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Behavioral Intention towards Dietary Diversity among Adult People Living with HIV in Public Hospitals in Southwest Ethiopia Using Theory of Planned Behavior—An Explanatory Study

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Abstract: Dietary diversity is a crucial element of inclusive care for people living with HIV (PLWHIV). Particularly in resource-limited countries where undernutrition and food insecurity prevail, low intention and poor attitude towards diversified diets are the common challenges. The aim of this study was to assess the intention towards dietary diversity behavior among adult PLWHIV in Jimma Zone public hospitals, Southwest Ethiopia. A hospital-based survey study was carried out in five public institutions among 403 sampled adult PLWHIV. Data were entered into Epi-Data (The EpiData Association, Odense, Denmark) and exported to SPSS version 20 (IBM, Armonk, NY, USA) for analysis. Relationships among variables were assessed using correlation coefficients. A multivariable linear regression model was fitted to assess predictors of behavioral intention towards dietary diversity at p -value ≤ 0.05 . The quantitative data were supplemented by qualitative data, which were collected through key informant interviews and analyzed thematically. The significant predictors of intention to use dietary diversity were attitude ($\beta = 0.196$, $p < 0.01$) and subjective norm ($\beta = 0.390$, $p < 0.01$) of the adult PLWHIV. The constructs of theory of planned behavior (TPB) independently explained the variance in intention towards dietary diversity by 25.7%. All the intermediate, proximal and distal components of the theory of planned behavior (TPB) explained the final model finding 32.2% of variance in the intention to use dietary diversity. The qualitative findings indicated that delivery of HIV care requires a sense of livelihood development, economical improvement and creating a sense of ownership for sustainable HIV care by creating behavioral change at the individual level. Conclusion: Dietary inadequacy was strongly correlated with being in the sociodemographic groups that are at heightened risk of adverse clinical outcomes. It is worthwhile to understand behavioral intention as a potential determinant of malnutrition and the Poor ART outcomes rather than symptomatic treatment of malnutrition with food by prescription.

Keywords: behavior; dietary diversity; HIV; intention; Jimma Zone; PLWHIV

1. Introduction

A many-sided and negative emphasis is given to the role of behavioral intention in people infected with human immune deficiency virus (HIV) and behavioral intention [1,2]. Poor dietary diversity can, in turn, hasten the progression of HIV infection and increase the risk of developing opportunistic infections (OIs).

There is a similarity in the cellular effects of malnutrition and HIV—the immune system becoming compromised by decreasing CD4 T cells, suppression of delayed hypersensitivity and abnormal B-cell responses. Providing sufficient food and nutrition to meet people’s basic needs for health, growth and development has been a longstanding challenge for African countries [3]. Thus they require greater protein and micronutrient intake in order to improve the weakened immune system [4,5]. Optimal nutrition can help boost the immune function, maximize the effectiveness of antiretroviral therapy (ART), reduce the risk of opportunistic infections (OIs) and improve the overall clinical care and life expectancy of PLWHIV [6].

HIV-positive individuals require 20–30% more energy than HIV-negative individuals of the same age, sex and physical activity level [7]. Dietary diversity scores (DDs) have been positively correlated with increased mean micronutrient density adequacy of complementary foods and micronutrient adequacy of the diet in adults [8]. Even then there is complex interaction between dietary diversity/intake, immune function and HIV/ AIDS and malnutrition [9].

In Ethiopia, 9% PLWHIV are severely malnourished and 25% are moderately malnourished [10,11]. Assuring adequate access to food in highly active antiretroviral therapy (HAART) treatment programs has been a central demand of PLWHIV in low-income countries and, as such, nutrition by prescription and therapeutic feeding has been assimilated [12–16].

Nutritional problems are among the first negative effects of HIV infection. These problems are due to inadequate diet intake and altered metabolic conditions, provoking impaired balance of energy and nutrients in patients even when they are treated with antiretroviral therapy (ART) [3]. The effect of poor nutrition in the case of PLWHIV is more urgent as they have to grapple with opportunistic infections. Dietary management of PLWHIV is the key to sustaining the ability to continue participating in the workforce and contributing to socioeconomic development [17]. Food insecurity and poor nutritional status may speed up progression of acquired immune deficiency syndrome (AIDS)-related illnesses [18].

The dietary diversity score at the individual level is a proxy indicator of adequate intake of energy and micronutrients [19]. Eating a diversity of foods (varieties of food groups) is an internationally accepted recommendation for a healthy diet, and is associated with positive health outcomes such as reduced incidence of mortality [20]. Dietary diversity is therefore a key concept that should be promoted in managing the nutritional situation of PLWHIV [15]. The relationship between nutrition and HIV infection is very complex and can fluctuate due to factors such as nutritional status, including wasting or weight loss and micronutrient deficiencies, HIV disease stage and other physiological factors and diets [21].

A number of development partners have participated in the planning and implementation of major initiatives and programs for HIV treatment, prevention, care and support in Ethiopia and Africa at large. For example, the “3 by 5” initiative was designed to treat 3 million people in 2005. “Getting to zero” was a theme of the 2015 World AIDS Day commemoration targeted to achieve “zero new HIV infections, zero discrimination and zero AIDS-related deaths. “Treat all food by prescription”, appointment spacing model care and HIV continuum care are other strategies that eloquently promote the universal HIV care coverage to ensure that all HIV-positive individuals receive ART irrespective of their CD4 count, World Health Organization (WHO) clinical stage or viral load.

From the above list, a program directly concerned with nutritional care is the Food by Prescription program that involves nutritional assessment, counseling and support to decrease nutritional problems in malnourished patients with HIV. However, food insecurity often occurs. The program is challenged by individual, institutional, community and health system-related factors. Scholars criticize this program by saying “symptomatic treatment is very expensive”/“the cheap intervention is very expensive”.

As far as the authors know, there is no evidence regarding the behavioral intention towards dietary diversity of PLWHIV in Ethiopia. Thus, this study aimed to assess be-

havioral intention of PLWHIV towards dietary diversity, which is very critical in settings where multicultural practices prevail, such as Ethiopia.

2. Methods and Materials

2.1. Study Area and Period

A hospital-based study was conducted in the Jimma Zone at five public hospitals (Jimma Medical Center, Shenen Gibe, Agaro, Seka and Limmu hospitals) from March to May 2018. During the study period, a total of 11,186 adults and 2683 pediatric individuals were on chronic HIV care (from the five public hospitals' database).

2.2. Study Population

A randomly selected group of 403 adult (≥ 18 years) PLWHIV were included in the study. However, patients who were too sick (WHO stage/grade IV) and HIV-positive adults with additional chronic non-communicable diseases such as diabetes mellitus, hypertension and current pregnancy were excluded from the study.

2.3. Sample Size and Sampling Procedure

A single population proportion formula was used to estimate the study sample size with the assumptions of prevalence of 50%, confidence level of 95%, 5% margin of error, and 5% allowance for non-response rate. The study participants were allocated proportionally based on the number of highly active antiretroviral therapy (HAART) patients in each hospital; then, 403 samples were drawn from the total listed patients' records.

2.4. Data Collection Tools and Procedure

Based on their relevance, most of the questions in the study were adapted from the theory of planned behavior (TPB) [1,2]. The format for the questionnaire consisted of seventy-five items separated into nine domains. The first domain assessed PLWHIV's knowledge, past experience and economic status on dietary diversity (14 items), the second domain was to ascertain the future and past behavioral intention of PLWHIV (2 items), the third domain was about behavioral beliefs (6 items), the fourth domain was about outcome evaluation (6 items), the fifth, sixth, seventh and eighth dealt with normative beliefs (9 items), motivation to comply (9 items), control beliefs (4 items) and power of control (4 items), respectively, and the ninth domain was background information (20 items). Finally, data were collected through face-to-face interviews by five BSC nurses and supervised by two masters of public health.

Additionally, in-depth interviews were conducted to explore factors related to intention towards dietary diversity behavior and to explore the quantitative findings. The overall aim of the in-depth interviews was to explore factors affecting behavioral intention towards dietary diversity of PLWHIV, plus to strengthen capacity for quality and sustainable clinical care of PLWHIV towards the new approach to care via the appointment spacing model (ASM). This approach helps to reduce direct and indirect costs of clients, stigma and discrimination, improve satisfaction by two visits per year (every six month) to answer the following three questions. (a) First, to what extent are patients who began HIV treatment after the rollout of ART continuing to engage in ART care? (b) Second, what are the characteristics of patients and the existing support of PLWHIV other than ART? (c) Third, why do people fail to improve their nutritional status, including availability of food at home, practice of dietary diversity, knowledge of dietary diversity and challenges of dietary diversity? In this regard, a mixed-methods approach within a specific economic and sociocultural context was used as exploratory of the predictors for undernutrition among 14 study participants (key informants) from HAART service providers, community advocates, HAART coordinators, and adult PLWHIV, who were purposively selected considering the roles and experiences they had to provide rich and relevant information. Finally, the research team leader further probed the content of the field notes and debriefing sessions.

2.5. Data Processing and Analysis

Data were coded and entered into EPI-data version 3.14 (The EpiData Association, Odense, Denmark), manufactured in 2017.USA and then exported to SPSS version 20.0 (IBM, Armonk, NY, USA) for analysis. Independent variables with $p \leq 0.25$ at bivariate analysis level were entered into multiple linear regressions to control potential confounders. Finally, variables, which had a value of $p \leq 0.05$ within respective confidence intervals (CIs) at multiple linear regression analysis, were considered to be independent predictors of dietary diversity behavior of PLWHIV.

2.6. Ethical Approval and Informed Consent

This study was approved by the institutional review board of the Institute of Health of Jimma University, Ethiopia (Ref. No. IHRPGC/1095/2017). All participants provided written informed consent prior to enrollment into the study, and data were explained in an aggregated way to maintain confidentiality throughout the data analysis and manuscript preparation.

3. Results

A total of 403 adult PLWHIV, of whom 196 (48.6%) were females, participated in this study. The mean age of the study participants was 29.5 (± 8.4) years. Concerning to marital status, 233 (57.8%), 81 (20.1%) and 46 (11.4%) were married, divorced and single, respectively. More than half, 236 (58.6%), of the study participants were urban residents.

Only less than a third (31.8%) of the respondents reported to be food secured whereas more than a third (37.8%) of them reported to be food insecure with either moderate (20.8%) or severe (16.8%) hunger (Table 1).

Table 1. Sociodemographic characteristics of adult people living with HIV, Jimma Zone public hospitals, Southwest Ethiopia, May 2018.

Variables		Frequency	Percentage (%)
Sex	Female	196	48.6
	Male	207	50.4
Residence	Rural	167	41.4
	Urban	236	58.6
Age in Years	18–24	84	20.8
	25–34	140	34.7
	35–44	111	27.5
	≥ 45	68	16.9
Marital Status	Single	46	11.4
	Married	233	57.8
	Divorced	81	20.1
	Separated	26	6.5
	Widowed	20	4.2
Religion	Muslim	186	46.2
	Orthodox	142	34.9
	Protestant	72	17.7
	Others	3	0.7
Educational Status	Cannot read and write	51	12.7
	Read and write	47	11.7
	5–8 Primary	64	15.9
	9–12(Secondary)	97	24.1
	Collage and above	144	35.7

Table 1. *Cont.*

Variables		Frequency	Percentage (%)
Employment Status	Merchant	155	38.5
	Government employee	122	30.0
	Farmer	98	24.3
	Others	28	6.9
Food Security Situation	Secure	128	31.8
	Insecure without hunger	123	30.5
	Insecure with moderate hunger	84	20.8
	Insecure with severe hunger	68	16.8

3.1. Intention of Adult PLWHIV towards Dietary Diversity Behavior

A total of 234 (58.1%) respondents did not have intention towards dietary diversity. The most frequently mentioned reasons for not consuming diversified food in their usual diets were household food insecurity (275 or 68.2%) and lack of information on the importance of diversified food (127 or 31.5%). The constructs of theory of planned behavior indicates that direct attitude, subjective norm and perceived behavioral compliance (PBC) had mean values of 23.26 (SD = 6.19), 15.55 (SD = 3.47) and 20.40 (SD = 7.14), respectively which explained behavioral intention towards dietary diversity (Table 2).

Table 2. Perceived risk of undernutrition, perceived risk of severe clinical outcome and intention of dietary diversity behavior of people living with HIV (PLWHIV) in Jimma Zone, Ethiopia, May 2018.

Components	Number	Items	Scale Range	Scale Mean (SD)
Direct SN	403	5	5–20	15.55 (3.47)
Intention	403	5	5–20	10.55 (3.82)
Direct PBC	403	5	5–28	20.40 (7.14)
Direct attitude	403	5	5–28	23.26 (6.19)
Motivation to comply	403	5	5–25	16.37 (7.06)
Control belief	403	5	5–25	16.75 (4.76)
Behavioral belief (BB)	403	6	6–30	25.47 (4.24)
Evaluation of behavioral belief (EBB)	402	6	6–30	22.26 (5.36)
Indirect attitude = (BB) _i (EBB) _i	401	6	6–150	92.43 (33.19)
Normative belief (NB)	403	6	6–30	23.82 (5.21)
Motivation to comply (MC)	402	6	6–30	21.15 (5.74)
Indirect SN = (NB) _i (MC) _i	403	6	6–150	79.55 (32.99)
Control belief (CB)	401	6	6–30	24.85 (5.19)
Power of control (PC)	403	6	6–30	21.94 (5.87)
Indirect PBC = (CB) _i (PC) _i	403	6	6–150	52.45 (28.52)

3.2. Overall Descriptive Findings of Behavioral Intention of PLWHIV towards Dietary Diversity

More than half (55.7%) of the study participants positively perceived dietary diversity depending on what significant others believed and half (50.5%) of them had good motivation to comply. Close to two-thirds (60.7%) of the respondents reported favorable behavioral beliefs and a similar proportion (59.7%) of the outcome evaluations were desirable towards intention to use dietary diversity when eating at home. Regarding the subjective norm, more than half (59.4%) of them reported a high value of social pressure as to what significant others said regarding favorable intentions to use diversified foods in their usual feeding habits (Table 3).

Table 3. Overall descriptive findings of the theory of planned behavior constructs of adult PLWHIV on highly active antiretroviral therapy (HAART) in Jimma Zone public hospitals, May 2018.

Variables	Frequency in %	Mean	SD	Min.	Max.
Behavioral belief					
Favorable	60.70%	4.35	0.68	1.65	5
Unfavorable	39.30%				
Outcome evaluation					
Desirable	59.70%	4.48	0.76	1	5
Undesirable	40.30%				
Normative belief					
Perceived positively	50.70%	3.61	0.75	1	5
Perceived negatively	49.30%				
Motivation to comply					
Good	50.50%	3.74	0.88	1	5
Bad	49.50%				
Control belief strength					
Facilitating	47.50%	3.88	0.76	1	5
Hindering	52.50%				
Control belief power					
Above the mean	54.00%	3.75	1.14	1	5
Below the mean	46.00%				
Intention to use DDs					
Good	48.20%	3.68	1.33	1	5
Bad	52.80%				
Attitude to DDs					
Good	52.20%	74.62	17.59	17	100
Bad	48.80%				
Subjective norm					
High value to S/P	59.40%	74.36	28.19	9	125
Low value to S/P	40.60%				
Perceived BC					
Perceived easy S/P	60.20%	60.12	22.66	8	100
Perceived difficulty S/P	39.80%				

S/P: social pressure.

3.3. Correlation of Dietary Diversity Behavioral Intention to Theory of Planned Behavior Constructs

Among the constructs, subjective norm showed the highest correlation ($r = 0.42$, $p < 0.001$) followed by perceived behavioral control ($r = 0.39$, $p < 0.001$) and attitude ($r = 0.38$, $p < 0.001$). The Cronbach's alphas measures for attitude, subjective norm, perceived behavioral control and intention to use were 0.63, 0.73, 0.74 and 0.96, respectively (Table 4).

Table 4. Correlation of the indirect and direct measures of theory of planned behavior among adult PLWHIV, Jimma Zone public hospitals, 2018.

Components	DATT	DSN	DPBC	IATT	ISN	IPBC
Attitude	0.63 ⁺⁺					
Subjective norm	0.42 ⁺⁺	1				
PBC	0.46 ⁺⁺	0.39 ⁺⁺	1			
IATT	0.57 ⁺⁺	0.49 ⁺	0.38 ⁺	1		
ISN	0.24 ⁺	0.52 ⁺⁺	0.25 ⁺	0.36 ⁺	1	
Intention	0.18 ⁺⁺	0.25 ⁺⁺	0.45 ⁺⁺	0.31 ⁺⁺	0.30 ⁺⁺	1

Note: Correlation is significant at ⁺⁺ $p < 0.001$, ⁺ $p < 0.05$, DATT: direct attitude, IATT: indirect attitude, DSN: direct subjective norm, ISN: indirect subjective norm, PBC: perceived behavioral control, DPBC: direct perceived behavioral control, IPBC: indirect perceived behavioral control.

3.4. Predictors of Intention towards Use of Dietary Diversity

Statistically significant predictors of intention to use dietary diversity were found to be attitude ($\beta = 0.196$, $p < 0.01$), subjective norm ($\beta = 0.390$, $p < 0.01$), perceived behavioral control (PBC) ($\beta = 0.048$, $p = 0.001$), and motivation to comply ($\beta = 0.03$, $p < 0.01$). This indicates that a unit positive change in the individual's perception about any counseling support from health professionals to use diversified food in their usual feeding as a normative action will increase the intention to use dietary diversity by 0.39 provided that the other conditions and medical care are in place.

At the same time, a unit positive change in the attitude towards the advantage associated with the use of diversified food for PLWHIV will change the intention to use dietary diversity by 16.6%, keeping all the comprehensive HAART care and livelihood factors constant. PBC and subjective norm explained 25.9% of the variance. When perceived behavioral control and sociodemographic factors were added to attitude and subjective norm, there was an additional 6.5% variance in the intention and the model explained 32.2% of the variance in consistent use of dietary diversity in the home (Table 5).

Table 5. Distal, intermediate and proximal constructs of the theory of planned behavior among adult PLWHIV with intention to use dietary diversity in Jimma Zone public hospitals, May 2018.

Variables	Unstandardized	Standardized	T	95% Confidence	p-Value
	β Coefficients	β Coefficients		Intervals	
Constant	0.57	3.37	0.873	(1.86, 5.61)	<0.001
Sociodemography	0.85	0.038	9.360	(−0.86, 3.21)	<0.001
Direct attitude	0.92	0.196	7.033	(0.05, 0.22)	<0.01
Direct s/norm	0.135	0.39	4.887	(0.42, 0.57)	<0.001
Direct PBC	0.234	0.048	3.352	(−0.04, 0.12)	0.011
Motivation to comply	0.222	0.03	2.674	(−0.08, 0.14)	0.563
Control belief	0.291	−0.029	3.418	(−0.12, 0.06)	0.471

Statistically significant predictors at $p < 0.05$. VIF: variance inflation factor < 10.

3.5. Explanatory Findings

Most common problems regarding dietary diversity were explored and the findings were presented in five themes. These were household food security, health system, income opportunity, individual behavior and support-related hindering factors.

3.5.1. Lack of Food at Home

Lack of food at home is one of the problems of adult PLWHIV on ART; follow-up was found to be critical according to the quantitative findings. Most of the in-depth interviewees mentioned emotionally the problem of availability and access to food at home. A female participant explained the condition by saying: "Let alone living with the disease and the limited capacity we have now, it is difficult to survive in Ethiopia even for a bachelor graduate who has regular monthly salary. Life for PLWHIV is getting very difficult".

Another health care provider for PLWHIV participant said that: “All PLWHIV have a demand to eat four to six times a day. The drug needs that much. But in most of the cases, they couldn’t even afford to eat two to three times a day. Sometimes, I feel shame when I hear such sound of PLWHIV”.

3.5.2. Problems of the Health System

The study participants also suggested the health system design routine behavioral change initiatives as a coping strategy to encourage dietary diversity at home for all PLWHIV rather than design a treatment protocol for undernutrition. In addition to the issue of individual behavioral change, creating income opportunities for PLWHIV on HAART as a strategy to sustainably reduce malnutrition and improve quality of life was mentioned.

A male participant said that, “Taking HAART can effectively prevent suffering and death. However, to sustain this promising outcome longer and to start thinking more about our health, we need to have a healthy diet differently from people free of HIV. In addition, when they have behavioral change and have their own job, they can support their own life and even they can bring impact on the primary prevention program of HIV in the country”.

3.5.3. Income Generation Opportunities

A majority of the discussants reported repeatedly that they passed days without food to eat but they did not miss doses of their HAART for they said it is their life. A male discussant said that, “The issue of HAART is serious. You can argue about food after taking your pills but you can’t say anything about any issue by discontinuing your pills because this is a life issue. Sometimes you need to take the pills without food if conditions didn’t allow you to access food”.

One female participant was quoted as saying that, “The difference in the effectiveness of the treatment is a matter of access to the food you want at the time and amount you need. I even believe the disease could be eliminated from the face of the world if PLWHIV on HAART could access the required food needed for the drug from government or non-governmental stakeholders”.

3.5.4. Individual Behavior

The participants also reflected that HAART improved their general health status, decreased frequency of infections, improved appetite, enhanced a sense of wellbeing, self-esteem, hope to live indefinitely, weight gain and increased CD4 count, but they did not know the importance of dietary diversity at home. A servant in the health institutions said that 30% weight gain, 43% increased CD4 count, 29% improved BMI and 27% reduced opportunistic infection were detected in the past two years/before data collection time among the individuals who had positive behavior on dietary diversity, meaning trying their best to eat diversified food at home was documented.

A female participant was quoted as saying that: “When PLWHIV started the treatment their CD4 count was only 1 per micro liter. Now, it is more than 600 per micro liter. Their weight was also 40 kg and now their weigh is 60 kg. But this improvement is not merely due to HAART; rather it is the combined effects of HAART and diversified food eating at home. It is also due to the psychological stability, pleasure and care they are getting from health professionals who are taking care of us in the hospital”. Almost all discussant perceived that lack of food to take with the HAART had an impact on the level of the benefits PLWHIV would gain from the treatment, if not on the level of behavioral change towards dietary diversity.

3.5.5. Absence of Food AID/Support

The discussants from the in-depth interviews agreed that lack of food/absence of food at home was an issue that is overlooked by the program and a challenge to the

successful implementation of the food by prescription program for PLWHIV in the stage of undernutrition.

On the other hand, the discussant mentioned that PLWHIV continued to depend on the food aid and food by prescription programs without behavioral change; consequently they may withdraw from their treatment due to lack of food and become hopeless/negligent, which in turn may lead to a new strain of the virus resistant to drugs appearing in the community, which could lead to failure of the whole program.

4. Discussions

The components of theory help explain determinants for a certain behavior to be endorsed or avoided by clients in their usual feeding habits. The study revealed that more than 50% of respondents in each construct had desirable beliefs (control of their beliefs in terms of the intention for using dietary diversity in their home) while all the comprehensive HAART care was in place. The fact that the TPB explained more than a quarter of the intention of using dietary diversity is in line with a study conducted in Dilla, Ethiopia and South Africa [22,23], in which a 35% variation in the intention for use of healthy diet was explained.

Similarly, a study conducted in Burkina and Tanzania [24,25] explained 30% and 31% variation, respectively, in the intention to use dietary diversity and the social cognitive aspects explained 27%, 26% and 29% in Mozambique, Addis Ababa and Kenya [26–28] where the theory explained about two-thirds of the variance in intention to choose diversified feeding at home. On the other hand, this is lower than the findings of studies done in Uganda and Malawi, where 58.8% and 59% of the study participants had low dietary diversity, respectively [29,30]. This shows that HIV-positive adults in the present study area had inadequate dietary intake compared to what is revealed in the previous studies, with dietary diversity, i.e., standards/the number of foods consumed across time and within food groups over a reference period, widely recognized as a key indicator of nutrient adequacy [31–35].

Each of the model constructs was positively correlated with the intention towards using dietary diversity and this is consistent with the results of other studies done in Addis Ababa and other African countries to predict intention to use HAART comprehensive services [36–39]. From the constructs of the TPB model, the subjective norm was the first strong positively correlated variable, followed by attitude. This suggests that each variable explained the variation in intention to use dietary diversity.

Absence of food aid and duration of antiretroviral treatment were significantly associated with dietary diversity. It is noted that HIV-positive adults who were on ART for less than 2 years and 2–3 years were more likely to have low dietary diversity, which exacerbated the weight loss and nutritional problems experienced by PLWHIV. It is known that taking the drugs without adequate food, and antiretroviral side effects such as nausea, taste changes and loss of appetite, may reduce food consumption, while inadequate food and side effects such as diarrhea and vomiting may increase nutrient losses [40]. From this point of view, the findings of this study can help identify the variables of focus in intervention programs intended to bring about the desired healthy feeding and reduction of malnutrition. This has a significant impact and warrants counseling on the practice of dietary diversity as part of comprehensive HAART intervention programs. Both PBC and subjective norm explained 25.9% of the variance in the intention towards dietary diversity, which is less than the findings of a study done in Kenya [41] on healthy diet behavior of PLWHIV. Studies revealed that subjective norm and perceived behavioral control (PBC) are pertinent predictors of intention to reduce dietary diversity practice and utilize it at home. As a result, a variety of nutrients are obtained and thus nutrient adequacy is attained [42,43]. Nutrition interventions that support, educate and create income generation opportunities for low-income PLWHIV are very critical if healthy eating is to be embraced. Changes at policy level should be well thought out to increase affordability and accessibility of healthful food in low-income settings [44]. This difference could be because of the personal and

cultural difference and the low contribution of behavioral intention observed in the present study. Ajzen also argues the magnitude of the PBC–intention relationship is dependent upon the type of behavior and nature of the situation.

The highest predictor of intention towards dietary diversity was subjective norm followed by attitude. This finding corresponds with studies conducted in Philadelphia, Metema and Hawassa [45–47]. This might be due to similarities in terms of source of social pressures and underlying normative beliefs. In addition, salient belief measures the nature of TPB, which is locally and culturally sensitive and might contribute to the instances of the findings.

5. Conclusions

From this study, it was understood that PLWHIV's intention towards dietary diversity was low, which explained 32.2% of variation in intentions towards using dietary diversity among adult PLWHIV. The predictors of behavioral intention towards dietary diversity were direct and indirect attitude, direct and indirect subjective norm, and direct and indirect perceived behavioral control. Additionally, the study documented that the intermediate variables and proximal variables of TPB explained nearly equal variance, suggesting both variables are equally important and should be taken into account in behavioral change interventions. Therefore, intention can be used to extend theories and to design interventions, which can increase the ability of those programs to change behavior rather than treating only malnutrition of the PLWHIV. The paradigm model is supportive and can be suggested for application of any nutritional programs considered to prevent undernutrition and reduce HAART care resistance and improve quality of life through nutritional education to be focused on subjective norm, attitude, and social norms and perceived behavioral control other than the food by prescription program, which is focused on symptomatic treatment. This study recommends a further longitudinal or interventional study which covers more area and factors of behavioral change compared with HIV-positive patients who have good intention towards dietary diversity.

5.1. Strength

Quantitative data were supported by qualitative data. The instrument was developed according to standard guidelines, relevant literature and an elicitation study was conducted to identify the salient beliefs of intention to apply the theory in the local context.

5.2. Limitation

This study did not account for the actual behavior to be predicted based on the theory of planned behavior constructs, which may show how much behavioral intention could be transformed into actual behavior. The TPB is purely psychosocial and lack of similar local literature may affect the scope of the study. In addition, there might be a possibility for bias to emerge in systematic sampling, since the samples were selected randomly and the researcher used his own discretion.

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Abbreviations

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
ASM	Appointment spacing model care
BB	Behavioral belief
BC	Behavioral control
EBB	Evaluation of behavioral belief
CI	Confidence intervals
DATT	Direct attitude
DDs	Dietary diversity score
DSN	Direct subjective norm
DPBC	Direct perceived behavioral control
HAART	Highly active antiretroviral therapy
HIV	Human immune deficiency virus
IATT	Indirect attitude
IPBC	Indirect perceived behavioral control
ISN	Indirect subjective norm
OIs	Opportunistic infections
PLWHIV	People living with HIV
PBC	Perceived behavioral control
SP	Social pressure
SN	Subjective norm
TPB	Theory of planned behavior
VIF	Variance inflation factor

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