a	5.7^b	1.90^d	1.97^{cd}
GGIX	0.08		0.38		0.18	

GGIX=Garaa garummaa ijoo xumuraa; kana jechuun, vaaraabiloonni qubee wal fakkaataa yoo qabaatan jijjiiramni hinjiru.

Midhaan wal-jala facaasu keessatti raammessi-dikee bo'oorra facaasu waliin yoo tajaajilu, bu'aan bishingaa hundeen (hektaaratti toonii 14.2) fi firiin (hektaaratti toonii 6.0) (Gabatee 2), naannoo deegssoon jirutti midhaan xaa'oo malee qofaa faca'een yoo madaalamu, hir'ina qabatamaa (77%) mul'isa (Fakii 2).
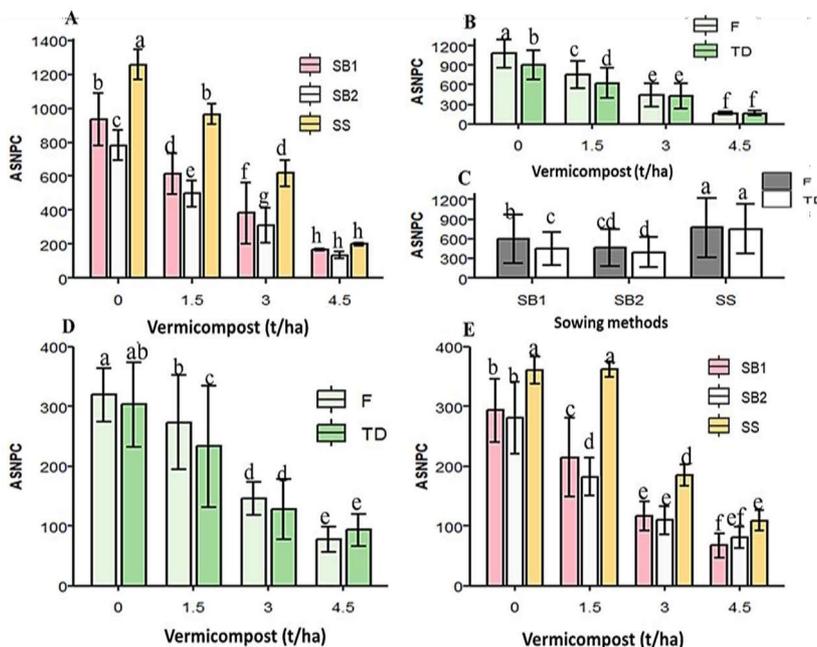
Fakii 2: Dhiibbaa hariiroo gamlamee raammoon dikeessuu mala facaasuu waliiniifi haala lafaa akka-sumas dhiibbaa hariiroo gamlamee mala facaasuufi haala lafaa bara 2021 ASNPC irratti (A, B fi C)) fi bara 2022 (D fi E) SS=bishingaa qofa; SB1/SB2= bishingaa jala Babile-1 fi Babile-2 ochooloonii faca'e; F= bo'oo keessa kan faca'e; TD = bo'oorra; Baaronni qubee wal fakkaataa qaban garaa garummaa qabatamaa 5% kan hinmul'ifnedha.

Gabatee 2: Dhiibbaa hariiroo raammoon dikeessuu, haala lafaafi bu'aa hundeefi firii bishingaaf mala itti faca'u kan ganda Qilee bara 2021 fi 2022

(a) Oomisha hundee (t/ha)

Mala facaasuu	VC (t/ha) Bara 2021				VC (t/ha) Bara 2022			
	0	1.5	3	4.5	0	1.5	3	4.5
SB1F	3.149[h]	3.947[gh]	6.852[d]	8.34[bc]	4.93[jklm]	4.794[klm]	8.918[f]	12.152[b]
SB1TD	3.590[gh]	5.490[e]	8.177[c]	10.81[a]	4.79[klm]	6.404[gh]	10.770[d]	12.01[bc]
SB2F	3.273[gh]	4.339[fg]	6.194[de]	9.275[b]	5.29[ijkl]	5.953[hi]	9.905[e]	12.619[b]
SB2TD	3.940[gh]	5.856[de]	8.578[bc]	10.95[a]	5.14[ijkl]	7.181[g]	11.22[cd]	14.205[a]
SSF	3.213[h]	5.804[de]	3.264[gh]	8.073[c]	3.549[n]	2.723[h]	8.117[f]	12.207[b]
SSTD	3.766[gh]	6.018[de]	8.206[bc]	8.83[bc]	4.214[m]	5.536[ijk]	8.349[f]	11.28[cd]
LSD	1.092				0.814			

(b) Grain yield (t/ha)

Mala facaasuu	VC (t/ha) Bara 2021				VC (t/ha) Bara 2022			
	0	1.5	3	4.5	0	1.5	3	4.5
SB1F	1.503[n]	2.49[ijk]	3.54[d]	4.782[c]	1.981[j]	2.689[h]	3.413[g]	5.033[cd]
SB1TD	2.29[jkl]	2.728[ij]	3.236[gh]	5.350[b]	2.171[j]	2.836[h]	4.719[de]	5.602[b]
SB2F	1.84[lmn]	2.39[ijk]	3.470[fg]	4.35[cd]	2.074[j]	2.635[h]	4.419[e]	5.584[b]
SB2TD	2.05[klm]	2.819[hi]	4.20[de]	5.817[a]	2.228[ij]	2.931[h]	4.813[de]	6.014[a]
SSF	1.445[n]	2.538[ij]	3.264[gh]	4.16[de]	1.549[k]	2.723[h]	3.562[fg]	4.605[e]
SSTD	1.627[mn]	2.44[ijk]	3.839[ef]	5.285[b]	1.885[jk]	2.592[hi]	3.941[f]	5.286[bc]
LSD	0.456				0.403			

SS=bishingaa qofa; SB1/SB2= bishingaa jala Babile-1 fi Babile-2 ochooloonii faca'e; F= bo'oo keessa kan faca'e; TD = bo'oorra; VC = vermicompost (raammoon dikeessuu); Baaronni qubee wal fakkaataa qaban garaa garummaa qabatamaa 5% kan hinmul'ifnedha; GGIX=Garaa garummaa ijoo xumuraa.

Akka argannoo qorannoo kanaatti, hektaara tokko irratti bishingaafi ochooloonii wal keessa faca'eef raammoon dikeessuu toonii 405 tajaajilamuun gabbina biyyee kaarboonii (1.45 g cm-3), N (0.247%), P (38.46%), Fe (27%), Zn (40%), akka jiraatu gargaaruufi oomishni bishingaas 58%n kan dabale (Gabatee 1).

Yaada Imaammataa

- Ministeerri Qonnaa qonnaan bulaan raammoon dikeessuu toora facaasuufi mala midhaan wal jala facaasuun bu'aa oomishni bishingaa akka dabaluufi aramaa deegssoo akka to'atuuf leenjii dadammaqinsaa kennuu qaba.

- Ministeerri Hojjettootaafi Ogummaa, dhaabbilee mit-mootummaafi qaamonni dhimmi kun ilaallatu hundi dargaggoonni raammoon dikeessuu oomishanii madda galiif akka oolfatan qindaa'uun ejjennoo fudhachuu barbaachisa.

- Investeroonni, yuuniyeenonniifi waldaaleen oomisha raammoon dikeessuu irratti bal'inaan

- irmaachuun gurguranii madda galiif hojjechuu.

Soorata Irratti Maayikiroobii Bu'a Qabeessa Ta'e Tajaajilamuun Re'oota Somaalee Gurra Gaggabaabaa Saffisaan Akka Guddatan Taasisa

Feyisa Hundeessaa[1*], Masarat Girmaa[1]

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Ergaawwan Ijoo

- Re'oonni furushkaa (qola firii qamadii) maayikiroobiin bukaa'e (EM-Bokashi) 7% sooratan ulfaatina qaamaa 50% yoo dabalan, kanneen faayidaa kanaan ala jiran 7.4% qofaan dabalani.

- Re'oota umrii waggaa lamaa gadiif soorata 7% EM- Bokashi qabu yoo kennameef bu'aan 19.5% argamuu danda'a.

Seensa

Itiyoophiyaatti baay'inniifi barbaachisummaan re'ee olaanaa ta'us, sabababa hanqina olaanaa qabiyyee fi hanga soorataa jiruun bu'aan argamu gadi bu'aadha. Soorri beelladaa bal'inaan argamu, hafteen midhaaniifi margi uumamaa, qabiyyee gadi bu'aan kan beekamanii fi kanneen garaacha keessatti bullaa'insa gadi aanaa qabanidha. Mala maayikiroobii qola qamadii (EM-Bokashi) irratti tajaajilamuun soorata fooyyessuun pirootiniin dabaluun garaachi soorata akka bulleessu ga'umsa ida'aaf.

Orgaanizimoota xixiqqaa ga'umsa qaban makaa gareewwan orgaanizimoota dandeettii naannoo qabatamaa bayyanachiisuu qaban tilmaamaan sanyii 80 maayikiroo orgaanizimoota bu'a qabeeyyii filataman kanneen akka baakteeriyaa laaktik asiidii, raacitii, baakteeriyaa footooseentetikiifi actinomycetes of-keessatti qabanidha dha.

Lub-leellistoonni (probiotics) hanga, argama, bullaa'insa, fi xuuxama soorataa qaama beelladaa keessatti dabalan uumuuf Bokashin qola firii qamadii orgaanizimoota ga'umsa qabaniifi qola firii qamadii walitti makuun qophaa'a. Orgaanizimoonni xixiqqaa ga'umsa qabeeyyiin mar'ummaan beelladaa keessatti madaallii orgaanizimoota xixiqqaa tolchuun xuuxama soorataa waan dabalaniif sifaa fi ulfaatina ni fooyyeessu. Kanaafuu, faayidaa nyaanni salphaatti hin bulloofne beellada kanneen akka re'eef kennu fooyyessuuf maaykiroobii Bokashi ga'umsa qabuti fayyadamuun qooda olaanaa qaba. Qorannoon kun kan gaggeeffame dhiibbaa itti fayyadamni makaan Bokash qola firii qamadii fi nyaata beelladaa haftee warshaa hanga gara garaa guddinaa fi oomisha foonii re'oota Somaalee gurra gaggabaabaa okaa akka nyata idileetti fayyadaman irratti qabu madaaluufi.

Malaafi Argannoo

Yaaliin re'ee sooruu kan gaggeeffame wiirtuu qorannoo re'ee Yuunivarsiitii Haramayaatti. Re'oota korbeeyyii gurra gaggabaaboo Somaalee umuriinsaanii tilmaamaan waggaa tokkoo ta'ee fi cidhaansaanii hin tumamiin 20 gabaa naannoo (local market) irraa bitaman irratti yaalii guyyoota 90f wallaanuu taasifame. Re'oonni hanga ulfaatina isaanii jalqabaa irratti hundaa'uun carraadhaan bilookiitti qoodaman. Sana booda korbeeyyiin (bucks) bilookiwwan shaniifi gareewwan yaalii afuritti qoodamani

(Gabatee 1).

Gabatee 2: Qindaa'ina raawwii yaalii qorannoo

Garee Yaalii (GY)	Soora idilee	Makaa/hanga soorata yaalii
Yaalii 1 (kunuunsa baramaa)	*Okaa osoo hin daangofne sooratu*	Makaa nyaata hafte warshaa EM *Bokashi malee*
Yaalii 2	*Okaa osoo hin daangofne sooratu*	3% EM *Bokashi* + 97% makaa nyaata hafte warshaa
Yaalii 3	*Okaa osoo hin daangofne sooratu*	5% EM *Bokashi* + 95% makaa nyaata hafte warshaa
Yaalii 4	*Okaa osoo hin daangofne sooratu*	7% EM *Bokashi* + 93% makaa nyaata hafte warshaa

EM WB= Qola qamadii Maayikiroobii bu'a qabeessa buka'ee; CMs= Soorata Makaa furdaa (Keekii sanyii nuugii+ qola qamadii+ Nyaata Vitaaminii makamaa).

Nyaanni dabalataa qabiyyeen badhaadhe qola firii qamadii (furushkaa), haftee cuunfaa nuugii fi hafeen vaayitaaminiifi mineraalli dursee qindaa'e walitti makuun qophaa'e. Makaan nyaataa kun hanga ulfaatina re'ootaa irratti hundaa'uun 2.5% kan dhihaateef yoo ta'u, okaan (marga goggogaa) hangi re'een barbaaddu otoo hin daangeffamiin akka nyaata/soorata idileetti dhihaateef. Akkuma itti makamni EM Bokashi nyaata dabalataa keessatti 3% irraa gara 7% tti dabalamaa deemu fudhatamni soorata gogaa, orgaanikiifi pirootinii dabalaa akka deeme argannoon mul'isa. Gamabiraan, akkuma ittimakamni 3% gara 7%tti dabalaa deemaniin faayiberri gosa adda addaa bulla'insa soorataatti farra ta'an hir'achaa deemani (Gabatee 2).

Gabatee 2: Re'oonni Somaalee gurra gaggabaaboo soora EM *Bokashi* guyyaatti fudhatan

Waan sooratan (gm/Guyyaa)	Yaalii					SEM
	T1	T2	T3	T4	Mean(±)	
DMI	589.7[c]	686.6[b]	752[b]	824.5[a]	713.20	18.5
OMI	558[d]	659.7[c]	749.7[b]	828.3[a]	698.93	17.8
CPI	97.7[d]	113[c]	139.6[b]	159[a]	127.33	2.5
NDFI	466[a]	432[ab]	398[b]	397.9[b]	423.48	17.0
ADFI	191.8[a]	165.5[ab]	128[c]	148.5[bc]	158.45	9.0
ADLI	113.8[a]	92.8[b]	83.5[b]	89.5[b]	94.90	5.2

[a-d] Means bearing different superscripts within factors across columns are significantly different at $P < 0.05$; SEM= Standard Error Mean; EM= Effective Microorganism; DMI= Dry Matter Intake; OMI= Organic Matter Intake; CPI = Crude Protein Intake; NDFI= Neutral Detergent Fiber Intake; ADFI= Acid Detergent Fiber Intake; MEI= Metabolizable Energy; T1= Ad libitum Grass Hay + 100% CMs+ 0% WB *Bokashi*; T2 = Ad Libtum Grass Hay + 3% WB *Bokashi* + 97% CMs; T3 = *Ad Libtum* Grass Hay + 5% WB *Bokashi* + 95% CMs; T4 = Ad Libtum Grass Hay + 7% WB *Bokashi* + 93% CMs.

Kanneen EM Bokashi hinkennamneefiin yoo madaalaman, re'oonni EM Bokashi nyaatan soorata bulleessu irratti fooyya'oodha (Gabatee 3). Bu'aan kun argamuuf qolli seelii biqilootaa (cell wall) lubbu qabeeyyii xixiqqoon (microbial) bulbulamuu/baqfamuu (solubilization) ykn sadarkaa qolli seelii itti caccabu dabaluu irraa ta'uu mala.

Gabatee 3: Sadarkaa bullaa'insaa (%) EM *Bokashi* re'oonni Somaalee nyaatan

Kunuunsa	Yaaliwwan				SEM
	GY1	GY2	GY3	GY4	
DM	72.29[b]	78.55[ab]	80.34[a]	83.50[a]	1.82
OM	73.2[b]	77.1[ab]	80.5[a]	82.4[a]	1.73
CP	57.3[c]	68.0[bc]	77.7[ab]	81.9[a]	2.99
NDF	63.9[b]	71[ab]	80.3[a]	77.4[a]	2.78
ADF	42.9[b]	45.5[ab]	56[ab]	61[a]	4.69

[a-d] Means bearing different superscripts within factors across columns are significantly different at $P < 0.05$; SEM= Standard Error Mean; T1= Ad libitum Grass Hay + 100% CMs+ 0% WB *Bokashi*; T2 = Ad Libtum Grass Hay + 3% WB *Bokashi* + 97% CMs; T3 = *Ad Libtum* Grass Heild + 5% WB *Bokashi* + 95% CMs; T4 = Ad Libtum Grass Hay + 7% WB *Bokashi* + 93% CMs.

Korbeeyyii kan yaalii biraa keessatti sooramaniin yoo dorgomsiifaman, korbeeyyiin nyaata dabalataa EM *Bokashi* 7% waliin walitti makame sooratan ulfaatina qaamaa olaanaa (27.9 kg) irra kan qaqqaban yoo ta'u, guyyaatti daballii ulfaatinaa giddu-galeessaa fi ga'umsa jijjiiramummaa soora fooyya'aa agarsiisan. (Gabatee 4).

Gabatee 4: Jijjiirama ulfaatina qaamaa re'oota Somaalee EM *Bokashi* sooratan

Qiyaasa ulfaatinaa	Yaaliwwan				SEM
	GY1	GY2	GY3	GY4	
IBW (kg)	17.5	18.2	18.2	18.6	0.56
FBW (kg)	18.8[c]	23.2[b]	25.6[ab]	27.9[a]	0.72
ADG (g/d)	13.3[c]	54.9[b]	82.6[a]	103.3[a]	5.98
FCE	0.02[c]	0.08[b]	0.1[ab]	0.124[a]	0.01

FBW=ulfaatina xumuraa; ADG= giddu galeessaan guyyaatti jiiirama jiru; FCE= ga'umsa jijjiirama sooraa

Ulfaatinni qaama qalmaa ho'aafi qorraa, persentaa ulfaatina/oomisha foonii (dressing percentage) fi yabbina coomaa hanguma waldhaansi EM-*Bokashi* 3% irraa gara 7% tti dabalaa deemeen dabalaa deemani (Gabatee 5). Korbeeyyiin nyaataa EM *Bokashi-n* deeggarame sooratan kanneen deeggarsa kana hinargatiinirra qabiyee qaama qalmaa (foon diimaa, coomaafi lafee) olaanaa qabu. Xumura irratti, re'oonni yaalii EM *Bokashi* keessa jiran kanneen EM Bokashi keessa hinturreerra dirra isaaniirra foon furdaa fi cooma yabbuu ta'e qabu.

Gabatee 5: Bu'aa qalmaafi yabbina coomaa re'oota Somaalee EM *Bokashi* sooratanii

Safartuu	Yaaliwwan				Hiika
	GY1	GY2	GY3	GY4	
HCW (kg)	6.6	10.3	11.9	13.7	10.63
CCW (kg)	6.2	9.6	11.1	12.8	9.93
Lean (kg)	1.90	2.76	3.10	3.20	2.74
Bone (kg)	0.88	1.27	1.39	1.55	1.27
Fat (kg)	0.36	0.66	0.77	1.00	0.70
RDP (%)	44.9	54.3	58.7	61.6	54.88
REA(Inch sqr)	0.54	0.601	0.63	0.71	0.62
FT (mm)	1.40	2.81	2.94	3.30	2.61

HCW = ulfaatinaa *reeffa* ho'aa; CCW = ulfaatina *reeffa* qorraa; RDP = Persentaa foon sirrii (EBW); REA=naannoo lafee cinaachaa; FT = yabbina coomaa;

Yaada Imaammataa

- Yuunivarsiitiwwan, wiirtuwwan qorannoo, waajjiraalee qonnaa, dhaabbilee mit-mootumaafi qaamoleen dhimmi kun ilaallatu hundi barbachisummaa, adeemsa qophaa'insaafi itti fayyadama EM Bokashi irratti qonnaan bultootaafi hojjettoota misoomaaf leenjii kennuu qabu.

- Namoonni dhuunfaafi yuuniyeenonni sadarkaa gara garaan re'ee gabbisuu irratti bobba'an EM Bokashi akka tajaajilaman gorfamu.

- Ministeerri qonnaafi dhaabbileen mit-mootummaa tajaajila EM Bokashi babal'isuu irratti hojjechuu qabu.

Qaliiwwan (Butcheries) Baha Itiyoophiyaaf Leenjii Kennuun Qulqullinniifi Foon Fayyaalessi Akka Argamu Tumsu

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Ergaawwan Ijoo

- Leenjiin hojjettoota mana foon qalaniif (butcheries) kenname faalama fi tamsa'ina baakteeriyaa Staphylococcus aureus %52.4 irraa gara %11.9tti haalaan hir'isuun hojii qulqullinaa fooyyessuu keessatti bu'a qabeessummaa agarsiisa

- Leenjii booda faalama Staphylococcus aureus saamuda naannoo (%41.66) fi foon (%26.7) irratti hir'inni guddaan mul'ateera.

- Baakteriyaan (S. Aureus) adda baafaman farra baakteeriyaa amoxicillin (88.68%) fi pencillin-G (79.25%) dandeettiin ofirraa ittisu isaanii olaanaa ta'uun isaa of eeggannoodhaan farra baakteeriyaa fayyadamuu fi hordoffii itti fufiinsa qabu barbaachisaa ta'uu agarsiisa.

Seensa

Haalli nyaata itti qaban gadi bu'aa, seerri nyaanni ittiin qabamuu malu dhibuu, tooftaa itti kunuunsan laaffachuu, meeshaalee nyaanni ittiin qabamaniif maallaqni dhibuufi qaamolee nyaata kunuunsan dhibeewwan nyaatarraa maddan irratti barnoota dhabuun qabatamaan mul'ataniiru. Bu'aalee horii, kanneen akka foonii, baakteeriyaas ta'e vaayireesota dhibee fidaniif sababa olaanaa ta'uun beekama. Qulqullinni waantota (gabatee irratti

muran, albeewwan, madaalliifi kan foon muran) naannoo dukaana qalmaa gadi bu'uu, hanqina hubannoo irraa kan ka'e qulqullinni nama dhuunfaas gadibu'aa ta'uuti akka Itiyoophiyaatti gabaafame. Foon ciccirame irratti baakteeriyoonni dhibee fidan jiraachuufi meeshaalee mana foonii irrattis hangi baakteeriyoota kanaa ho'a guyyaan wal qabatee dabaluunis gabaafameera. Kana biraan, dhibeewwan fayyaa hawaasaaf yaaddoo ta'an fooniifi naannoon wal qabatanii akka mudatanis qaama gabaasaati. Dhibeen tuttuqqaa fooniin wal qabatanii mudatan E. coli, Salmonella, fi S. aureus, saamudota foon hinmummuramiin irratti 29.17%, 4.17%, fi 37.5%; kan mummurame irratti ammoo 43.75%, 6.25% fi 37.5% ti mul'atani. Kana malees, bakkeewwan Ityoophiyaa adda addaa irraa manneen foon qalmaa keessatti dhibeen qoricha dandamatu jiraachuun gabaafameera.

Adeemsa sakatta'insaan, xiinxala baakteeriyaafi vaayireesii dhibee fidaniifi bar-gaaffii tajaajila-muun madaallii ga'umsa leenjii qulqullina nyaataa irratti kennameen, qorannoowwan gara garaa faalama foonii hir'isuuf leenjii hojjettootaaf barbaachisu irratti yaaddootu jira. Kanaafuu, kaayyoon qorannoo kanaa Staphylococcus aureus fayyadamuun manneen foonii Itiyoophiyaatti foon bifa qulqullina qabuun akka qabatan irratti fooyya'insa jiru sakatta'uudha.

Malaafi Argannoo

Magaalota baha Itiyoophiyaa keessaa filataman (Haramaya, Awaday, Malk-Rafu and Harar towns) keessatti qaliiwwan jiran irratti qorannoon hawaasa gara garaa irraa ragaa funaanameen Sadaasa 2020 hanga Waxabajji 2023 tti gaggeeffame. Marsaa lamaan saamudni fudhatame. Saamudi duraa qaliiwwan 30 utuu leenjiin haala foon qulqullinaan itti qabatan irratti hinkennamiiniifi kan lammataa leenjiin boodadha. Ida'amaan saamuda 210 (cinaacha, mi'a garaa, miilla (crutch) fi naannoo armaa irraa) fi saamuda naannoo (dhiqaa gabatee, albee, waan foon irratti fannifamu, lafaafi harka namootaa) irraa marsaa hundaan ragaan fudhatameera. Saamuda fudhatame hedduu keessaa kanneen S. aureus qaban adda baasuun leenjiin guyyaa lamaa kennameef. Akkaataa Vaz et al. (2005) yaada kenne irratti hundaa'uun, adeemsa qabannaa nyaata (foon) irratti to'annoofi dadammaqinsa kennuuf manneen daldala foonii keessaa bakka bu'oota fudhachuun hojjettootaaf yaaxxina (theoretical) fi qabatamaan raawwachuu irratti leenjiin kennameera. Baatii lama booda, lakkoofsaafi gosa saamudaa hunda irraa qorannoon
S. aureus taasifame. Marsaa duraan S. aureus adda baafaman keessaa filannoo mit-carraan (random) 53 qofa irratti farra baakteeriyaa dandama-chuu isaanii mala Kirby-Bauer disk diffusion tajaajilamuun qorannoon taasifame.

Guutummaa saamudaa manneen foonii 210 fudhataman keessaa mudannoo S. aureus leenjiin duraafi booda 51.4% fi 11.90% n (garaa garummaa 39.5%) jijjiiramni qabatamaa mul'ateera. Faalamni S. aureus gadi bu'uun, kan naannoo (41.66%) fi kan foonii (26.70%) ti mul'ate. Utuu leenjiin hinkennamiin dura mudannoon S. aureus naannoofi saamuda foonii keessa jiru qixa ture. Leenjiin booda garuu jijjiirama qabatamaati (P = 0.03) mul'ate. Akka waliigalaattiifi saamuda naannoon, leenjiin booda gadi bu'eera (p < 0.001). Leenjiin booda hir'inni S. aureus naannoo, fooniifi saamuda waliigalaa irratti jiru dachaa 3, 9 fi 7 olidha. Qaliiwwan 30 (100%) hundi dhiira. Barnootaan, 11 (36.67%) sadarkaa gadii, 12 (40%) umruu 26–30 gidduufi 13 (43.33%) hojii mana foonii muuxannoo waggaa 1-2 qabu.

Lakkoofsa qaliiwwaniifi mudannoo S. aureus ilaalchisee, leenjii duraafi booda 50% fi 46.7% ti calaqqise. Akkaataa umuriifi sadarkaa barnoota isaaniin, namoota digirii qabaniin ala S. aureus hunda isaanii irratti mul'ateera. Leenjiin booda jijjiiramni qabatamaa hir'achuu S. aureus irratti mul'ateera.

Farra baakteeriyaafi vaayireesii kan dandamatan saamudni S. aureus 53-nis qoratamaniiru. Amala saaxilamummaa maayikiroobiyaalii hundaan qorannoo farra maayikiroobiyaalii (gentamicin) taasifame hundaan saaxilamoo akka ta'aniifi hubaatii hamaa baakteeriyaa yaaluuf dawaa farra baakteeriyaa (vancomycin) dandamachuun isaanii argameera. Kanneen adda baafaman keessaa hedduun isaanii faarra baayotiksiiwwan akka chloramphenicol (83.02%), sulfamethoxazole-trimethoprim (69.81%) fi erythromycin (60.38%) jiraniif kan saaxilamanidha. Akkasumas, harki caalmaan isaanii amoxicillin (88.68%) fi penicillin-G (79.25%) dandamataniiru. Dawaa qindeef-faman (generic) walitti makaman dandamannaan garee (n= 53) ammoo faca'insa mul'ise. Qoricha qindaa'an lama (beta lactam and glycol-peptide group) sadarkaan dandamannaa saamudaa 67.92% dha. Dawaa 3 fi isaa ol irraa qindaa'aniin dandamannaan saamudaa 16(30.19%) dha. Saamudi lama (3.77%) dawaa afur (beta lactam, sulfonamide, macrolides and glycol-peptide groups) qindaa'an dandamatani.

Yaada Imaammataa

- Ministeerri Fayyaa fi biirooleen fayyaa naannoo haala foon qulqullinaan qabamuu fi itti fayyadama farra maaykiroobiyaanii sirrii ta'e fi tamsa'ina paatojeenoota farra maaykiroobiyaanii dandamatan hir'isuu irratti leenjii itti fufiinsa qabu kennuu qabu.

- Ministeerri fayyaa, dhaabbileen mit-mootummaafi qaamolee dhimmi kun ilaallatu fooyya'insa qabatamaafi waarawaa mirkaneessuf deeggarsa meeshaaleefi to'annoo itti fufinsaa taasisuu qabu.

Gosa Dhibee Tiruu Siiroosis fi Walitti Dhufeenya Aflatoxin B₁ Waliin Qabu Baha Itiyoophiyaatti

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Ergaawwan Ijoo

- Dhibeen tiruu Siiroosis (liver cirrhosis) jedhamu hamma Aflatoxin B1 albumin ((≥8.6 pg/mg) dhiiga keessa jiru waliin walitti dhufeenya cimaa qaba.

- Gar-malee olka'uun ykn dabaluun hamma Aflatoxin B1 balaa dhibee tiruu siiroosisif nama saaxila. Akkasumas, sababoonni akka umriin dabaluu, hojiidhaan qonnaan bulaa tahuu, maatii keessaa namni dhibee tiruu qabu jiraachuu fi infeekshinii dhibee tiruu kan tahe vaayrasii hepatitis B, carraa dhibichaan qabamuu ni dabalu.

Seensa

Dhukkubni tiruu cirrhosis, kan beekamu boca tiruu jijjiiruufi bocni biraa (nodule) uumamuun dhukkubbaafi du'aatii dhukkubsattoota tiruuf sababa guddaadha. Innis dhimma fayyaa addunyaafi du'aatii bara 2019, %2.4 tiif itti sababa ture (Huang et al., 2023). Itiyoophiyaatti cirrhosis tiruu sadarkaa ajjeesummaa isaan, namoota 100,000 keessaa 24 ajjeessuun sadarkaa 7ffaarra jira. Baroota kana keessa yaalli isaa fooyya'insa qabaatus, ilaalcha dhukkubsattoonni qaban gadibu'aadha. Kanaafuu, sababoota dhibee kanaa ittifamuu danda'an adda baasuufi to'achuuf dursa kennuu barbaachisa. Dhibeen kun sababoota gara garaa irraa kan maddu yoo ta'u, furdina qaamaa humnaa olii, dhukkuba cooma tiruu alkooliin alaa, alkoolii hedduu fayyadamuufi infeekshinii vaayireesii (HBV or HCV) Hepatitis B ykn Cn qabamuu dabalata (Huang et al., 2023; Wang et al., 2022). Dabalataan, kan dhukkuba kana fidan hookkaramuu, dhibee kooleestikiifi ayreeniin heddummachuun qooda ba'an qabu. Dhibee kanaan wal qabatee hubannoo guddaa qabaannus, biyyoota Afrikaa Sahaaraan gadii keessatti dhibee tiruu cirrhosis galmaa'an keessaa 1/3 sababni isaanii hinbeekamu (Mokdad et al., 2014). Qorannoon baha Itiyoophiyaatti amma dura gaggeeffaman dhibeen tiruu cirrhosis % 55 oliif madda isaaf waan mirkanaa'aa hinkeenye. Tiishuwwan qorataman akka mul'isanitti, dhibeen kun madaa tiruu hamaa uumuun qorannoofi odeeffannoon dabalataa fudhatamuu akka malu mul'isu.

Midhaan nyaataa aflatoxin B1 (AFB1) qabuuf saaxilamuu, fangasii summaa'oo Aspergillus flavus and Asper-gillus parasiticus-n maddan, dhibee tiruu cirrhosis akka muudatuuf qooda olaanaa taphatu. Qorannoo yeroo dhihoo Guatemala-tti taasifameen AFB1-f saaxilamuufi dabalaa adeemuu dhibee tiruu cirrhosis gidduu hariiroo guddaatu jira. Baha Itiyoophiyaatti qorannoowwan muraasa gaggeeffamaniin faalamni bishingaafi ochooloonii keessa jiru sadarkaa rifachiisaa hamma AFB1 mul'isu. Haata'uutii, AFB1 saaxilamuun dhibee tiruu cirrhosis faana hariiroo qabaachuu ragoota muraasatu jira. Kanaafuu, qorannoo kun akka baha Itiyoophiyaatti aflatoxin-tti saaxilamuun yaaddoo dhibee tiruu cirrhosis sababa ta'uu sakatta'uuf karoorfame.

Gabatee 1: Loojistikii dachaan jijijjiiramtoota ofdanda'oo xiinxala sababoota tiruu baha Itiyoophiyaa 2020/20 tilmaamuuf

Vaaraabiloota	Qooddii	Cases n (%)	Control n (%)	COR (95% CI)	AOR (95% CI)
Saala	Dhiira	84 (66)	144 (57)	1.5 (0.9, 2.3)	1.0 (0.6, 1.9)
	dubara	43 (34)	109 (43)	1.00	1.00
Umurii	<35	65 (51)	125 (49)	1.00	1.00
	35-44	23 (18)	48 (19)	0.9 (0.5, 1.6)	0.5 (0.3, 1.1)
	45-54	18 (14)	32 (13)	1.1 (0.6, 2.1)	0.7 (0.3, 1.5)
	55 fi ol	21 (17)	48 (19)	0.8 (0.5, 1.5)	0.4 (0.2, 0.8) *
Bakka jireenyaa	Magaalaa	20 (16)	78 (31)	1.00	1.00
	Baadiyyaa	107 (84)	175 (69)	2.4 (1.4, 4.1)	1.0 (0.5, 2.0)
Haala fuudhaa	Kan hinfuune	14 (11)	52 (20)	0.5 (0.3, 0.9)	0.7 (0.3, 1.6)
	Fuudhe/eerumte	110 (87)	194 (77)	1.00	1.00
	Hiikkaa/du'a	3 (2)	7 (3)	0.8 (0.2, 3.0)	1.4 (0.3, 7.6)
Barnoota idilee	Lakki	102 (80)	140 (55)	1.00	1.00
	Eeyyee	25 (20)	113 (45)	0.3 (0.2, 0.5)	0.6 (0.3, 1.3)
Hojii	Qotee bulaan ala	23 (18)	120 (47)	1.00	1.00
	Qotee bulaa	104 (82)	133 (53)	4.0 (2.4, 6.8)	3.0 (1.5, 6.0) *
Jimaa qama'u	Lakki	48 (38)	132 (52)	1.00	1.00
	Eeyyee	79 (62)	121 (48)	1.8 (1.2, 2.8)	1.3 (0.7, 2.4)
Tinboo xuuxuu	Lakki	99 (78)	221 (87)	1.00	1.00
	Eeyyee	28 (22)	32 (13)	2.0 (1.1, 3.4)	1.4 (0.7, 2.8)
Madaallii ulfaatinaafi dheerinaa	Giddugaleessa	73 (58)	162 (64)	1.00	1.00
	Gadi bu'aa	45 (35)	82 (32)	1.2 (0.8, 1.9)	1.4 (0.8, 2.3)
	Umnaa'ol	9 (7)	9 (4)	2.2 (0.8, 5.8)	1.8 (0.6, 5.7)
Seenaa maatii dhibee tiruu	Lakki	111 (87)	245 (97)	1.00	1.00
	Eeyyee	16 (13)	8 (3)	3.5 (1.5, 8.0)	2.9 (1.1, 7.9) *
HBV qabamu	Lakki	100 (79)	239 (94.5)	1.00	1.00
	Eeyyee	27 (21)	14 (5.5)	4.6 (2.3, 9.2)	4.0 (1.9, 8.8) *
sadarkaa AF-alb adduct	Kan adda hinbaane	32 (25)	91 (36)	1.00	1.00
	Gadi bu'aa	38 (30)	91 (36)	1.2 (0.7, 2.1)	1.2 (0.6, 2.2)
	Olaanaa	57 (45)	71 (28)	2.3 (1.3, 3.9)	2.0 (1.1, 3.7) *

Note: *p value < 0.05; AF-alb, aflatoxin B1 (AFB1)-albumin adduct; AOR, Adjusted Odds Ratio COR, Crude Odds Ratio; HBV, Hepatitis B Virus.

Malaafi Argannoo

Baha Itiyoophiyaa magaalaa Harar, Amajji 1, 2020 hanga Gurraandhala 31, 2021tti hoospitaala Caffee ykn Hiwoot Faanatti Hiwot Fana Comprehensive Specialized University Hospital (HFCSUH) keessatti qorannoon gaggeeffamee ture. Akka waliigalaatti namoota dhibee tiruu cirrhosis qaban 127 fi dhibee kana hin qabne 253 meeshaa ultrasound-iin irratti hundaa'uun qorannoon irratti adeesifamee ture. Af-gaaffii qindaa'aafi uunkaa tarreeffaman fayyadamuun odeeffaannoon, haala jireenyaafi yaalii irratti ragaan funaanameera. Dabalataan, sadarkaa tajaajila tiruu madaaluuf saamudi dhiigaa vaayireesii (HBV) hepatitis B, vaayireesii (HCV) hepatitis C fi aflatoxin-albumin assay hirmaattota hunda irraa fudhatameera. Hariiroo cirrhosis tiruufi jijjijiiramoo of danda'oo (independent variables) gidduu jiru mala istaatistikiin xiinxalamani.

Akka argannoon argisiisutti namoota dhibee tiruu cirrhosis qabu keessaa harki 75 AF-Alb akka qaban yoo mul'isu namoota dhibee tiruu cirrhosis hin qabne immoo %64 AF-Alb qama isaanii keessaa akka qaban agarsiisa. Giddugaleessaan dhukkubsattoota dhibee tiruu cirrhosis qaban keessatti AF-Alb 11 pg/mg (IQR: 5.5-25) mul'ata. Namoota dhibee tiruu cirrhosis hinqabne keessatti hammi AF-Alb 7.0 pg/mg (IQR: 4.3-20.5) caaluun gama istaatistiksiin (p<0.05) ta'uu mul'isa (Gabatee 1). Hirmaattota umriin 55 fi isaa olii kan umriin 35 fi isaa gadiin yoo madaalaman carraan dhibee tiruu cirrhosis qabamuu %60n gadi bu'aadha. Dhukkubsattoonni qonnaa irratti bobba'aniifi seenaa maatii isaanii keessa dhibeen tiruu jiraachuu kanneen kaaniin yoo madaalaman carraan dhibee tiru cirrhosis qabamuu isaanii dachaa 3- fi 2.9n caalu.

Vaayirasiin Hepatitis B dhukkubsattoota keessa jiraachu (seropositive) carraan dhibee tiruu cirrhosis qabamuu isaanii dachaa 4n dhukkubsattoota vaayirasii sana irraa bilisaa (seronegative) caala. Carraan dhukkubsattoota AF-alb olaanaa qaban cirrhosis tiruun qabamuu kanneen keessatti hinargamerra dacha lamaan caalu.

Yaada Imaammataa

- Ministeerri Qonnaafi qaamni dhimmi isaa ilaallatu hundi sonoota nyaataa oomisha duraafi boodaa keessatti tooftaa faalama AFB_1 itti hir'isan uumuufi hojiirra oolchuu qabu.

- Summii AFB_1 hir'isuuf, Ministeerri Qonnaafi qaamni dhimmi ilaalu sadarkaa AFB_1 nyaataafi soorata keessa jiru walitti fufinsaan madaaluu qabu.

- Ministeerri Fayyaa dhibee tiruu cirrhosis yeroo hunda dhukkubsattoota vaayirasii hepatitis B fi dhukkuba tiruu seenaa maatii keessaa qaban adda baasuu qaba.

- Yaaddoo AFB_1-f saaxilamuufi hariiroonni tiruu faana qaburraa ka'uun qaamni dhimmi ilaalu qotee bulaa, daldalaafi fayyadamtoota haala itti nyaata qulqullinaan qabatan irratti duula dadammaqinsaa gaggeessuu qabu.

Dhibeen Sammuu (Schizophrenia) Baha Itoophiyaatti Dabalaa Jira

Fatiyaa Mohammed[1*], Biiftuu Gadaa[2], Tasfaaye Assabee[1], Yaadataa Dassee[1]

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Ergaawwan Ijoo

- Baha Itoophiyaatti dhukkubi sammuu hamaan schizophrenia jedhamu bara 2016 tti %57 kan ture bara 2020 tti gara %65tti guddate.

- Dhibeen sammuu kun hoji-dhabdummaa, sadarkaa barnootaa, maatii keessa seenaan dhukkuba sammuu jiraachuu fi waantoota sammuu namaa adoochan hedduu tajaajilamuun walitti dhufeenya cimaa qabata ture.

- Namoonni dhikkuba sammuu kana qaban %44.57n qoricha farra dhibee sammuu seeraa hin hordofne. Kunis qoricha dhibee sammuu dhaloota tokkoffaa akka yaalaman, dhukkuba isaaniif xiyyeeffannoo kennuu dhabuufi dhiibbaa dawaa irraa mudatuun walitti dhufeenya cimaa qabata ture.

- Waantoota sammuu namaa adoochan gosa hedduu fayyadamuufi amala ofiin hawaasa keessaatti gad-aantummaan itti dhagahamuum warren dhukkuba kanaaf gumaacha godhu.

Seensa

Schizophrenia-n dhibee sammuu cimaa ta'ee yaada dogoggoraa, xebenaafi mallattoolee fafee ta'een kan calaqqisufi yeroo baayyee xumura umrii dargaggummaa ykn jalqaba umrii ga'eessummaatti kan jalqabuudha. Sababni qabatamaan inni ittiin dhufu wallaalamus, dhalootarraa, naannoon, akkasumas dhiibbaa amalaa irraa kan ka'e dhibee kana fiduu irratti dhiibbaa geessisuu malu. Schizophrenia-n rakkoo fayyaa hammaataa addunyaa tilmaamaan namoota miiliyona 24 waggaatti hubudha. Kanneen keessaa, miiliyona 15 ol Chaayinaa fi miiliyonni 5 Afrikaadha. Akka dhiibbaa dhukkuba addunyaatti sadarkaa duraa kudhan keessa jira. Haala jireenyaa fayyaalessa hintaane kanneen akka furdina humnaa olii, itti fayyadama waantota sammuu adoochaniifi of ajjeesuun sadarkaa olaanaa qabaachuun carraa lubbuun jiraachuu eegamu waggoota 10-25 hir'isa. Dawaan Antipsychotic yaala yeroo dheeraa barbaadu waanta'eef, haalaan fudhachuun nama rakkisa. Kunimmoo bu'aa fafee akka deebi'anii dhukkubsachuu, hospitaala ciisuu fi of ajjeesuu fiduu danda'a. Dhibeen schizophrenia qulqullina jireenyaa irratti dhiibbaa guddaa kan qabu ta'ee, xebena, dogoggra, hanqina hubannoofi hawaasummaan adda baafamuu qaba. Kanuma sababeeffachuun Itiyoophiyaan Ajandaa Guddina Itti fufiinsa Qabuu 2030 madaqfachuun dhibee sammuu akka schizophrenia hir'isuufi karoora fayyaa sammuu qindaa'aa qopheeffatteetti.

Malaafi Argannoo

Qorannoon kun nmoot dhibee smmuun bmnii br 2016 hanga bara 2020tti hospitaalatti yaalamaniii galmee yaalaa qaban 29,184 irratti gaggeeffameera. Dabalataanis Qorannoon hospitaala irratti hundaa'e kan haala to'annoo walsimsiisu dhukkubsattoota dhibee

iskiizoofreeniyaa qaban 218 fi namoota fayyaa qaban 218 umuriin isaanii waggaa ≥ 18 ta'ee fi yeroo walfakkaataatti hospitaala daawwatan kan hammate yoo ta'u, qorannoon qaxxaamuraa hospitaala irratti hundaa'e dhukkubsattoota 909 irratti gaggeeffameera. Gaaffiin caaseffama qabu odeeffannoo waa'ee amala hawaas-dimoogiraafii, sababoota kilinikaa fi odeeffannoo waa'ee itti fayyadama wantootaa kan akka Alkoolii, Tamboo Xuuxuu fi qorchoota biroo fayyadamuu argachuuf (ASSIST) fayyadameera (Group, 2002). Haala Qoricha farra dhibee smmuu hordofuu ilaalchisee kan ittin safarame, Iskeelii Madaallii Dhuunfaa Qoricha (MARS) kan fooyya'e fayyadamuun yoo ta'u, kunis iskeelii of-gabaasaa qabxiilee 10 qabudha. Qulqullina jireenyaa madaaluuf, World Health Organization Quality of Life Assessment Short version (WHOQOL- BREF), qabiyyee 26 qabu, gaaffilee dimshaashaa ofiin of oogganuufi skeeliin isaa haarawni WHOQoL-100 tajaajileera (Organization, 1998). Meeshaan kun tuuta afur qabu: fayyaa qaamaa (qabiyyee 7), fayyaa xiin-qalbii (qabiyyee 6), hariiroo hawaasummaa (qabiyyee 3), tuuta fayyaa naannoo (8) akkasumas hubannoo qulqullina jireenya isaanii irratti qaban qabiyyeew-wan lama waa'ee nama dhuunfaa qofaatti galmaa'anidha. Kanaafuu, qabxiileen madaallii kallattii poozetiiviirra jira (kana jechuun, qabxiin dabalaa deemuun qulqullina jireenyaa ibsa) (Skevington et al., 2004). Akka argannoo irraa mul'atetti, umriin hirmaattotaa giddu galeessaan waggaa 34.18 (SD=+10.43) 18-65 gidduu jira. Harki caalaan hirmaattotaa dhiira, saamuda 706 (77.67%) keesaafi harki cinaa (56.55%) hirmaattotaa magaalaatii dhufani.

Dabalataan, hirmaattota keessaa hedduun barnoota idilee kan hinqabneefi harki cinaa (40.70%) isaanii hojii kaffaltii hinqabne hojjetu. Waggaa shan (2016 to 2020) keessatti schizophrenian 57% irraa gara 65% dabalaa deeme (Fakii 1). Barnoota idilee kan hinqabne (AOR: 3.11; 95% CI: 1.30–7.42), gaa'ela qeenxee (AOR: 6.15; 95%CI: 2.47–15.28), hojidhabdummaa (AOR: 4.60; 95% CI: 1.80–11.71), seenaa dhibee sammuu maatii (AOR: 12.21; 95% CI: 4.83–30.00), amma kan tinboo xuuxan (AOR: 2.31; 95% CI: 1.08–4.91), jimaa kan qama'an (AOR: 2.82; 95% CI: 1.23-6.45) fi waantota sammuu adoochan hedduu kan fayyadaman (AOR: 4.45; 95% CI: 1.28–15.45) Schizophrenia-n wliin hariiroo cimaa akka qaban agrsiisa (Fakii 2).

Qoricha anti-psychotic haalaan hordofuu dhiisuun 44.57%n namoota schizophrenia qaban irratti mul'ateera. Gaa'elli qeenxee (AOR=2.478; 95% CI(1.713-3.855), kan ammatti tinboo aarsan (AOR= 2.034; 95 % CI (1.496- 2.674), kan fayyadaman (AOR= 1.991 ; 95 % CI (1.457- 2.719), jimaa kan qama'an (AOR= 2.836; 95 % CI (2.0601- 3.902) fi dhukkuba waggaa ≤ 5 (AOR 1.446; 95 % CI (1.049-1.993), qoricha fudhachuu dhiisuu wliin hariiroo cimaa akka qaban agrsiisa (Fakii 3).

Doommeenota arfan qulqullina jireenyaa keessaa, doommeenii fayyaa naannoo irratti deebi-kennitoonni giddu galeessaa olaanaa 23.39 (±3.64) fayyaa hawaasaa irratti gadaanaa 9.52 (± 2.57) galnmeessan. Qulqullinni jireenyaa doommeenii fayyaa qaamaa kanneen deeggarsa hawaasum-maa gadaanaa qabanii 0.86 (p-value=0.040)-n gadibu'e.
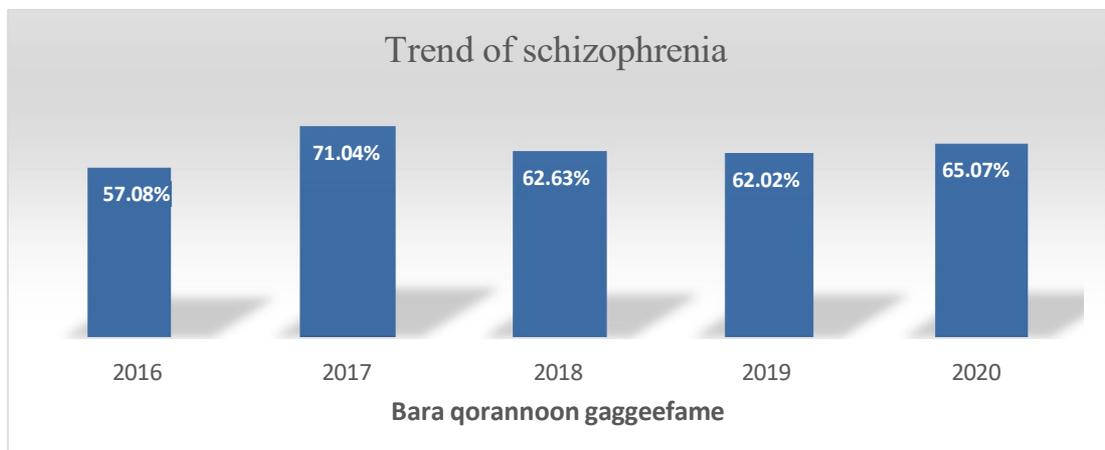
Fakii 1: Guutummaa dhukkubsattoota schizophrenia bara 2016-2020 gidduu jiruu
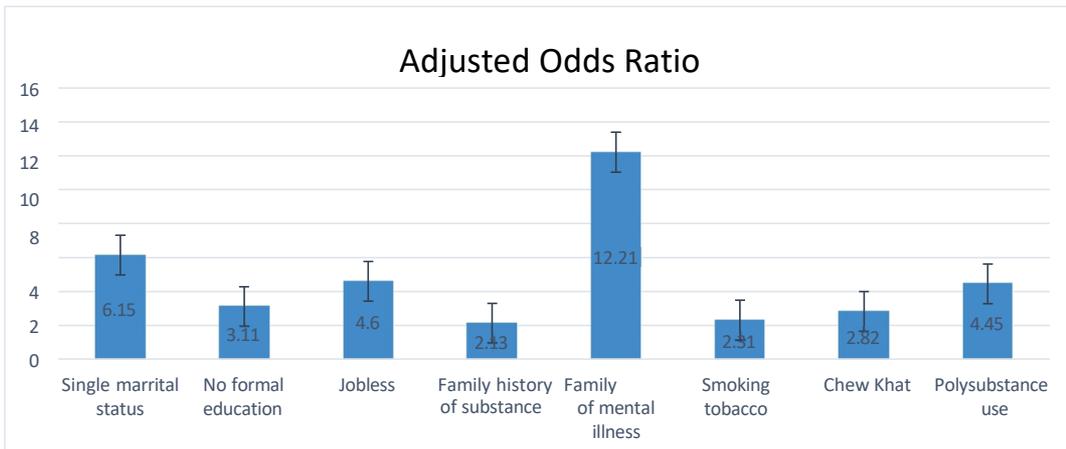
Fakii 2: Murteessitoota dhibee *schizophrenia* Hospitaalota mootummaa, baha Itoophiyaa filataman
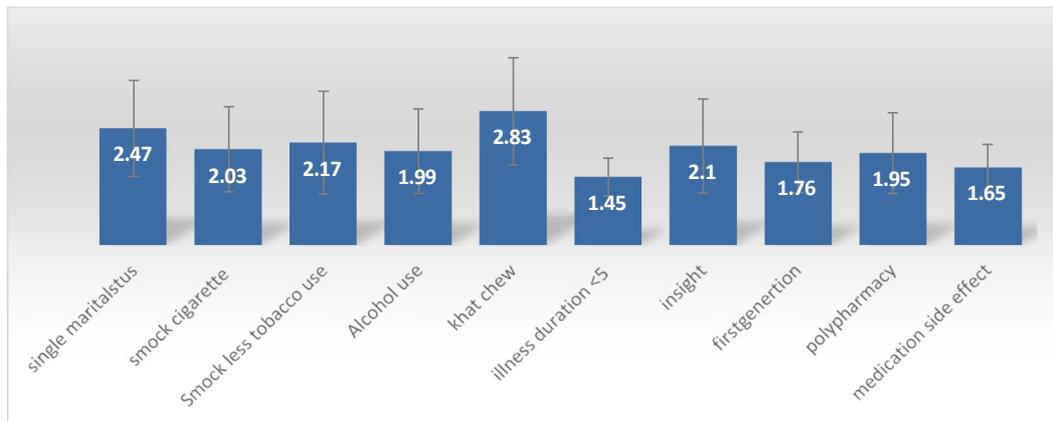
Fakii 3: Sababoota qoricha fudhachuu dhiisuu. Dhukkubsattoota *schizophrenia* qaban Hospitaala mootummaa baha Itiyoophiyaa Mudde 1, 2022 hanga Amajji 31, 2023tti

Qulqullinni jireenyaa doommeenii fayyaa xiin-qabii 0.77(β = -0. 768, P =0.001), waantota sammuu adoochan hedduu kan fayyadamaniifi kanneen deeggarsa hawaasaa gadaanaa qaban 0.48n gadibu'e. Qulqullinni jireenyaa doommeenii hariiroo hawaasaa waantota sammuu adoochan hedduu kan tajaajilaman -0.7(β = -0. 71, P=0.001) fi kanneen ofitti amanamummaa dogoggoraa horatan 0.57 (β = -0.57, P =0.0001)-n hir'ina mul'isani. Qulqullinni jireenyaa doommeenii fayyaa naannoon dhukkubsattoota deeggarsa gadaanaa qaban biratti 0.532(β = 1.125, p-value=0.0001)-n hir'ate.

Yaada Imaammataa

- Ministeerri fayyaa, abbaa taayitaa gumuruukii fi qaamoleen seera kabachiisan waantota sammuu adoochuuf oolan tooftaa ittiin hir'isan irratti hojjechuu qabu.
- Dhaabbileen fayyaa dhaabbilee mit-mootummaa faana qindaa'uun wiirtuu dandamannaa hundeessuufi tajaajila gorsaa kennuu qabu.
- Ooggantoonni hawaasaa, abbootiin amantaa, yuunivarsiitiwwaniifi manneen barnootaa waantota sammuu adoochan fayyadamuun hubaatiinni qabu irratti hubannoo dabarsuu qabu.
- Ooggantoonni hawaasaafi abbootiin amantaa ofitti amanamumuu dogoggoraa hir'isuufi deeggarsa hawaasaa jajjabeessuu irratti qooda olaanaa taphachuu qabu.

Hospitaalota Baha Itiyoophiyaa Keessatti Bakka Baqaqsanii Hodhuutti Dhukkubi Infekshinii Uumamuu Dabaluu fi Of-eeggannoon Ogeeyyiis Gadi-bu'uu

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Ergaawwan Ijoo

- Applications Dhukkubsattoonni harka hedduu (13.98%) hospitaalota baha Itiyoophiyaa keessatti yaala baqaqsanii hodhuun booda dhukkubbi infekshinii kan isaan qunnamu yoo ta'u, baakteeriyaan giraam-negaatiivii baay'inaan (%66.10) adda baafamee infekshinii kanaaf sababa ta'uun argameera.

- Bakka baqaqsanii hodhuutti infekshiniin/dhukkubin uumamuun turtii yaala baqaqsanii hodhuun duraa, dhukkubbii duraa, turtii baqaqsanii hodhuu, farra baakteeriyaa /prophylaxis/ infekshiniin dhorkan, fayyaa waliigalaafi gosa madaa baqaqsanii hodhuu waliin walqabatee.

- Qorichoota hedduu dandamachuun baakteeriyoonni addan baafaman keeesa Staphylococcus Species (baakteeriyaa yeroo baayyee gogaa idilee wajjin walqabatu) kanneen baay'inaan argaman yoo ta'u, Klebsiella Spps fi E. coli itti aanan.

- Narsoonni kutaa baqaqsanii hodhuu fi dubartootaa/da'umsaa keessatti hojjetan ulaagaa beekamoo infekshinii ittisan hinordofan.

Seensa

Bakki baqaqfamee hodhame madaa'uun/ infekshiniin gosa madaa yaala fayyaan wal qabatudha. Innis madaa naannoo ykn bakka yaalame fi/ykn tiishotaafi orgaanota gad jiran guyyoota 30 yaalaman keessatti mudata. Dhukkubni kun dhaabbata eegumsa fayyaa keessatti qormaata fayyaa hawaasaa hamaa ta'ee itti fufee jira. Kunis infekshin/madaa hospitaalaa keesati umamufi gayee olaanaa kan fudhatuufi dhukkubsataa baasii fayyaa olaanaaf saaxiluu, dhukkubbiifi lakkoofsa du'aatii akka addunyaatti jiruuf qooda olaanaa qaba. Fooyya'insi gamaa raawwii kutaa baqaqsanii hodhuu, mala meeshaalee qulqulleessuu, tooftaalee gaarii baqaqsanii hodhuufi madaa'uu/ infekshiniin bakka baqaqfamee hodhamee ittisuuf yaaliin jabaa jiraatus, biyyoota guddachaa jiraniif dhibeen kun fayyaa hawaasaaf yaaddoo ta'ee itti fufeera. Ogeessota fayyaa biroo irraa adda ta'ee, narsoonni madaa baqaqsanii hodhuun dhufu ittisuu keessatti itti gaafatamummaa angafaafi qooda olaanaa taphatu. Haata'uutii, mudannoon madaa baqaqsanii hodhuu, farra baakteeriyaa baakteeriyaan fo'aniif saaxilamuufi raawwilee narsonni naannoo baqaqee hodhame irraa madaa'uu ittisuuf hojjetan akka baha Itiyoophiyaatti qorannoon jiru muraasa.

Malaafi Argannoo

Qorannoon hordoffii dhukkubsattootaa hospitaala irratti hundaa'e hospitaala mootummaa baha Itiyoophiyaa keessatti taasifame. Dhukkubsattoonni 801 waldhaansa baqaqsanii hodhuu olaanaa taasifame mala tooftawaan filatamuun bu'aa fedhii irratti hundaa'uun hordofamani.

Akkasumas qorannoon yeroo tokkotti gaggeeffame narsoonni 476 hospitaalota baha Itiyoophiyaa keessa hojjetan kan carraa irratti hundaa'uun kan filatame fudhachuun qorannoon gaggeeffameera. Ragaan kan madde raga dhukkubsataa sakatta'uu, af-gaaffii dhukkubsattootaafi narsootaa, bu'aa isaaf yaala baqafamee hodhame daawwachuufi kunuunsa madaaf ta'u qajeelfama ulaagaa sadarkaa eeggateen hordofuuni. Xiinxala addeessaafi hariiroo tilmaamaafi bu'aa jijjijjiiramoo gidduu jiru madaaluuf moodelli logistic regression hojiirra oolaniiru.

Saamuda kilinikaa madaa huccuu (swab) qorataman keessaa 112 (13.98%) naannoo baqaqfamee hodhame tuqeen baakteeriyaan adeemsa barameen akka guddatu agarsiisa. Infekshiniin/dhukkubin Uumamuu agarsiisa. Baakteeriyaan adda baafaman kana keessaa harki caalaan (%66.1) "gram-negative" dha. Sanyiin Staphylococcus fo'amoo 36 (32.14%) yoo dursu, kana kan hordofan "*Escherichia coli*" 22

(19.6%) fi "Klebsiella: 21 (18.75%) dha. Sanyiin Staphylococcus lakkoofsa ol'aanaa ta'e qoricha farra baakteeriyaa bal'inaan tajaajilan keessaa sadarkaa olaanaan dandamate agarsiiseera; azithromycin (18/36), gentamycin (16/36), cotrimoxazole (15/36), erythromycin (11/36), tetracycline (10/36) and penicillin (10/36), garuu vancomycin-f saxilamummaa gadi aanaa qabu. Sanyiin Klebsiella olaanaan ceftriaxone (15/21), Ciprofloxacillin (10/21), and amoxicillin with clavulanic acid (8/21) makate kan dandamate, garuu meropenam, gentamycin fi piperacillin tazobactam waliin dhihaatuuf ammoo saaxilamaadha. Escherichia coli ammo guddaan ceftriaxone (13/22) and cotrimoxazole (8/22), kan dandamatuuf meropenam, kanneen akka gentamycin fi piperacillin tazobactam waliin kennamuuf kan saaxilame ta'uu mul'isa.

Gabatee 1: Xiinxala amal-danee dhukkubsattoota baqaqsanii hodhuun taasifameef sababoota SSItti hidhatan, Hospitaalota mootummaa baha Itiyoophiyaa, 2024

Vaaraabiloota	Bu'aa SSI		COR(95%CI)	AOR(95%CI)
	Eeyyee L(%)	Lakki L(%)		
Umuriin waggaan				
<=18	12(20.0%)	48(80.0%)	1	
19-40	83(14.6%)	485(85.4%)	0.685(0,349,1.343)	0.700(0.308,1.592)
>40	42(24.3%)	131(75.7%)	1.282(0.623,2.639)	1.203(0.481,3.006)
Koorniyaa				
dhiira	58(21.6%)	210(78.4%)	1.578(1.089,2.312)	.746(0.396,1.404)
Dhalaa	79(14.8%)	454(85.2%)	1	
Gosa madaa				
Qulqulluu	31(7.0%)	414(93.0%)	1	
Faalamee jira	106(29.8%)	250(70.2%)	5.662(3.684,8.704)	14.725(8.210,26.410)*
Turtii hospitaalaa baqaqsanii hodhuun duraa				
<7 guyyaa	118(15.8%)	630(84.2%)	1	
>=7 guyyaa	19(35.8%)	34(64.2%)	2.984(1.646,5.408)	2.452(1.113, 5.402)*
Turtii adeemsa baqaqsanii hodhuu				
Daqiiqaa 30 keessatti	16(10.7%)	134(89.3%)	1	
Daqiiqaa 31-60	29(12.6%)	202(87.4%)	1.202(0.629,2.299)	1.077(0.509,2.282)
Daqiiqaa 60 oli	92(21.9%)	328(78.1%)	2.349(1.332,4.144)	2.598(1.217,5.546)*
Itti fayyadama farra baakteeriyaa				
Fudhatame	87(13.4%)	560(86.6%)	1	
Hinfudhatame	50(32.5%)	104(67.5%)	3.0951(2.062,4.644)	5.506(3.006, 10.084)*

Haala fayyaa guutuu (ASA score)				
<3	109(14.8%)	628(85.2%)	1	
=>3	28(43.8%)	36(56.2%)	4.481(2.627,7.644)	3.497(1.713,7.141)*
Dhukkubni biraa walin jiraachuu				
jira	27(30.7%)	61(69.3%)	2.426(1.477,3.987)	4.088(2.266, 7.375)*
Hin jiru	110(15.4%)	603(84.6%)	1	
Sigaaraa xuuxuu				
Eeyyee	27(30.0%)	63(70.0%)	2.342(1.428,3.840)	1.210(0.560, 2.613)
Lakki	110(15.5%)	601(84.5%)	1	
Jimaa qama'uun				
Eeyyee	74(27.7%)	193(72.3%)	2.867(1.969,4.173)	2.884(1.322, 3.613)*
Lakki	63(11.8%)	471(88.2%)	1	
Haala soorataa				
Ulfaatina idilee	97(14.8%)	558(85.2%)	1	
Ulfaatina gadi aanaa	22(33.3%)	44(66.7%)	2.876(1.651,5.012)	1.881(0.509,2.084)
Ulfaatina garmalee	18(22.5%)	62(77.5%)	1.670(0.947,2.945)	1.030(0.724,2.738)

ASA- American Society of Anesthesiologists

Sababoota akka gosa madaa, turtii hospitaalaa baqaqsanii hodhuun duraa, turtii adeemsa baqaqsanii hodhuu, itti fayyadama farra baakteeriyaa prophylactic/ preventative, haala fayyaa guutuu (ASA score), dhukkubni biraa walin jiraachuu, jimaa qama'uun Infekshiniin/dhukkubin Uumamuuf gahee guddaa qabatee argameera.

Sadarkaan gaariin ittisa madaa'uu bakka baqaqsanii hodhuu taasifamu %56.4 dha. Leenjiin ittisa madaa'uu (AOR=1.69, 95% CI:1.11-2.58), qajeelfama ittisa madaa'uu fayyadamuu (AOR=2.45, 95% CI:1.34-4.47), meeshaalee madaa ittiin yaalan ga'aa dhabuu (AOR=1.81, 95% CI:1.21-2.71), beekumsa gaarii qabaachuu (AOR=1.81, 95% CI:1.21-2.71) fi ilaalcha gaarii qabaachuu (AOR=1.83, 95% CI:1.21-2.77) kanneen jedhan ittisa madaa'uu naannoo baqaqsanii hodhuu mudatu hanbisuuf raawwatamu faana hariiroo murteessoofi sirriidha (Gabatee 1).

Yaada Imaammataa

- Hoggansi kilinika hospitaalaa turtii dhukkubsatoota hospitaalaafi turtii adeemsa baqaqsanii hodhuu hir'isuu irratti cimsanii hojjechuu qabu.
- Tajaajila fayyaa kan kennan dhukkubsattoota yaaddessoo (dhibee dabalataafi amalaan wal qabatu) malaan qorachuufi adda baasuufi haala sanaan balaa madaa'uu hir'isuuf yeroon farra baakteeriyaa prophylaxis kennuufi balaa adeemsa baqaqsanii hodhuu adda baasuu.
- Biirooleen fayyaa bakkeewwan baqaqsanii hodhuu hordofuu, qajeelfama yaalaa ulaagaa eege hordofuu, ittisa madaa'uu/infekshinii sakatta'uufi itti fayyadama farra baakteeriyaa hospitaalaa hordofuu cimsuu qabu.
- Hoggansi hospitaalaa qajeelfama ittisa infekshiniin istaandardaa'aa jiraachuufi salphaatti argachuu danda'uu mirkaneeffachuufi leenjii hojiirraa itti fufinsa qabu ittisa infekshiniin (SSI) irratti kennuu qabu.

Oomisha Naannootti Argaman Irraa Nyaata Dabalataa Da'imanii Gatii Madaala'aafi Sooraan Badhaadhaa Qindeessuu

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Ergaawwan Ijoo

- Nyaanni dabalataa daa'imaa soora olaanaa qabuufi miirra namootaa simatu oomisha naannootti argaman kanneen akka boqqolloofi ochooloonii biqile ykn bilchaate, mixaaxisa burtukaanawwaa (orange-fleshed sweet potato) fi raafuu/kurumbaa irraa qophaa'uu danda'a.

- Nyaatni daa'imannii dabalataa soorataan badhaadhe qabiyyee pirootiinii (%15.35-16.39), qabiyyee sooraa murteessoo (iron: 7.16-10.36 mg/100g, β-carotene: 113.40-197.53 mg/100g), faca'insa amala sooraa (391.82-440 Kcal) fi sadarkaa jijijjiiramummaa kanneen soora hinqabne (tannins: 2.22-5.79 mg/100g) qophaa'aniiru.

Seensa

Hanqinni wabii nyaataa fi sooraa biyyoota Saaraa gadii, keessattuu Itiyoophiyaatti, bakka hanqinni nyaataa hamaa dubartoota, ijoolleefi daa'imman hubu jirudha. Fooyya'insi hanga ta'e jiraatus, baay'ina jiru keessaa %21.6 soorata gadaanaa argachaa jira. Baatii 6 booda daa'imman harma hoosisuu qofaan soora isaanii barbaachisu waan galma hingeenyeef hanqina nyaataa irraa kan ka'e daa'imman hedduutu du'a. Daa'imman hedduun carraa nyaataa gosa gara garaa soorachuu, nyaata sooraan badhaadhe dhabuun dhibeefi dhukkubaaf

isaan saaxila. Baha Harargee, bakka nyaanni midhaan callaa soorachuu irratti hundaa'e, dhaabbataan bishingaa soorachuun hanqina viitaaminaafi mineraalaa hammeessuun, hanqina nyaataa dagaagsuutti ce'a. Nyaata soora-danuu gatii madaalawaa oomishaa naannootti argamurraa qindeessuun kan barbaachiseef, nyaanni qulqulluu gabaarra jiran hawaasni galii gadaanaa qabaniif waan hindanda'amneef. Kanaafuu, qorannoo kanaan nyaata dabalataa midhaan gara garaa naannootti argaman qindeessuu irratti xiyyeeffate.

Malaafi Argannoo

Nyaata dabalataa soora-danuu oomisha naannootti argaman kan akka boqqolloo, ochooloonii, mixaaxisa burtukaanawwa (orange-fleshed sweet potato) fi kurumbaa/raafuu irraa qindaa'a. galteen isaa kan argame qotee bulaa naannoofi Yuunivarsiitii Haramaayaa irraati. Saamudi qophii mixaaxisa burtukaanawwa fi kurumbaa, daakuu boqolloofi ochooloonii biqile ykn bilchaate waliin waliitti makuudha. Qabiyyee kanneen hanga gara garaan walitti fiduun sukkaaraa %4.5 fi soogidda %0.5 itti dabaluun nyaata dabalaa 8, kg 1/2 qophaa'e. Wantoonni kunniin pirooppoorshinii adda addaatiin walitti makuun nyaataa dabalataa daa'imanni gosa saddeet walakkaa kilograamaa sukkaara %4.5 fi soogidda %0.5 itti dabalatuun qopha'eera.

Qindaa'inni F1-F4 jiran kan qophaa'an boqqolloofi ochooloonii bilchaate irraa yoo ta'u, F5-F8 ammoo kan biqile irraati. Filannoon kan taasifame ga'umsa yaalii duraa qabiyyee sooraa murteessoo gaarii agarsiisuu, hangaafi amaloota tajaajila daakuu sanaa irratti hundaa'e (Gabatee 1). Qindoominni kan walitti dhufu akkataa daa'imaaf ta'a jedhamee taa'e, tokkoon tokkoo isaanii reeshoo sirriin daanga'uutiini.

Bu'aan xumuraa sukkaara 4.5% fi soogidda 0.5% ida'uun haala sirriin saamsamee ol kaa'ama. Ga'umsa soora isaa madaaluuf jiidhina, pirootinii, cooma, kaarboohayidireetii, hanga anniisaa, albuudaafi qabiyyee beetaa-karootiiniif isaa mala ulaagaati tajaajilame. Dabalataan, farri sooraa (tannins and phytic acids), amaloota raawwii kanneen akka bishaan xuuxuu, bulbulamuufi gama yaala dhamdhamaan fudhatamummaa miiraa isaa murtaa'e dha.

Gabatee 1: Haala soorri makaa oomishoota addaa irraa itti qopha'ee

Foormulaa (F)	Reeshiyoo (%)			
	Boqqolloo bilchaate	**Ochooloonii bilchaate**	**OFSP**	**Kurumbaa**
F1	60	15	10	10
F2	55	10	15	15
F3	50	15	20	10
F4	45	10	25	15
	Boqqolloo biqile	**Ochooloonii biqile**	**OFSP**	**Kurumbaa**
F5	60	15	10	10
F6	55	10	15	15
F7	50	15	20	10
F8	45	10	25	15

Madaalliin sooraa kan mul'isu bu'aa abdachiisaa, gama qabiyyee sooraa madaaluun hojjechuufi vayitaaminootaafi mineraalota barbaachisoo dabaluun (Gabatee 2). Sooratni daa'imanni qopha'an keessaa, F1 fi F5 daa'immaniif albuudota fi fudhatamummaa miiraa gaariin ta'uu fudhataman.

Gabatee 2: Annisaafi makaa walitti dhiheenya qabaniin foormulaa daa'immanii qopha'e

Koodii	Cooma (%)	Pirootinii (%)	Ca (mg /100g)	KHD (%)	Vit A (µg/g)	Energy (Kcal)
F1	**10.8±0.65[a]**	**16.39±0.71[a]**	**68.97±0.73[c]**	**60.35 ±0.81[c]**	**120.32±0.78[cd]**	**404.19 ±2.67[ab]**
F2	9.39±0.34[a]	16.18±1.31[a]	99.02±0.83[ab]	63.07 ±2.06[ba]	172.57±6.83[b]	401.60 ±6.77[ab]
F3	10.5±1.06[a]	15.68±0.52[a]	79.46±1.28[abc]	62.08 ±2.21[a]	126.99±5.89[c]	405.69 ±3.3[ab]
F4	8.10±0.39[a]	16.02±0.04[a]	90.98±0.97[abc]	61.69±0.87[c]	162.33±0.03[ab]	383.82± 2.77[b]
F5	**12.4± 0.43[a]**	**15.60±0.46[a]**	**66.75±0.619[c]**	**60.12 ±0.54[d]**	**113.4±16.9[d]**	**412.56± 4.87[a]**
F6	10.52±0.42[a]	15.35±0.38[a]	102.48±3.59[a]	61.42± 0.49[d]	186.07±5.47[ab]	401.87 ±4.55[ab]
F7	11.92±0.60[a]	16.14±0.83[a]	74.75±0.70[abc]	60.08±1.38[bc]	131.98±3.54[c]	412.21 ±4.78[a]
F8	11.31±0.24[a]	16.57±0.52[a]	84.63±0.96[ab]	59.61 ±0.08d	197.53±4.34[a]	406.64 ±1.05[ab]
CV(%)	24.21	4.77	17.67	5.58	5.06	3.28
LSD	4.567	1.32	25.76	5.89	13.52	23.09

*Values represent means ± standard deviation, n=3, results are in dry basis. Means with the same superscript on the same column are not significantly different (p>0.05).*KHD- Kaarboohayidireetii

Gabatee 3: Soora qindaa'e kanneen gabaarra jiran waliin madaallii taasifame

Qabiyyee	Foormulaa (Makaa)		Soora gabaarra jiran	HGE*	Soorri qinda'e % HGE'n yoo madaalamu
	F1	F5	Cerelac/Faffa		
Pirootinii (%)	16.39	15.60	15.8/18	>15	100
Cooma (%)	10.80	12.40	10.5/5.1	10-25	100
Kaarboohayidireetii (%)	60.35	60.12	68.4/70	64	93.9 - 94.3
Hanga anniisaa (Kcal/100g)	404.19	412.56	432/400	400-425	100
Kalsiiyeemii (mg/100g)	68.97	66.75	600/516	500	13.4 - 13.8
Beetaa-karootiiniif (µg/g)	120.32	113.40	400	60-180	100

Hanga guyyaatti nyaachuun da'immaniif eeyyamamu (FAO and WHO)

Foormulaawwan filataman (F1 fi F5) amala faayidaa, dhiibbaa farra sooraa (*tannin*), qabiyyee adda addaa, mineraala, qabiyyee beetaa-karootiiniin fi fudhatamummaa miiraa isaan qabaniin filatamani. Foormulaawwan tokko tokko fooyya'oo ta'anis, foormulaawwan qabiyyee farra soorataa (*taaniin*) xiqqaa qabanii fi fudhatama miiraa guddaa qabantu filame. Qulqullinni soora qindaa'ee/Foormulaa olaanaa, qabiyyeen pirootinii 15.35%-16.57% gidduu kan jiru, hanga pirootinii da'imti soora keessaa argattu guuta. Hangi annisaa soora qindaa'ee, giraama 100 keessaa kiiloo kaalorii 383.82 fi 412.56, guddina fayyaalessa da'imaa guuta. Dabalataan, soorri qindaa'an kaalshiyeemiifi beetaa-karootiiniin kan badhaadhan, soorata barbaachisaa lafeen jabaataa akka guddatuufi dandeettii dhukkuba ittisuu akka dabalu taasisaniin kan badhaadhedha.

Foormulaawwan qophaa'anii fi filataman kunniin dhiibbaa farra soorataa kanneen akka taaninii, asiidota faayitii (*phytic acid*) fi qabiyyee feenooliik (*phenolic content*) haalaan hir'isun, argamiinsa nutirentootaa guddiseera. Dabalataan, sooratni qindaa'e amala faayidaa fooyya'oo kan agarsiisan yoo ta'u, bishaan qabachu fi bishaan keessatti bulbulamuu fooyya'aa ta'e qabu, keessumaa da'immaniif. Gama fudhatamummaa miiraan, F1 (makaan boqqoloofi ochooloonii bilchaate) fi F5 (makaan boqqoloofi ochooloonii biqilan) dhandhama, bocaafi fudhatamummaa waliigalaan qabxii olaana kan galmeessani yoo ta'u, baay'inaan oomishuuf kaadhimmamoo dha.

Foormulaawwan qopha'an kun oomishaalee gabaarra jiranii irraa baasii xiqqaan kan pho'an yoo ta'u, qormaata hanqina nyaataa da'imman bakka qabeenyi daangeffame keessatti mul'atu ni fura.. Oomishaaleen qophaa'an kun sababa dhiibbaa farra soorataa hir'isaniifi fudhatamummaa miiraa qabaniif, bal'inaan madaqsuuf mijatoodha.

Policy Recommendations

- Yuunivarsiitiwwaniifi wiirtuleen qorannoo hawaasaaf leenjiwwan ogummaafi deeggarsa meeshaalee soorata qindeessuuf oolaniifi oomishtoota qinda'ina nyaataa fooyyessuufi waantota naannoo tajaajilamuun bu'aa qulqulluu argamsiisuuf akka ooluuf.

- Ministeerri fayyaafi qaamoleen dhimmi ilaallatu oomishaafi foormulaa kana sagantaa soorata biyyaa keessatti hammachiisuu, kaka'umsa fayyaa haadhaafi da'immanii faana guddisu qababachu. Kun kan hammatu, hawaasa barsiisuufi sooranni dabalataa naannoo keessatti qophaa'u soorata da'immanii fooyyessuufi bu'aa fayyaa itti fufinsa qabuuf qooda olaanaa akka taphatu irratti duula dadammaqinsaa hojjechuu.

- Ministeerri Daldalaafi Industirii dhaabbileen xixiqqaafi waldaalee hojii gamtaa nyaata dabalataa gatii madaalawaan akka oomishaniif, deeggarsa maallaqaa gama liqii maaykiroo, gargaarsaafi tumsaan bira dhaabbachuu qabu.

YUUNIVARSIITII HARAMAAYAA
BIIROO DHIMMA QORANNOO

IBSA IMAAMMATAA 3.2

Caamsaa 2017

GOOROO QORANNOO

III

Bakka Meeshaa Yaalii Murtaa'aa Ta'eetti Sirna Dijitaalaa Dhibee HIV fi Vaayirasii Dhukkuba Tiruu B Waliin Jiran Qorachuuf Oolu

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[1]Kolleejii Kompiyuutiingii fi Infoormaatiksii, Yuunivarsiitii Haramaayaa, Haramaayaa, Itiyoophiyaa
[2]Kolleejjii Saayinsii Fayyaa fi Meedikaalaa, Yuunivarsiitii Haramaayaa, Haramaayaa, Itiyoophiyaa

Ergaawwan Ijoo

- Sirni yaalaa dijitaalaa ogeeyyiin fayyaa namoota HIV fi vaayirasii dhukkuba tiru waliin qabaman bakka meeshaaleen yaalaa murtaa'aa ta'eetti haala gaariin adda baasuu fi yaaluuf gargaaru qophaa'eera.

- Sirnichi dandeettii HIV fi vaayirasii dhukkuba tiru qulqullinaan qorachuu ykn adda baasuu dhibeentaa
95.36 kan galmeesse yoo ta'u fayyadamtoota irraa
fudhatama guddaa argateera.

Seensa

HIV-iin vaayirasii dhukkuba tiru waliin hidhatuun nama qabu akka addunyaatti fayyaa hawaasaaf rakkoo hamaa kan kaa'e yoo ta'u, dhukkubni tiruutii fi du'i sababa kanan saffisaan dabalaa jira. Itiyoophiyaatti saffisi dhukkubi lammen waliin qabamuu dhibbeenta 5.9 hanga 42.8 yoo ta'u, bu'uuraalee misoomaa fi qabeenyi eegumsa fayyaa mutaa'aa ta'uun naannoleen akka Harargee Bahaa addatti miidhamaa jiru. Sababa dabalaa adeemuu dhibee tiruu ariifachiisuuf dhukkubbiiniifi du'aatiin qabatamaan dabale. Itiyoophiyaatti saffisni qaba- waliinii 5.9% hanga 42.8% ta'ee, bakkeewwan akka Baha Harargeettti hanqina meeshaalee yaalaa irraa kan ka'e hubaatii guddaa qaqqabsiisa.

To'annoon bu'a qabeessa ta'e tooftaalee bal'aa kan barbaadu yoo ta'u, kunis qorannoo vaayirasii dhukkuba tiru idilee, yaala farra vaayirasii kan vaayirasii lamaan irratti xiyyeeffate, fi tarkaanfiiwwan ittisaa kanneen akka talaallii fi sagantaalee miidhaa hir'isuu dabalata.

Haata'uutii, hanqinni galteewwanii ejjennoon kun akka hojiirra hinoolle gufuu ta'uun, tatamsa'inni akka dabaluufi hawaasa rakkoo kanaaf saaxilamaniif haala fayyaa gadibu'aa uuma. Hubannoo namtolchee (Artificial Intelligence/AI) fi ragaa coruu (Data mining/DM) walitti qindeessuun, qulqullina qorannoofi hojjetootaaf hojii salphisuun rakkoo kanaaf furmaata abdachiisaadha. Qorannoon kun argannoo mala dandeettii fayyaa tooftaa ragaa coruu qorannoofi to'annoo HIV-vaayirasii dhukkuba tiru qaba-waliinii hir'isuuf beekumsa bu'uureffate waliin qindaa'ee hojiirra oole beeksise. Malichi moodela bu'uura seeraan xiyyeeffannoo ogeessaa makate uumuun, tuuta ragaa guddaa keessaa mala dhokataa baasuuf qajeelfama ragaa coruu hojiirra oolche. Mala duraanii beekumsa ogeessaa irratti qofa hundaa'een yoo wal bira qabamu, inni kun sirrummaa tilmaamaafi murtoo gadifagoo kennuuf fooyya'insa dabala. Itti fayyadamummaa naannoo qabeenyi murtaa'aa jiru keessatti dabaluuf xiyyeeffannoo sirnal digitaala hubannoo namtolchee fayyadamuun HIV fi vaayirasii dhukkuba tiru infekshiiniin qorachuu fi fayyadamtootatti salphaatti akka madaqu godhuun hojjechuu dabalata.

Qaawwa gochaalee eegumsa fayyaa amma jiran furuudhaan sirnichi/malichi rakkoo dhukkubsattootaa fooyyessuu, imaammata eegumsa fayyaa deeggaruun, fi to'annoo HIV fi vaayirasii dhukkuba tiru darba-waliiniif furmaata sirrii madaalamuu qopheessuf kaayyeffateera.

Malaafi Argannoo

Guddinaafi mala dandeettii yaalaa maddan madaaluu irratti xiyyeeffachuun xiinmala Design Science Research (DSR)-ti tajaajile. Sirnichi maloota ragaa guddaa funaanuu fi adda baasu beekumsa ogeeyyii moodela ulaagaa irratti hundaa'ee sababeessu makateera. Ragaan qorannoof fudhatame Hospitaala Ispeeshaalistii Waliigalaa Yuunivarsiitii Haramaya Hiwot Faanaa irraa keezota 1,108, vaayirasii dhukkuba tiru hidhata HIV bara 2016-2022ti. Xiyyeeffannoon ijoo waliigalatti

amaloota 32, isaanis seenaa dhukkubsataa, safartuuwwan yaaliifi seenaa yaalaa dha. Qoodinsa qajeelfamaaf ragaa qulqulluu seensisuuf kanneen hinbarbaachifne keessaa baasuu, kan hanqatan eeruufi sirreessuun hojii jabaati hojjetame. Xiinxalaafi amaloonni 19 qajeelfama Information Gain Ratio irratti hundaa'uun filatamani. Qajeelfama ragaa coruu qoqqooduu afur (PART, JRip, J48, and REPTree) qulqullina tilmaamaa madaaluuf tajaajilani. PART qulqullina olaanaarra geessisuu isaan moodela jabaa qoqqooduuf oolu ta'ee fudhatame. Seeronni qajeelfama MARTn maddan, galtee ogeessaan walitti dabalamani, bu'uura beekumsa sirnicha ta'ani. Hojiirra oolmaafi ga'umsi sistemaa madaalliin dabalataa qabatamaan tajaajiluu isaa ogeeyyiin mirkanaa'e. Akka argannoon mul'isutti, dandeettiin mala yaalaa argame, bakka qabeenyi murtaa'aa jirutti qorannoofi to'annoo fooyyessuuf ga'umsa qabatamaa agarsiiseera (Gabatee 1).

Gabatee 1: Safartuuwwan raawwii hojii qajeelfama ramaddii

Algoriizimii	Accuracy (%)	Precision	True Positive Rate (TPR)	False Positive Rate (FPR)	F-Measure
PART	95.36	0.954	0.954	0.050	0.954
JRip	95.00	0.950	0.950	0.052	0.950
J48	95.09	0.951	0.951	0.060	0.951
REPTree	95.36	0.954	0.954	0.056	0.954

Xiinxalli ga'umsa sirnichaa kan mul'isu qajeelfamni PART olaanaa ta'uu, kan galma ga'insa guddaa dhibbeentaa 95.36 qabuufi modeloota madaalaman keessaa deebii sirrii hin taane (*False Positive Rate* (FPR)) gadaanaa mul'ise. Moodelli seera bu'uureffatee sababeeffamu sirnincha haala ogeeyyii fayyaan dhihaatanitti wal qabatinsa amansiisaafi hojiirra oolmaa qabatamaa waliin qindaa'e. Dabalataan, sirnichi qorannoo amansiisaa olaanaa agarsiise, keezota HBV qaban 432 keessaa 408 fi 668 vaayirasii dhukkuba tiru hinqabne keesaa 641 ifatti adda baase (Gabatee 2).

Gabatee 2: Tilmaama moodeela daataa dhugaa wajjin walbira qabuu

Actual Class	Predicted HBV Positive	Predicted HBV Negative
HBV Positive	408	24
HBV Negative	27	641

Sirni dijitaalaa yaalaa qorannoo kanaan qophaa'ee Baha Hargee, bakka qabeenyi murtaa'aa jirutti HIV- vaayirasii dhukkuba tiru darba-waliinii qorachuufi to'achuuf argannoo abdachiisaa ta'e fide. Tekinikoota ragaa coruufi beekumsa ogeessaa walitti fiduun ga'umsa qorannoo fooyyessuufi hirkattummaa ogeeyyii olaanaafi meeshaalee qorannoo olaanoo hir'ise. Malli kun bifa addaan, buufataalee fayyaa qabeenya (meeshaaleefi human namaa) murtaa'aa qabaniif murteessaadha.

Sirnichi beekumsa ogeessaafi tekinika ragaa coruu, kallattiin qajeelfama qoqqooddii Algorizimii barumsa mashinii fayyadamuun ga'umsa qorachuu olaanaa 95.36% argamsiiseera. Kunis, adeemsa mirkansaa harka kudhan hordofuun sirrummaa dhibbentaa 95.4 mul'iseeraa. Fedha fayyadamtootaa guutuun dhibbentaa 89.44 ogeeyyii fayyaa biratti fudhatamummaa guddaa argateera. Dabalataan, naannoo hanqinni meeshaan fayyaa jirutti qorannoo sirrii yeroodhaan kennuun, bu'aa dhukkubsataa fooyyessuufi ba'aa yaalaa salphisuun shoora olaanaa taphata.

Sirrummaafi fayyadamtootaan fudhatamuun addunyaa qabatamaa keessatti hojiirra ooluu akka danda'uu ni mul'isa. Sirrummaan dhibbeentaa 95.36 ta'uun egeree kan irratti hundaa'e ta'uu mul'isa, sirnichi fayyadamaaf toluun isaa qaamolee fayyaa irratti hojjetaniin madaqfamuuf kennataadha. Dabalataan, dhibeentaa sobaan kennu
5.0 hir'ate qabeenya tajaajilamuu guddisuun yaala hinbarbaachifne gadibuuse.

Gabatee 3: Safartuu Ga'umsa Qoqqoodinsa PART

Metric	Value
Accuracy	95.36%
Precision	95.4%
True Positive Rate (TPR)	95.4%
False Positive Rate (FPR)	5.0%
User Satisfaction Score	89.44%

Accuracy: how close model's predictions are to the actual values. Precision: how consistent model's predictions.

Sirni qophaa'ee dandeettii yaalaa karoorfames baasii kan qusatuufi meeshaa qormaata sirrii kennu, naannolee qabeenya yaalaa muraasa qabaniif mijataa ta'e.

Yaada Imaammataa

- Ministeerri Fayyaa ga'umsaa fi qabatamummaa qormaataa HIV fi vaayirasii dhukkuba tiru fooyyessuuf akka ooluuf sagantaa to'annoo biyyaalessaa keessa oolchuu qaba.

- Biirooleem fayyaa naannoo bu'aa eegumsa fayyaa fooyyessuu, qabeenya haala gaariitti fayyadamuu, fi dhukkubbii fi du'a waliin wal qabamanii hir'isuuf naannoo daddarbiinsa HIV fi vaayirasii dhukkuba tiru baay'ee qabutti mala/sirna qormaata artifishaal intelegeensiin geggeeffaman dursa kennuu fi guddisuu qabu.

- Ministeerri Fayyaa, Waldaan Hakiimoota Itiyoophiyaa fi yunivarsiitiiwwan ogeeyyii fayyaaf itti fayyadama sirna dijitaal artificial intelligensii fayyadamuun geggeeffaman irratti leenjii itti fufinsaan kennuu qabu.

- Ministeerri Maallaqaa naannoo qabeenyi murtaa'aa jiru keessatti sirna dijitaalaa irratti hundaa'e deeggaruuf itti fufinsa deeggarsa maallaaqaafi bu'uuraaleef dursa kennuu qabu.

Dubartoonni Booranaa Wal-caalmaa Caasaa Mormuufi Wal-dhabbii Ceesisuun Mallattoo Humna Dubartummaati

Tasfaayee Guddataa[1*], Guutamaa Imaanaa[1], Muluu Birhaanuu[1], Fikaaduu Addunyaa[2]

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[1]Kolleejjii Saayinsii Hawaasummaa, Yuunivarsiitii Addis Ababaa

Ergaawwan Ijoo

- Dubartoonni Booranaa mallattii jijjiiramaa si'atoodha, nagaa ijaaruufi dursummaa keessatti qooda qabu, akkasumas dursummaafi murtoo kennuu keessatti hirmaachuun wal caalmaa caasaan jiru mormu.

- Dubartoonni Booranaa olaantummaa dhiiraa dura dhaabbachuun, hojii dinagdee keessatti hirmaatu, akkasumas kara sirboota aadaa, jechamaafi durii- duriin seera sirreessu.

- Shoora dubartoonni booranaa hawaasa keessatti qabaniin caasaa walcaalmaa bifa si'ataafi qindaa'aan mormuun yaaxxina dubartummaa qooda ba'eera.

Seensa

Dubartoota Afrikaa miidhamtoota waraanaa taasisanii ibsuufi qabeenya dhiiraa irratti hirkatoo kan jedhu seenessaa qorattootaa bal'inaan jirudha. Seenessi kun shoora dubartoonni Afrikaa qaban akka irra darbamu taasise, utuu dubartoonni mala maluu, walqixxummaaf hojjechuufi caasaa hawaasaa ijaaranii. Dubartoonni caasaa wal caalmaafi hacuuccaa nimormu, wal qixxummaaf warraaqsahawaasummaafi siyaasaa gaggeessu, olaantummaa dhiiraarratti dhiibbaa taasisu. Garuu, ga'ee dubartoonni taphatan kun hinqoratamne, keessattuu hawwaasa Oromoo keessatti.

Qorannoon kun ga'ee dubartoonni Booranaa caasaa walcaalmaa itti furan, hirmaannaa isaan gadaa keessatti qabaniifi hookkarsa aadaa hanisuuf waan hojjetaniifi wal caalmaa yeroo nagaa, waraanaa, fi yeroo waraanaan boodaa irratti xiyyeeffate.

Malaafi Argannoo

Qorannoon kun kibba Itiyoophiyaa, Bulchiinsa Mootummaa Naannoo Oromiyaa, Godina Booranaatti saxaxa qorannoo sanyaabaan gaggeeffame. Namoota ragaan irraa madduufi marii garee qindeessuuf saamuda dhimmataafi darbaa dabarsaati hojiirra oole. Ragaan argame Afaan Oromoo irraa gara Afaan Ingiliziitti jijjiiramuun xiinxalli akkaataa ergaafi madda ragaa lammaffaa (kitaabbilee, barruuleefi gabaasota fudhatamoofi ibsa qaban) irraa kan argamaniin qaxxaamura ilaalamaniiru.

Fooklooriin dursummaafi murtoo kennuu keessatti akka meeshaa wal caalmaa furuu: Dubartoonni Booranaa sirboota, jamootaafi durii-durii tajaajilamuun olaantummaa aadaa dhiiraafi mormii dhageessisuu, murtoowwan siyaasaa irraan dhiibbaa mit-kallattii taasisuu, dursummaafi amala aangoo irrattis qooda taphatu. Kaarrilee keessaan mufii qaban dubbatu, murtoo haqa-qabeessa hintaanetti qoosuufi jijjiirama hawaasaa gaafatu. Yeroo qoraan funaananiifi bishaan waraaban kaarrilee dhahachuun yaaddoofi komii isaanii ibsatu. Qabiyyeen sirbaa jaarrolee bira ga'uun murtoo isaanii irratti dhiibbaan uumama.

Lafa hamtuu karaa hinqabne	a dangerous place devoid of any access routes
Gumee hamtuu garaa hinqabne	a beautiful who do not envy
Nama haaloo baasii hinqanee	a person who is not asked to seek avenge and person who is not asked to stop weeping.
booyee callisii hinqabe	
Ani booyee callise	I cried, but I stayed quiet and patient.

Ibsi aadaa kun diddaafi humneessuutti kan tajaajilu yoo ta'u, dubartoonni bulchiinsa dadhabaa qeequfi caasaa ol'aantummaa dhiironni qaban jeequ. Dubartoonni Booranaa abbaa gadaa filachuufi mirkaneessuu, seera aad-malee jijjiirsisuufi bulchiinsa hawaasaa bocuu keessatti hirmaachuun dursitoota irraan dhiibbaa qabatamaa taasisu. Hubannoofi ooggansaafi murtoo kennuu keessatti hirmaachuun isaanii caasaa hawaasaa fooyyesse, hirmaachisummaafi ga'eessuu dabale. Seenessi abbaa gadaa Dawwe Gobbo (1706–1714), fuudhi tokkoo ol akka hindanda'amne murteesse, murtoo kana Dubbe morme. Dubartoonni waan kana dhaga'anii kaarrileen mormani. Mormiin kaarrilee dubartootaas:

"*Kan Daawwee daawuma;*	Perhaps, Dawwee's suggestion is trash or foolishness;
Kan Dubbe Dubbuma;	
Waan Daawwn jette nu dhageetuma"	Dubbe's idea is serious/valid eloquence.

Dubartoonni yaada Dubbee sirriifi kan hirmaachisummaafi wal qixxummaa dubartootaa eega jedhamee fidhatame. Faallaa kanaan, dubbii Daawwee qarummaafi hubannoo hanqate jechuun haqame. Egasii, yaa'a gadaas ta'e Gumiin Gaayoo seera utuu hinlallabne dubartoota mariisisu.

Jireenya hawaasaa itti fufsiisuu: Dubartoonni Booranaa tika, daldalaafi horii irratti ooganuun safuu aadaa koorniyaa irratti hojjetu. Hirmaannaan isaanii ga'oomsuu, hirmaachisummaa fi maxxantummaa maallaqaa hanqisuu dabale. Raawwilee akka marroon walqixxummaa dinagdeefi wabii nyaataa dabaluu, hojii keessatti ga'ee qooddachuufi jireenya hawaasaa keessatti qooda ba'uun waan barsiifataan dhufe faallessani (redefine).

Seera aadaafi caasaa bulchiinsaa: Dubartoonni Booranaa caasaa bulchiinsaa walcaalmaa qabu gama seera aadaan dhiibbaa taasisaniin aadaa dubartoota tiksuufi mirga issanii eegu, dhiirummaan sirrii kan dubartoota gargaaru malee miidhu akka hintaaneef. Seeronni kun kan of keessaa qabu, namni dubartii miidha itti gaafatama, hookkarsaafi loogii hanqisuu fa'i. Gumiin Gaayoo murtoo kennuu keessatti qoodni dubartootaa olaanaa ta'uufi carraa walqixa kennuu irratti hojjeta.

Ga'ee dubartootaa yoomessa waldhabbii keessatti: yeroo waraanaa: Dubartoonni Booranaa yeroo waraanaa faallaa safuu koorniyaa jira. Akka nama waraana keessa jirutti fudhatamuunii deeggarsi murteessoo akka nyataafi bishaanii ta'aaf, kanaanis aadaa ga'ee qooddannaa faallessu. Hirmaannaan kun dubartoota dadammaqsa, caasaa hawaasaa fooyyessuufi amala koorniyaa ceesisa, nagaafi waraana keessatti qooda isaanii agarsiisuun.

Waraana dhaabuu: dubartoonni Booranaa nagaaf murteessoo (liichoo) dha. Hayyuu garee gara garaa gidduu dubbachuun, lafa nyaphaa seenuun nagaa dubbachuuf haala mijeessu, yaadoofi muddama xiqqeessuuf abbootii seeraan dubbatu. Hirmaannaa isaaniin nagana itti fufinsa qabu akka jiraatu hojjechuun aadaan ga'ee qooddannaa akka cabuufi wal qixxummaa koorniyaa calaqqisiisu. Nagaa buusuu isaaniin dhugeeffannaa horatameen saboota gara garaa walitti fidu, finiina wal dhabbii hanqisu.

Waraana booda: Waraanaan, dubartoonni Booranaa nagaa buusuufi hirmaannaa dinagdee isaaniin wal qixxummaa mirkaneessu. Akkuma liichoo, safuu koorniyaa cabsuun dhimma nagaa dubbatu. Gama dinagdeen, horsiisa horii, daldaluufi aannan argatan maallaqaan akka of danda'aniifi human murtoo kennuu olaanaa qabaatu. Hariiroon hawaasummaa (Marroo) wabii nyaataa mirkaneessuufi dandamannaa hawaasaa fide. Kanaafuu, dubartoonni Booranaa taatee waraanaan boodaa keessatti qoodaa olaanaa taphatu.

Ga'ee dubartootaa caasaa walcaalumaa furuu keessatti: Dubartoonni Booranaa sababa safuu aadaa, olaantummaa dhiiraa, qabeenya murtaa'aa, jijjiirama haala qilleensaafi waraanaan wal caalmaa caasaa furuuf dhiibbaa guddaati irra jira. Hanqinoonni kunneen hirmaannaa murtoo kennuu isaanii murteesse, ga'ee qe'ee jirutti isaan daangessuufi qoodni isaanii mit-kallattiin akka raawwatu malee fuuldura walqixxummaaf akka hihojjenne ta'e.

Carraan qabeenyaa akka lafaafi liqii xiqqaachuun of danda'ummaa dinagdee isaanii hubuufi hacuuccaaf isaan saaxile. Naannoo waraanaatti buqqa'uu, horii ofii dhabuufi hookkarsaaf saacilamuu malee mirga isaaniif akka hindubbanne isaan dhorke. Miidhaa dubartoota irratti qaqqabsiisaniin hinimatamiin hafuun sodaafi callisuun akka uumamu, mormii aad-malummaa koorniyaa xiyyeeffatee raawwatu irratti jijjiirama jiru hanqise.

Yaada Imaammataa

- Ministeerri Nagaa ga'ee dubartoonni Booranaa nagaa buusuu keessatti qabaniif beekamtii kennuufi dubbiiwwan nagaa idileefi mit-idilee, akkasumas adeemsa murtoo kennuu sadarkaa kamiiyyu keessatti hirmaachisuu. Kun kan gabbatu, leenjii dandeettii waldhabbii furuu gabbisu kennuuni.
- Ministeerri Haqaa qaamolee dhimmi isaa ilaallatu waliin ta'uun ilaalcha dubartootaa yaaxxina waldhabbiifi nagaa garaa garummaa saalaa hir'isuufi nagaa ijaaruuf qooda qaban bu'uuralee seeraatti fiduu irratti hojjechuu qabu.
- Ministeerri Qonnaa dhaabbilee maallaqaa waliin ta'uun qabeenya (lafa, liqii, carraalee galii) oomishtummaa dubartoota Booranaa tumsan guddisuun hirkattummaa maallaqaa isaanii hanqisuu qabu.

Nageenyaa fi Araara Naannoo Waldhabdeetti: Gahee Pirojektii Daangaa Qaxxaamuraa Booranaa

Gaaddisaa Tasfaayee[1*] fi Riichaard Weenzil[1]

[1]Kolleejjii Seeraa, Yuunivarsiitii Haramaya, Itiyoophiyaa

Ergaawwan Ijoo

- Pirojektiin Inisheetiivii Daangaa Qaxxaamuraa Booranaa qindoomina hawaasa gidduu jiruu fi ittisa walitti bu'iinsaa Zoonii Booranaa fi naannolee ollaa jiran haalaan guddiseera.

- Inisheetiiviin Pirojektii Daangaa Qaxxaamuraa Booranaa wal hubannoon hawaasa gidduutti akka dabalu, qabeenya uumamaa waliin fayyadamuun akka jajjabaatu, akkasumas ijaarsi dandeettii nagaa uumuu marii hunda galleessa ta'een akka guddatu, duulli hubannoo uumuu fi hirmaannaa hawaasaa akka guddatu taasiseera.

- Pirojektichi dhaabbilee naannoo walitti bu'iinsa irratti dalagan dandeettiin isaan walitti bu'insa ittisuu fi furuu irratti qaban akka dabalu fi hirmaannaan dubartootaa fi dargaggoota nagaa ijaaruu irratti qaban haalaan guddiseera.
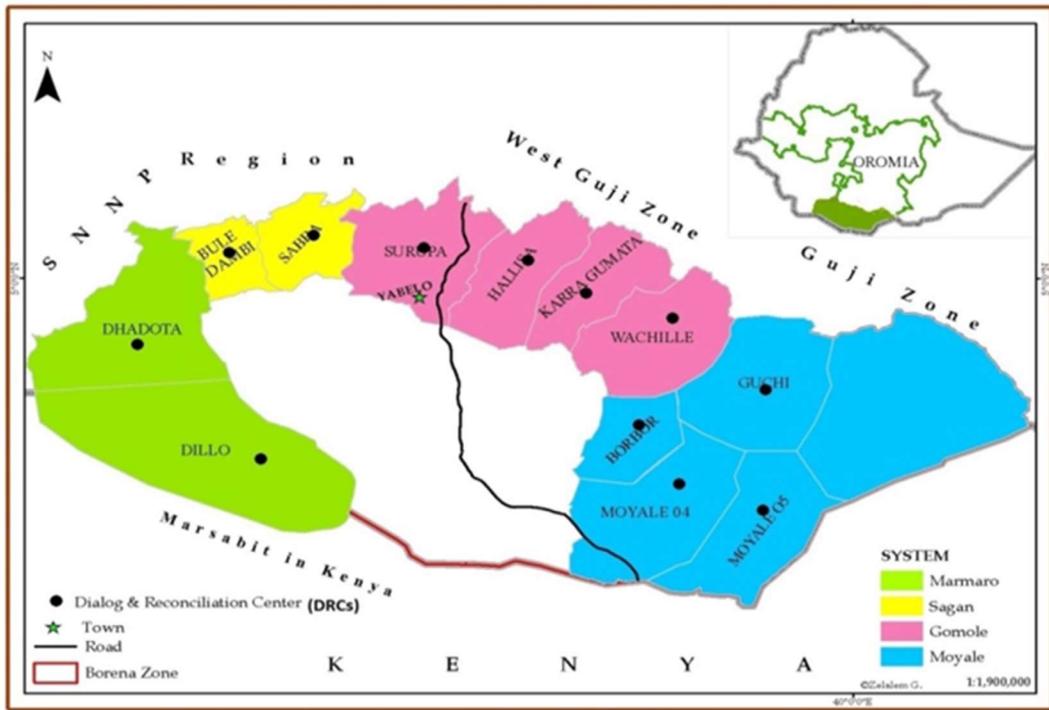
Seensa

Waldhabdeen sabaa gosa waldhabdee saboonni adda addaa aangoo siyaasaa, qabeenya dinagdee, ol'aantummaa aadaa, fi to'annoo lafaa irratti wal dorgomaniidha. Waldhabdeen kunniin walqixxummaa dhabuu dhugaa ykn yaadame, jal'ina seenaa, siyaasa eenyummaa, fi dorgommii qabeenya hanqina qabuun kan uumaman yoo ta'u, jeequmsa, loogii fi gargar bahuu hawaasaa fiduu danda'u. Gaanfi Afrikaa naannolee Afrikaa tasgabbii hin qabne keessaa tokko yoo ta'u, sababoota fi qooda fudhattoota hedduu qaba. Itoophiyaa keessatti wal-dhabdeen uumamaan siyaasaa, diinagdee, saba, amantii, fi naannoo waliin wal qabatu dha.

Keessattuu Kibba Itiyoophiyaa Godinaa Booranaa Mootummaa Naannoo Oromiyaa fi naannoo daangaa naannoo ishee keessatti waldhabdeen sabaa fi sablammootaa baay'inaan ni mul'ata. Naannoon kun sabaa fi sablammoota hedduu kan akka Booranaa, Gabra, Gujii, Garri, Konsoo, Bhurjii, Wagyu, Hammer, fi Arboree hedduu qaba.

Gareen akkasii seenaa lafa, siyaasa eenyummaa fi qabeenya uumamaa daangeffame irratti wal dhabdee qaban. Akkaataan waldhabdee naannoo kana keessatti mul'atu roga hedduu qaba. Waldhabdeen kun waldhabdee furmaata hin arganne kan akka weerara loon qaba. Malli waldhabdee akkanaa furuuf itti fayyadaman marii hawaasaa hunda hammate, waliigaltee bulchiinsa qabeenya, fi sirna waldhabde furuu sadarkaa naannootti dhaabbata taasisuudha. Kanaaf pirojektiin kun waldhabdeewwan yeroo dheeraaf seenaa keessatti walitti hidhamiinsa hawaasummaa fi qabeenya argachuuirratti jeequmsa gurguddaa geessisan Godina Booranaa fi naannolee daangaa qaxxaamuraa itti aananii jiran salphisuuf kan kaayyeffate ture.

Malaafi Argannoo

Pirojektichi waggoota afuriif kan raawwatame goodina Booranaa Mootummaa Naannoo Oromiyaa, Ityoophiyaa, fi naannolee daangaa qaxxaamuraa ishee walitti aananii jiran keessatti. Qorannoon kun aanaalee 17 (kebelelee 80) irratti kan xiyyeeffate yoo ta'u, sabaa fi sablammoota adda addaa kanneen akka Booranaa, Gabra, Gujii, Garri, Konsoo, Burjii, Wayyu, Hamar, fi Arboree dabalatee hirmaachise. Waldhabdee walxaxaan naannoo kana keessatti mul'atu sirnoota adda addaa afuritti ramadama: Moyale, Gomole, Sagan, fi Marmaro.

Fakkii 1. Maappii naannoolee qorannoon itti gaggeefame argisiisu

Pirojektiichi mala "ummataa gara uummataatti" jedhamuun kan gaggeefame yoo ta'u kunis miseensota hawaasaa, jaarsolii, hoggantoota aadaa, fi bakka bu'oota bulchiinsa naannoo gareewwan waldhaban adda addaa irraa kuma kudhaniin lakkaa'aman waliin marii gaggeessuu dalagame. Haala naannoo, akkasumas dursa hawaasaa hubachuu fi gidduu-galummaawwan itti aanan odeeffannoo kennuudhaaf, hojiiwwan ijoo madaallii bu'uuraa fi xiyyeeffannoo gadi fageenya qabu kan hammatan yoo ta'u: odeeffannoo maatii irraa walitti qabuuf namoota 1100, mariif namoota 52, fi af-gaaffiif namoota 34 dhaan odeeffannoo funaanameera.

Mariin hawaasaa bal'aan bulchiinsa qabeenya uumamaa walta'iinsaan fayyadamuu, ilaalcha gareewwan gidduu jiru guddisuu, fi dambii ittiin bulmaataa hawaasaa uumuuf kaayyeffate mala pirojektichaaf barbaachisaa ta'e hojiirra ooleera. Sochiiwwan walqunnamtii fi araaraa gareewwan gidduutti taasifamuu, kan akka sirna bunaa waloo, ayyaana aadaa, fi kaampii dargaggootaa waliin ta'uun, hojiiwwan kun hundinuu walgahii ummataa, marii raadiyoo fi maxxansaatiin duula hubannoo uumuu bal'aa ta'een dabalamaniiru.

Kana malees, sagantichi koreewwan nagaa, jaarsolii, fi qondaaltota mootummaaf leenjii fi workshopii sadarkaa olaanaa walitti bu'iinsa ittisuu fi furuu irratti kennuudhaan seera qabeessummaa fi tumsa dhaabbilee haqaa ofiisaa fi aadaa deeggareera.

Bu'aan qorannoo kanaa akka agarsiisutti sagantichi manneen murtii aadaa fi dhaabbilee haqaa naannoo ciccimoo ta'an uumuun, tumsa/waliigaltee gareewwan gidduu fi qoodinsa qabeenya uumamaa fooyyessuun, kilaboota nagaa dargaggootaa fi neetwoorkii nagaa dubartootaa uumuun hariiroo gareewwan gidduu jiru akka cimu gargaareera. Pirojektiichi walta'iinsa guddisuu fi hubannoo gareewwan gidduu jiru haaromsuu irratti milkaa'eera. Fakkeenyaaf, maatii fi firoota dhibbaan lakkaa'aman, keessumaa miseensota garee Booranaa, Gabraa fi Gaarii waggoota dheeraaf walirraa adda ba'an turan akka walitti dhufan godheera. Walqunnamtiin hawaas-dinagdee gareewwan akkasii deebi'ee maatiin akka walitti makaman fi hawaasni qabeenyaafi gabaa kanaan dura sababa walitti bu'iinsaan cufame akka argatan taasiseera. Kanarraa kan ka'e hawaasni cufame kanneen kanaan dura gabaa gurguddoo argachuu irraa ala turan gabaa barbaachisoo ta'an irra deebi'anii argachuu danda'aniiru, kunis gareen Gaarii gara gabaa magaalaa Borboritti deebi'uu isaati.

Gaa'elli fi waliigalteewwan yeroo gogiinsa sochii beeyladaa murteessoo ta'an hayyaman bu'aa adeemsa marii walfakkaatoo hawaasa Booranaa, Arboree, fi Wayyaayyuu gidduutti taasifamee ture.

Dabalataanis, jalqabbii kanaan qabeenya uumamaa qoodamuu fi tumsa gareewwan gidduutti taasifamu haalaan fooyyesse. Qabeenya waliinii walta'iinsaan itti fayyadamuuf waliigalteewwan marii irratti gaggeeffaman hoggantoota hawaasaa fi qondaaltota mootummaa naannootiin mallattaa'aniiru. Kunis lafa dheedichaa hawaasaa hektaara kumaatamaan lakkaa'amu fi bishaan wal falmisiisaa ta'e kan akka "Iddoo dheedichaa Chabbii fi bishaan Argile" walta'iinsaan hoggansaafi mariif akka banaman taasiseera. Bu'aa marii dorgommii irratti tumsa jajjabeessu irraa kan ka'e dambii ittiin bulmaataa hawaasaa waloo qophaa'ee ragga'eera. Rakkoolee jireenyaa ciccimoo furuufis, kaka'umsi kun maatii fi hawaasni Konsoo naannoo dhiyoo jiran lafa qonnaa fi qabeenya bosona barbaachisoo kebelelee Booranaa dhiyoo jiran akka argatan taasiseera. Wanti guddaan, manneen murtii aadaa deeggaruun fi xiyyeeffannoon koreewwan nagaa bulchiinsa muddama irraa gara safartuu dursanii fudhachuutti jijjiiruun dandeettii fi dhaabbilee naannoo walitti bu'iinsa ittisuu, bulchuu fi furuuf guddiseera.

Walqunnamtii fi araara hawaasaa fooyya'aa ta'e dagaagsuuf pirojektiin kun koreewwan nagaa irra deebiin gurmeessuun manneen murtii aadaa uumuu fi hojii akka hojjetanis deeggareera. Kanarraa kan ka'e sirni haqaa idilee fi aadaa caalaatti seera qabeessaa fi tumsa ta'eera. Dhuma irrattis pirojektichi gahee ijaarsaa fi hirmaannaa dubartootaa fi dargaggoota waldhabdee furuu fi araara keessatti qaban haalaan guddiseera. Pirojektichi waldhabdee uumuu fi hambisuu keessatti gahee dhalootaan qaban beekamtii kennuudhaan kilaboota nagaa dargaggootaa fi toora nagaa dubartootaa hundeesseera. Neetworkiin kun dubartootaa fi dargaggoota gareewwan waldhabdee uumuu danda'an irraa gara ergamtoota jijjiirama naannootti bu'a qabeessa ta'een kan jijjiiran yoo ta'u, ijaarsa nagaa irratti dammaqinaan akka hirmaatan, jijjiirama ilaalchaa guddisuu, fi walqunnamtii gareewwan gidduutti itti fufiinsa qabu karaa duula hubannoo uumuu, taateewwan aadaa waloo, fi kaampii dargaggoota ganna "sanyii-nagaa" uumuun deggareera. Carraan qabeenyaa akka lafaafi liqii xiqqaachuun of danda'ummaa dinagdee isaanii hubuufi hacuuccaaf isaan saaxile.

Naannoo waraanaatti buqqa'uu, horii ofii dhabuufi hookkarsaaf saacilamuu malee mirga isaaniif akka hindubbanne isaan dhorke. Miidhaa dubartoota irratti qaqqabsiisaniin hinimatamiin hafuun sodaafi callisuun akka uumamu, mormii aad-malummaa koorniyaa xiyyeeffatee raawwatu irratti jijjiirama jiru hanqise.

Yaada Imaammataa

- Nageenyaa fi waajjiraaleen bulchiinsa naannoo marii hawaasaa, akkasumas marii gareewwan gidduutti taasifamu fi tattaaffii araaraa itti fufee jiruun wal hubannoo, tumsa, fi tattaaffii nagaa ijaaruu, kunuunsuu fi guddisuuf tattaaffii gochuu qabu.
- Ministeerri Haqaa fi biiroon haqaa naannoo dandeettii dhaabbilee naannoo kan akka koree nagaa fi manneen murtii aadaa fooyyeessuu, mala isaanii sirna seeraa ammayyaa wajjin walsimsiisuu, karaa tumsaa fi odeeffannoo waljijjiiru uumuu qabu.
- Ministeerri Dhimma Dubartootaa fi Hawaasummaa kilaboota nagaa dargaggootaa fi dubartootaa uumuu fi gargaaruun, hojii isaanii pirojektoota hawaasaa gurguddoo keessatti hammachuudhaan hirmaannaa dubartootaa fi dargaggootaa ijaarsa nagaa keessatti babal'isuu qaba.
- Ministeerri Nageenyaa fi Ministeerri Qonnaa waliigalteewwan bulchiinsa qabeenya uumamaa tumsaan uumuu fi jalqabbii ijaarsa nagaa tooftaalee jireenyaa itti fufiinsa qabuun walqabsiisuun walitti bu'iinsa qabeenya irratti hundaa'e hir'isuu fi waldhabdee hawaasaa dandamachuu fooyyessuu qabu.

Qonni Magaalaa Baha Itoophiyaatti Jireenya Maatii Fooyyessa

Gabraigiziabiher Nigus[1*], Mangistuu Katamaa[2], Jamaa Hajii[1], Miliyoon Silashii[1]

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[2]Waldaa Diinagdee Itiyoophiyaa, Addis Ababa, Ethiopia

Ergaawwan Ijoo

- Gosoota qonna magaalaa (QM) keessaa tokkoo yookiin isaa ol irratti hirmaachuun galii isaanii dhibbentaa 13-27, baasii waan fayyadamanii dhibeentaa 13-36 fi annisaa nyaata sooratanii dhibeentaa 8-34 dabaluun guutummaa jireenyaa isaanii fooyyessa.

- Dhiibbaaleen ijoo hirmaannaa abbootiin warraa QM-rra jiran carraa liqii, leenjiifi hubannoodha.

Seensa

Lakkoofsi namaa saffisaan dabaluufi babal'inni magaalaa lafti qonnaa akka xiqqaatu, magaalaatti fedhi nyaataa dabaluufi nyaanni qulqullina hinqabne heddummachuuf qooda olaanaa kanneen taphatan keessaa isaan ijoodha. Galmoonni Guddina Waarawaa (Sustainable Development Goals) 2030 rakkoolee kanaaf mul'ata ceesiisaa, fuulduree beelarraa walabaa, wabii nyaata dhaabuufi hanqina nyaataa gama hundaan jiran irratti hojjeta. Hanqina wabii nyaataa magaalaa, taateen guddachaa jiru, sababniifi furmaanni isaa hanqina wabii nyaataa baadiyyaa irraa adda. Qonni magaalaa hanqina wabii nyaataaf furmaata ta'uuf kan madde, hiyyeeyyii magaalaaf madda nyaataafi galii ta'ee achumaanis naannoo eeguufi dhiibbaa hanqina lafa qonnaa hir'isuuf qooda ba'a.

Kanaafuu, qorannoo kanaan qonni magaalaa baha Itiyoophiyaatti haala jireenya maatii irratti shoora inni taphatu sakatta'uuf karoorfame.

Malaafi Argannoo

Magaalota baha Itiyoophiyaa shan, Haramaayaa, Qullubbiifi Qarsaa (Nannoo Oromiyaatii), magaalaa Harar (Naannoo Hararii) fi magaalaa Dirre-Dhawaa (Bulchiinsa Magaalaa Dirre-Dhawaa) irraa odeeffanoon yeroo tokkoo (cross-sectional) funaanameera. Mala saamudaa gulantaan abbaa warraa 385 filataman keessaa 270 QM irratti kan hirmaataniifi 115 ammoo kan hinirmaanne of keessaa qaba. Xiinxalli ragaa qorannoo addeessaafi moodela dinagdee keessaa hirmaannaa QM-tti gufuu kan ta'an adda baasuuf moodela Multivariate Probit (MVP) fi dhiibbaa hirmaannaan haala jireenyarratti fidu sakatta'uuf moodela Multinomial Endogenous Switching Regression (MESR)-ti hojiirra oole.

Akka argannoon mul'isutti murtoon abbootiin warraa horiifi kuduraa, midhaan/muduraafi kuduraa, akkasumas midhaan/muduraafi horsiisa horii irratti hirmaachuuf taasisan walirratti kan hirkatanidha. Xiinxalli MVP hojiirra oolmaa QM irratti dhiibbaaleen hedduu akka jiraniifi isaanis sadarkaa gara garaa akka qaban mul'ise (Gabatee 1).

Gabatee 1: Dhiibbaalee hirmaannaa qonna magaalaa miidhan

Vaaraabiloota	Kuduraalee Coef. (SE)	ME	Horii Coef. (SE)	ME	Midhaan-Muduraa Coef. (SE)	ME
Sex	0.46**(0.23)	0.073	0.61* (0.34)	0.099	-0.02 (0.18)	-0.004
Age	-0.02**(0.01)	-0.003	-0.00 (0.02)	-0.000	-0.01 (0.01)	-0.002
Education	0.02 (0.02)	0.004	-0.02 (0.04)	-0.003	-0.00 (0.02)	-0.000
Occupation	0.18 (0.24)	0.030	0.47* (0.28)	-0.076	0.04 (0.18)	0.006
Family size	-0.09 (0.06)	-0.014	-0.15 (0.10)	-0.023	0.06 (0.05)	0.010
Land size	-1.24**(0.48)	-0.200	0.08 (0.58)	0.013	-0.10 (0.38)	-0.016
Extension	0.12 (0.09)	0.020	0.02 (0.12)	0.003	0.05 (0.06)	0.008
Perception	-0.47 (0.30)	-0.075	7.40***(0.74)	0.192	0.54** (0.21)	0.087
Credit	0.69***(0.26)	0.110	0.44 (0.42)	0.072	-0.23 (0.18)	-0.037
Experience	-0.01(0.02)	-0.002	0.01 (0.02)	0.002	0.00 (0.01)	0.001
Group participation	0.44 (0.29)	0.071	3.35***(0.42)	0.540	-0.15 (0.23)	-0.024
Market distance	0.08 (0.09)	0.012	0.25***(0.10)	0.040	0.15**(0.06)	0.024
Training	0.95***(0.27)	0.154	0.27 (0.33)	0.044	0.45** (0.21)	0.073
Non-farm income	0.64 (0.41)	0.102	0.64 (0.59)	0.103	0.13 (0.35)	0.021
Dependency ratio	0.42 (0.35)	0.067	0.16 (0.36)	0.027	-0.49**(0.25)	-0.078
Constant	-5.80 (4.40)		-9.77 (6.37)		-1.45 (3.86)	
Predicted probability		0.873		0.519		0.629
Joint Probability (Success)				0.4389		
Joint Probability (Failure)				0.0206		
Draw Number (#)				100		
Log Likelihood				-269.62		
Wald χ2(45)				670.08		
Prob > χ2				0.000*		
				**		

Madda: Bu'aa moodelaa (2022); *Standard errors are shown in parentheses; ME refers to marginal effects.*

Abbootii warraa oomisha kuduraa irratti hirmaataniif gufuu kan ta'an saalaafi umurii oogganaa abbaa warraa, hanga lafaa, carraa liqiifi carraa leenjii QM fa'i. Horii horsiisuu irratti kan irmaataniif saala oogganaa warraa, gosa hojii, hubannoo bu'aa QM, irmaannaa garee hawaasaafi fageenyi gabaa dhiibbaalee ijoodha. Dhiibbaaleen oomisha midhaan/kuduraa mudatan hubannoo bu'aa QM, fageenya gabaa, leenjiifi sadarkaa hirkatummaa fa'i.

Bu'aan yaala giddu-galeessaa bu'aa qabatamaafi kanneen faallaa jiran gidduu garaa garummaa ifa ta'e agarsiise (Gabatee 2). Kun kan mul'isu, warreen QM irratti hirmaatan kanneen hinirmaannerra fooyya'insa jireenyaa akka agarsiisuudha. Gosoota QM adda addaa irratti hirmachuun gaalii hirmaattotaa 13-27% dabaluu isaa argannoon kun ni mul'isa. Dabalataan, warraa QM irratti hirmaatan kanneen hinirmaannerra ga'eessi tokko baasiin tajaajilaa 13-36%-n fi hangi kaaloorii fudhatanii 8-34% dabaluuti mul'ate. Argannoon kun kan mul'isu, qonni magaalaa oomisha qonnaa gara galii olaanaatti jijjiiruun, akkasumas fayyadamummaa guddaafi soora hannisaa fudhatamu dabaluun, jireenya maatii akka fooyyeessuudha.

Gabatee 2: Hirmaannaan qonni magaalaa jireenya maatii irratti fide

Bu'aa	Muuxannoo QM	Hojjechuuf Actual	Kan hinojjenne Counterfactual	Jijjiirama yaalii giddu galeessaa ATT	Change (%)
Galii	$V_1L_0C_0$	34357.67	27656.42	6701.25***(2330.35)	24.23
	$V_0L_1C_0$	26733.96	21763.27	4970.69**(1935.03)	22.84
	$V_0L_0C_1$	29971.74	24972.04	4999.70**(2135.36)	20.02
	$V_1L_1C_0$	29878.32	26392.86	3485.46*(2071.21)	13.21
	$V_1L_0C_1$	32253.22	25720.22	6532.63***(1341.69)	25.40
	$V_0L_1C_1$	28743.20	25220.25	3522.95* (1822.93)	13.97
	$V_1L_1C_1$	32366.11	25446.05	6920.06***(810.64)	27.20
Baasii	$V_1L_0C_0$	16852.75	12414.90	4437.86*** (1113.5)	35.75
	$V_0L_1C_0$	16096.08	12659.88	3436.20*** (851.30)	27.14
	$V_0L_0C_1$	16172.69	13233.23	2939.45** (1132.86)	22.21
	$V_1L_1C_0$	16060.12	13321.63	2738.49*** (711.48)	20.56
	$V_1L_0C_1$	15901.55	13319.91	2581.64*** (722.90)	19.38
	$V_0L_1C_1$	14120.83	12517.95	1602.88** (703.89)	12.80
	$V_1L_1C_1$	15314.74	13408.28	1906.47*** (378.30)	14.22
Kiiloo kaalorii	$V_1L_0C_0$	2934.83	2191.60	743.24***(133.87)	33.91
	$V_0L_1C_0$	3146.30	2900.25	246.05* (123.58)	8.48
	$V_0L_0C_1$	2916.06	2834.81	81.25 (160.41)	2.87
	$V_1L_1C_0$	2914.44	2875.13	39.30 (123.05)	1.37
	$V_1L_0C_1$	2863.82	2236.29	627.52***(103.60)	28.06
	$V_0L_1C_1$	2628.20	2186.81	441.39***(109.50)	20.18
	$V_1L_1C_1$	2708.28	2093.09	615.19***(52.59)	29.39

Madda: Bu'aa moodela (2022)   Note: Standard errors are shown in parentheses.

Yaada Imaammataa

- Ministeerri Qonnaa wabii nyaata magaalaafi jireenya maatii mirkaneessuuf qonna magaalaa irratti imaamaata qopheessuu qaba.
- Biirooleen qonnaafi bulchiinsonni magaalotaa jijjiirama QM madaqsuun jiru tajaajilamuun QM akka amaleeffatamu dadammaqsuu qabu.
- Biirooleen gara garaa magaalaa jiran, yuunivarsiitiiwwan, wiirtuwwan qorannoofi manneen barnootaa QM hojiirra oolchuufi agarsiisuu qabu.
- Dhaabbileen maallaqaa abbootii warraa QM irratti hirmaataniif deeggarsa gochuu qabu.

Mission

Undertake knowlege-genetating,problem solving and cutting-edge reasearch and provide demand-driven and transformative community engagement activies that will contribute to local, national, regional and sustainable development.

Vision

Haramaya University strives to be one of the top ten universities in Eastern Africa with an international reputation by 2030.

Goal

To evolve as an autonomous and independent (academic and research institute) graduate and research university with competitive national and international quality and relevance standards in its academic, research, and community engagement endeavors.

Haramaya University Research Themes and Sub-themes

Theme 1: Productivity and Environmental Sustainability for Food Security and Poverty Alleviation
Sub-themes:
1. Animal Production and Health
2. Plant Production and Health
3. Environment, Natural Resources, and Climate Change

Theme 2: Human Health, Nutrition, and Welfare
Sub-themes:
1. Health Promotion and Disease Prevention
2. Advances in Curative and Rehabilitative Health Services and Disease Management
3. Nutrition, Food Safety and Security, Dietetics, and Nutritional Problems
4. Reproductive Health, Maternal and Child Health

Theme 3: Energy, Engineering, and Information Technologies
Sub-themes:
1. Information Technology and Computing
2. Advanced Material Research and Development
3. Energy Resource Development and Utilisation
4. Postharvest Technology, Processing, and Food Analysis
5. Civil Infrastructure, Manufacturing, and Industrial Technology

Theme 4: Human and Social Development
Sub-themes:
1. Society, Culture, and Tourism
2. Educational Advancement and Quality Assurance
3. Population, Gender, and Development
4. Governance and the Rule of Law

Theme 5: Institution, Innovations Systems and Economic Development
Sub-themes:
1. Economic Development, Policy, and Institutional Analysis
2. Innovation Systems and Impact Evaluation Studies

Theme 6: Basic Science Research
Sub-themes:
1. Bioscience Research
2. Chemical Science Research
3. Biophysics and Computational Physics
4. Mathematical Research