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## Understanding the traditional values and use of Okra among pregnant women in Ethiopia: A qualitative study.

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2023-071612
Article Type:	Original research
Date Submitted by the Author:	04-Jan-2023
Complete List of Authors:	Negash, Efrem; Mettu University; Mettu University Belachew, Tefera; Jimma University College of Public Health and Medical Sciences, Nutrition and Dietetics Tamiru, Dessalegn; Jimma University College of Public Health and Medical Sciences, Department of Nutrition and Dietetics
Keywords:	NUTRITION & DIETETICS, Nutritional support < ONCOLOGY, PUBLIC HEALTH, QUALITATIVE RESEARCH, Nutrition < TROPICAL MEDICINE

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3 1 **Understanding the traditional values and use of Okra among pregnant women in Ethiopia:**  
4  
5 2 **A qualitative study.**

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19 10 P.O.BOX: 318

20 11 **Word count:** 4,270.

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3 **Abstract:**  
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5 **Objectives:** This study explored how okra plants are obtained, prepared, and utilized by pregnant  
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7 women and the associated traditional nutritional values, beliefs, and meanings attached to them  
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9 in Western Ethiopia.

10 **Design:** Qualitative research.

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12 **Setting:** Rural areas of western Ethiopia

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14 **Participants:** A purposive sampling technique was used to select a total of 86 pregnant women  
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16 (14 for in-depth interviews (IDI), and 72 for focused group discussions (FGD) in western  
17  
18 Ethiopia.

19  
20 **Results:** Pregnant women in the western part of Ethiopia mainly consumed okra pods. In line  
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22 with this, traditionally okra is used as a source of income and is a common food invited for  
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24 guests visiting their homes. For future consumption and preservation for long period, they  
25  
26 usually transform okra into the form of powder.

27  
28 **Conclusions:** Other parts of the okra plant rather than pods were not known as a food source and  
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30 are the most neglected food sources in rural districts of western Ethiopia. The study provides  
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32 evidence that supports nutritional behavioral change communication (BCC) interventions on  
33  
34 promoting local food diversity aimed at reducing household food insecurity through improved  
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36 agricultural productivity and awareness creation on the nutritional importance of okra.

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38 **Keywords:** Pregnant women: traditional value: okra: west Ethiopia  
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3 63 **Article Summary:**  
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5 64 **Strengths:**

- 6 65 ❖ This study used the in-depth interview to strengthen the evidence generated through focus  
7 group discussions.  
8 66  
9 67 ❖ Data collection tools were pretested and native language was considered.  
10 68 ❖ Traditional values and beliefs related to okra consumption were considered.  
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14 69 **Limitations:**

- 15 70 ❖ This study did not explore taboos related to okra plant food.  
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## 94 1. Introduction:

95 Women in developing countries face malnutrition because of their limited intake of a diversified  
96 diet <sup>(1)</sup>. Access to and intake of a diverse diet is a cost-effective strategy to overcome this  
97 problem <sup>(2, 3)</sup>. Rural communities depend on indigenous plants to satisfy the diversity of their  
98 food through traditional knowledge <sup>(4)</sup>. Likewise, wild food resources play a role in increasing  
99 the dietary diversity of pregnant women <sup>(5)</sup>.

100  
101 Various wild and edible plant foods are available, particularly in developing countries <sup>(6)</sup>.  
102 Moreover, the use of wild plants in native diets, religious ceremonies, and medicinal purposes is  
103 common and widespread in Ethiopia <sup>(7)</sup>. One of the most common staple diets for indigenous  
104 people of Asossa District, west Ethiopia is a plant locally named "Kenkase." It was commonly  
105 named "Okra" (*Abelmoschus Esculentus*) <sup>(8)</sup>. Okra was first found in Ethiopia and later  
106 distributed to other parts of the world while gaining popularity in the west <sup>(9)</sup>.

107  
108 Edible plants such as okra play a critical role in ensuring food security and are commonly  
109 consumed in food-insecure areas <sup>(10)</sup>. Okra is an important vegetable crop cultivated in tropical,  
110 subtropical, and warm-temperature regions of the world <sup>(11)</sup>. It plays an important role in the  
111 human diet as a good source of essential nutrients <sup>(12)</sup>. Furthermore, it is especially important for  
112 pregnant women for its folate content and prevents both macro- and micronutrient deficiency  
113 problems <sup>(12, 13)</sup>. For this reason, the consumption and demand of okra increased, which brings  
114 more income to the local farmers <sup>(14)</sup>. Although okra is the staple diet for the indigenous  
115 communities of western Ethiopia, most diets of developing countries lack this plant <sup>(15)</sup>.  
116 However, different parts of okra are underutilized due to a lack of knowledge of their nutrient  
117 composition <sup>(16)</sup>.

118  
119 Okra seed flour has different nutritional compositions (proteins, fat, and minerals) and  
120 antioxidative potentials which are used for food fortification <sup>(17,18, 19, 20)</sup>. However, okra leaves  
121 showed a predominance of carbohydrates, fibers, proteins, and minerals that were not  
122 significantly affected by food processing <sup>(21)</sup>. Thus, nutritional and the biochemical contents of  
123 okra were higher in the leaves than in the fruits <sup>(22,23)</sup>. On the other hand, dietary fiber, mainly  
124 insoluble dietary fiber is the most abundant macronutrient content of okra pods, followed by total  
125 carbohydrates, proteins, and different minerals <sup>(24, 25)</sup>. In line with this, okra pod is rich in active

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3 126 ingredients which are antioxidant, anti-inflammatory, hypoglycemic, hypolipidemic, and other  
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5 127 functions <sup>(26, 27)</sup>.

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7 128  
8 129 About 85% of households in rural areas use a diverse of wild edible plants to meet their daily  
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10 130 food requirements <sup>(28)</sup>. Likewise, different parts of the Okra plant can be processed in various  
11  
12 131 forms for consumption in the western parts of the world <sup>(9)</sup>. Even though okra is the backbone of  
13  
14 132 dietary diversity in developing countries, utilization of its different parts is neglected and  
15  
16 133 underutilized <sup>(29)</sup>.

17 134  
18 135 Edible plants have the potential to play a central role in addressing food insecurity in sub-  
19  
20 136 Saharan Africa <sup>(30)</sup>. The promotion and utilization of nutritive indigenous plants like okra could  
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22 137 be a cost-effective and sustainable method of preventing nutritional problems <sup>(31)</sup>. Similarly, the  
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24 138 promotion and consumption of okra could help mitigate household food insecurity and alleviate  
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26 139 malnutrition in developing countries like Ethiopia <sup>(9,16,32)</sup>. However, studies showed that the  
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28 140 consumption of wild edible plants in Ethiopia is very low covering only 5% of the region in the  
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30 141 country <sup>(33)</sup>.

31 142  
32 143 This calls for further evidence that might have inputs that support efforts of sustainable  
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34 144 development goals such as ending hunger, achieving food security, and improving nutrition  
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36 145 among nutritionally vulnerable groups such as pregnant women <sup>(34)</sup>. It could also increase  
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38 146 awareness and the incomes of small-scale food producers (especially women) with the help of  
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40 147 proper research and advocacy.

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42 149 Therefore, employing the qualitative research method, this study explored parts of the okra  
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44 150 plants that are obtained, prepared, and consumed as edible food staples by pregnant women and  
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46 151 associated traditional nutritional values, beliefs, and meanings attached to the diets in Western  
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48 152 Ethiopia.

## 49 153 50 154 **2. METHODS AND MATERIALS**

### 51 155 **2.1. Study setting**

52 156 This study was conducted in the Sherkole and Asossa districts of western Ethiopia. The Asossa  
53  
54 157 Zone is located in the Benishangul-Gumuz Regional State, of Ethiopia. The indigenous  
55  
56 158 communities in the region are Berta, Gumuz, Shinasha, Maho, and Komo. The staple diet of the



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2  
3 159 community was okra. The regional city is Asossa Town which is 670 Km far away from the  
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5 160 capital city of Ethiopia with a total population of 405, 466 <sup>(35)</sup>. There were a total of 8,324 and  
6  
7 161 30,049 women in the reproductive age group of Berta communities found in the Sherkole and  
8  
9 162 Asossa districts respectively.

10 163  
11 164 The climatic condition of the Asossa zone is tropical <sup>(36)</sup>. The livelihood of the study area is  
12  
13 165 subsistence farming which accounts for nearly 95% of the population <sup>(37)</sup>. Similarly, the  
14  
15 166 magnitude of food insecurity in the region is very high (16%) as compared to the national  
16  
17 167 prevalence of food insecurity (23%) <sup>(38)</sup>. In line with this, 20.1%, 6.9%, and 19.2% of women of  
18  
19 168 reproductive age in the study area are thin, overweight, and anemic respectively <sup>(39, 40)</sup>.

## 20 169 **2.2. Study design**

21 170 This study employed a qualitative research approach to understand how okra plants are obtained,  
22  
23 171 prepared, and consumed by pregnant women. In line with this, this study was performed from a  
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25 172 constructivist point of view using an interpretative phenomenological perceived eating  
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27 173 experience of okra among pregnant women of western Ethiopia. The Standards for Reporting  
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29 174 Qualitative Research (SRQR) reporting guidelines were used as well <sup>(41)</sup>.

## 30 31 175 **2.3. Sampling Procedure**

32 176 One Kebele (the smallest administrative unit of Ethiopia, contained within a district) was  
33  
34 177 selected purposively from each district. Following the selection of Kebeles, women with known  
35  
36 178 pregnancies were identified using registry books from health posts and health extension workers  
37  
38 179 in each kebele <sup>(42)</sup>.

## 39 40 180 **2.4. Selection of study participants**

41 181 Purposive sampling was used to select participants for this study. Thus, pregnant women of  
42  
43 182 comparable educational status and age were purposively recruited in the focused group  
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45 183 discussion. Similarly, those pregnant women of older age from the others and who have the  
46  
47 184 potential to explore the issues were purposively selected for in-depth interviews.

## 48 185 **2.5. Data collection tool**

49  
50 186 In-depth interviews (IDI) and focused group discussions (FGD) guides were used for data  
51  
52 187 collection. The FGD guide was developed to identify parts of the okra utilized during food  
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54 188 processing. They also identified any part of the plant not used and its reason, and the traditional  
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56 189 values of the okra part. Each FGD consisted of 8 - 12 participants and a total of 72 pregnant

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3 190 women were included in the FGD. Similarly, a total of 14 pregnant women were interviewed.  
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5 191 The topic guides for each tool were initially prepared in English and translated into the local  
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7 192 language (Rutanegna) by a language expert. Then back to English to check the consistency of the  
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9 193 tool. Both tools (FGD and IDI) were used to triangulate individual and group-level opinions  
10  
11 194 towards parts of the okra plant being utilized and its traditional values <sup>(43)</sup>.

## 12 195 **2.6. Data collection procedure**

13 196 Data were collected from June 1 to 30/2020 by six trained nurse professionals who have  
14  
15 197 experience in qualitative interview techniques. Homogenous participants of FGD were gathered  
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17 198 at suitable places for discussion. Likewise, the data collectors welcomed the participants, invited  
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19 199 them to introduce themselves, and introduces the purpose of the discussion. Thus, IDI was also  
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21 200 conducted at the convenience of each participant. Finally, both FGD and IDI were conducted in  
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23 201 the local language (Rutanegna). The FGD guide consisted of themes of traditional and health  
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25 202 benefits of Okra for pregnant women, parts of the okra being utilized, and cultural practices  
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27 203 related to okra food processing.

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29 205 Audiotape recorders and field notes were used during both FGD and IDI sessions. Finally  
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31 206 transcribed verbatim; 45 to 50 minutes were used for each FGD while 25 to 30 minutes were  
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33 207 used for IDI to be covered. Moreover, the FGD and IDI were continued until saturation of  
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35 208 information was reached. Thus, a total of seven FGDS: three from the Sherkole district and four  
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37 209 from the Asossa district were used. Likewise, 14 IDI: six from the Sherkole district and eight  
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39 210 from the Asossa district were also considered for this study.

## 40 211 **2.7. Data quality control**

41 212 The trustworthiness of the data was ensured with a pretest of both FGD and IDI guidelines  
42  
43 213 carried out at the Bambasi district of the Asossa Zone. Furthermore, the recording of the  
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45 214 participant discussion and interviewees was also conducted in the local language to minimize  
46  
47 215 any ambiguities. In line with this, triangulation with the focus group data was used to broaden  
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49 216 the in-depth information from the individual-level in-depth interviews in the analysis. In addition  
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51 217 to this, clarification for any ambiguities was given to them by the research assistant. Moreover,  
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53 218 training of the data collectors and their supervision were also considered.

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3 221 **2.8. Patient and Public Involvement:** No patient involved

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5 222 **2.9. Data Processing and Analysis**

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7 223 After each FGD and IDI session, an audio-taped voice recorder was replayed to participants to  
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9 224 listen and make the necessary correction to the data. Furthermore, data collected in the local  
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11 225 language were first translated into English and transcribed by two different language experts.  
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13 226 Then their translations were compared for consistency. In line with this, the FGDs results were  
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15 227 confirmed with those of the IDI.

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18 229 An inductive approach was used, where the researchers read and reread the transcripts three  
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20 230 times to get a good understanding of the context. Transcripts were coded line-by-line by the  
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22 231 researchers and categories were developed, discussed, and synthesized to develop broader  
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24 232 themes, and sub-themes. Any discrepancies regarding the codes, categories, themes, and sub-  
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26 233 themes were corrected through team discussions. Then three themes of consumption of okra by  
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28 234 pregnant women; cultural practice related to okra food processing, and traditional and health  
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30 235 benefits of okra for pregnant women were identified. In line with this, six sub-themes were  
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32 236 identified as well. Finally, thematic analysis was used, where interpreting the content of the  
33  
34 237 themes and sub-themes was carried out.

### 33 238 34 239 **3. RESULTS**

#### 35 240 **3.1. Socio-Demographic Characteristics of Study Participants,** 36 37 241 **west Ethiopia**

38 242 A total of 86 participants (72 FGD and 14 IDI) were involved in this study. The majority  
39  
40 243 (97.2%) of the FGD were Muslim in religion. On the other hand, out of the total participants of  
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42 244 IDI, only four (7.4%) attended primary school (Table 1).  
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254 **Table 1: Socio-demographic characteristics of study participants (n = 86.0), west Ethiopia,**  
255 **2022**

Variable (Category)	Data collection tool	
	In FGD, the number (%)	In IDI, the number (%)
District		
Asossa	42.0 (58.3)	8.0 (41.7)
Sherkole	30.0 (41.7)	6.0 (58.3)
Educational status		
No formal education	22.0 (68.8)	10.0 (31.2)
Primary school	50.0 (92.6)	4.0 (7.4)
Marital status		
Married	61.0 (84.7)	9.0 (64.3)
Widowed	5.0 (7.0)	3.0 (21.4)
Divorced	6.0 (8.3)	2.0 (14.3)
Religion		
Muslim	70.0 (97.2)	13 (92.8)
Orthodox	2.0 (2.8)	1 (7.2)
Age in years		
< = 31	59.0 (81.9)	5.0 (35.7)
32 – 43	13.0 (18.1)	9.0 (64.3)

256 Key:

257 FGD - Focus Group Discussion

258 IDI – In-depth Interview

### 259 3.2. Emerging themes and sub-themes

260 Thematic analysis of the transcripts resulted in three themes and six sub-themes including okra  
261 plant parts consumed, knowledge about okra (its nutritional benefits), how okra is obtained, how  
262 okra is prepared, beliefs about okra, and traditional values of okra.

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#### 265 3.2.1. Consumption of okra by pregnant women

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3 266 **3.2.1.1. Okra plant parts consumed**

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5 267 As a result of this study explored, all of the study participants had the common practice of using  
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7 268 only okra pods as a food source. As 35 years old participants of this study stated:

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9 269 *“Only the pods of Okra are prepared in different forms to be used as food. No other parts of the*  
10  
11 270 *Okra plant were utilized [pregnant women, FGD].”*

12  
13 271 Furthermore, other participants in this study whose age was 30 years also explored as:

14 272 *“I am not using other parts of Okra rather than Pods. Until now I have not seen any person*  
15  
16 273 *consuming other parts of Okra [HEW, FGD].”*

17  
18 274  
19 275 Almost all study participants shared common practices in the utilization of the okra plant part as  
20  
21 276 a food source. In addition to the aforementioned practices of okra plant part utilization, 22 years  
22  
23 277 old women also stated:

24 278 *“I never practice any parts of the Okra plant as a food rather than its Pods. How can other parts*  
25  
26 279 *of the plant be edible? How could it be eaten? In my life as well as in my experience no one used*  
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28 280 *other parts of Okra except its Pods. And even I didn't hear this before [pregnant women,*  
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30 281 *FGD].”*

31  
32 282 This was also supported by the experience of a 25-year-old participant in this study:

33 283 *“Only the Pods of Okra were eaten while the leaves and the steam of Okra were not. Those parts*  
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35 284 *of the plant were not suitable and not known before as a food source. We didn't have any*  
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37 285 *experience of using such parts of Okra [pregnant women, FGD].”*

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40 287 The practice of okra plant part utilization, which was explored by different FGD members, was  
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42 288 also supported by individual-level IDI. Accordingly, one of the 28 years old participants of this  
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44 289 study explored the:

45 290 *“The seeds, leaves, and the steam of Okra were not eaten. I as well as all my family used only*  
46  
47 291 *Pods of Okra. Even my grand families were using only Pods of Okra [Pregnant Women, IDI].”*

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54 294 **3.2.1.2. Knowledge about okra (its nutritional benefits)**

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3 295 The communities of western Ethiopia used pods of okra for their mucous and viscosity which  
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5 296 increases the palatability of the okra to use as food. This was stated by one of 37 years old  
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7 297 pregnant women:

8 298 *“Rather than Pods of Okra, the leaves and stem of the Okra plant were not eaten because they*  
9  
10 299 *didn't have any mucous and viscosity. They didn't have also benefits. The mucous nature of okra*  
11  
12 300  *pods increases my appetite to eat more food [Pregnant women, IDI].”*

13  
14 301 This study also explored as other parts of the okra plant didn't have any nutritional values except  
15  
16 302 the pods of okra. This was explored by 29 years old pregnant women:

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18 303 *“The pods of okra had many importance or values. I used to prepare it with different food items*  
19  
20 304  *to make my food delicious. No other parts of the plant had importance like pods [ pregnant*  
21  
22 305 *women, IDI].”*

### 23 24 306 **3.2.2. Cultural practice related to Okra food processing**

#### 25 26 307 **3.2.2.1. How okra is prepared (forms of diet and preservation)**

27 308 According to the results of this study, there were different practices of pods of okra during food  
28  
29 309 processing. One of 25 years old respondents in this study explained okra food processing as:

30 310 *“The Pods of Okra were first harvested and sundried, grind to a fine powder. Then prepared as*  
31  
32 311  *a wot, porridge and eaten along other food groups. In addition to this, salt, oil, and onion were*  
33  
34 312  *added to Okra during its processing to make it easy for cooking and palatable. [Pregnant*  
35  
36 313 *women, FGD].”*

37  
38 314 In addition, pods of okra were prepared along with other food groups, as stated by the 35-year-  
39  
40 315 old respondent of this study:

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42 316 *“I prepared the flour of Okra Pods along with smoked meat, beans, and tomato which made*  
43  
44 317  *those foods delicious. But I never prepared with Shiro since the mucous nature of Okra is*  
45  
46 318  *disappeared and become tasteless [Pregnant women, FGD].”*

47  
48 319 Moreover, okra pods could be preserved for a long period for use after harvest by making them  
49  
50 320 dry and powdered. This was explained by one of the 32-year-old respondents:

51 321 *“I made okra pods sundried and ground them to a fine powder to preserve it for a long period. If*  
52  
53 322  *not sundried, it becomes spoiled. In addition to this, it is not recommended to store the powder*  
54  
55 323  *Okra on wet surfaces. I only store it on dry surfaces because if the storage place is dry, okra can*

324 *be preserved for one year. Then the powder of Okra Pods was prepared with dry meat, and*  
325 *beans but not used with cabbage and Potato [Pregnant women, FGD].”*

### 326 **3.2.2.2. How okra pod is obtained**

327 According to the finding of this study, the pods of okra were harvested before drying, and  
328 precautions were required during the harvest. This made it comfortable and palatable for use as  
329 food. This was explored by 40 years old Pregnant women as follows:

330 *“During harvest time, I used gloves for my hand prepared locally to prevent my hand from*  
331 *injury. Pods of okra were collected from its plant before it becomes dry. If it became dried on the*  
332 *plant, it loses its mucous and is not comfortable to feed [Pregnant women, IDI].”*

### 333 **3.2.3. Traditional and health benefits of okra for pregnant women**

#### 334 **3.2.3.1. Traditional values of okra**

335 As explored by this study, okra had different traditional and health benefits for pregnant women.  
336 It relieved the pain related to gastritis and related problems. As indicated by a 19-year-old  
337 participant in this study:

338 *“Okra is important for health specifically to get relief of pain when I suffered from abdominal*  
339 *(gastric) pain. It increases my appetite. When I eat foods with Okra, I was taking more amount of*  
340 *food as compared to food taken without Okra. We also used it when we suffer from abdominal*  
341 *pain rather than going to the health facility. We prefer to use Okra for abdominal pain treatment*  
342 *[Pregnant woman, FGD].”*

343 According to the finding of this study, okra also gives good strengths, makes them healthy, and  
344 is used to increase life expectancy. As one of 41 years old participants in this study explored:

345 *“The secret of my strength and my age is Okra. I am still strong enough. While I am eating food*  
346 *prepared from okra pods in the morning, it protects my stomach from any burning sensation*  
347 *[Pregnant women, IDI].”*

348 Accordingly, okra may have a role in neutralizing stomach acids. As stated by a 28-year-old  
349 participant:

350 *“Okra is used to build my body, to provide energy for me, to soften my stool during defecation.*  
351 *Okra is the most comfortable food for me as compared to other food sources. Furthermore, Okra*  
352 *gives me energy during delivery and makes my labor easy [Pregnant women, FGD].”*

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2  
3 353 Okra is also used to increase the income of rural communities in western Ethiopia, especially for  
4 pregnant women. As explored by one of the 40-year-old participants of this study:

5 354  
6 355 *“In addition to use as a food source, okra also increases our income. For example, one Alkela*  
7 *(local serving material used for measurement) of okra was sold with 400 Ethiopian Birr*  
8 356 *[Pregnant women, IDI].”*  
9 357

### 10 358 **3.2.3.2. Beliefs about okra**

11  
12 359 As the finding of this study explored, there were different cultural beliefs related to okra.  
13 Accordingly, one of 32 years old participants in the study explained:

14 360  
15 361 *“Okra was added to our daily food, and nothing was eaten without okra in our culture. If there*  
16 *was no okra, we did not eat enough food. Even we invite Okra food when guests come to our*  
17 362 *home [Health extension worker, FGD].”*  
18 363  
19 364

20  
21 365 In line with this, okra could also be used to express happiness and belongingness in the  
22 communities of western Ethiopia. As explored by one of the pregnant women:

23 366 *“When there was okra in my dish, I was very happy and also invited this food for whom I want to*  
24 *express my belongs [pregnant women, IDI].”*  
25 367  
26 368

## 27 369 **4. DISCUSSION**

28  
29 370 According to the findings of this study, the communities of rural parts of western Ethiopia  
30 utilized only the pods of okra. However, different parts of Okra were utilized across different  
31 371 parts of the world <sup>(12)</sup>. Fresh leaves, buds, pods, stems, seeds, and immature fruits can be  
32 prepared in different forms as vegetables as compared to only pods of okra eaten in western parts  
33 372 of Ethiopia <sup>(9)</sup>. However, those were missed in the diets of rural communities in western  
34 Ethiopia.  
35 373  
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37 375  
38 376 The communities of western Ethiopia used pods of okra for their mucous and viscosity which  
39 increases the palatability of the okra plant to be used as food. This was consistent with scientific  
40 377 evidence as okra offers mucilaginous consistency after cooking which has medicinal applications  
41 when used as a plasma replacement and others <sup>(9)</sup>. Thus, the mucous of okra pods during food  
42 378 preparation may increase the taste of the food and make it delicious.  
43 379  
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45 381  
46 382 According to the results of this study, there were different practices of pods of okra during food  
47 processing. The pods of okra were prepared along with other food groups. Moreover, okra pods  
48 383



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2  
3 384 could be preserved for a long period for use after harvest by making them dry and powdered.  
4  
5 385 This was consistent with different evidence. Dried okra seed flour is rich in nutrients, which  
6  
7 386 could be used for baking and fortification of foods <sup>(44)</sup>. Similarly, the addition of dried okra fruit  
8  
9 387 powder can increase the palatability of different food products <sup>(45)</sup>. On the other hand, okra is  
10  
11 388 exported both in fresh as well as in dried form while size reduction and drying of okra pods can  
12  
13 389 facilitate easy packaging, storage, and transport <sup>(46)</sup>. Therefore, the traditional preservation  
14  
15 390 method of okra pods in western Ethiopia had different importance which was supported by the  
16  
17 391 aforementioned scientific evidence.

18 392  
19 393 The cultural food processing of okra plants in rural communities of western Ethiopia indicated  
20  
21 394 that; there was no experience of using okra seeds as roasted caffeine-free coffee. In line with this,  
22  
23 395 there was no practice of fortification of okra seed flour with different cereals. Likewise, there  
24  
25 396 were no benefits of okra leaves as cabbage or soup. However, okra seed flour and leaves were  
26  
27 397 used in different parts of the world <sup>(47, 48)</sup>. Likewise, okra seeds were used to fortify different  
28  
29 398 cereals to increase their nutrient contents and prevent malnutrition in developing countries <sup>(13,</sup>  
30  
31 399 <sup>19,20)</sup>. In line with this, okra seed has significant amounts of protein (22.14%), lipids (14.01%),  
32  
33 400 and high amounts of unsaturated lipids (66.32%), especially the oleic (20.38%) and linoleic acids  
34  
35 401 (44.48%) <sup>(17, 18, 49)</sup>.

36 402 As explored by this study, okra had different traditional and health benefits for pregnant women,  
37  
38 403 which relieved the pain related to gastritis and related problems. This is supported by different  
39  
40 404 scientific evidence. Antiadhesive compounds of okra do not enhance *H. pylori* virulence which  
41  
42 405 can effectively prevent bacterial adhesion and lead to reduced infection rates (gastritis) <sup>(50)</sup>. In  
43  
44 406 line with this, okra has a gastroprotective effect and it could be a possible therapeutic antiulcer  
45  
46 407 agent <sup>(51)</sup>. Accordingly, okra may have a role in neutralizing stomach acids. Likewise, okra has  
47  
48 408 various bioactive components used for the treatment of gastritis and ulcers comparable to the  
49  
50 409 drug omeprazole <sup>(52)</sup>. Therefore, the mucous of okra pods produced during food processing may  
51  
52 410 neutralize stomach acids and prevents adherence of *H. pylori* bacteria to the gastric mucosal  
53  
54 411 surface.

55 412  
56 413 According to the findings of this study, the consumption of okra gives good strengths. This is  
57  
58 414 also supported by different scientific evidence. The ethanol extracts and polysaccharides of okra

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2  
3 415 have antifatigue effects <sup>(53)</sup>. In line with this, okra seeds were the anti-fatigue part of okra pods  
4  
5 416 which is caused by reducing the levels of blood lactic acid and urea nitrogen and enhancing  
6  
7 417 hepatic glycogen storage <sup>(54)</sup>.

8 418  
9 419 The findings of this study explored that, the consumption of okra makes them healthy, and is  
10  
11 420 used to increase the life expectancy of the respondents. There is evidence indicating that; okra is  
12  
13 421 a good source of antioxidants that prevent the formation of free radicals <sup>(12)</sup>. Likewise, okra  
14  
15 422 contains a potentially rich source of natural antioxidants such as polyphenols and flavonoids <sup>(55)</sup>.  
16  
17 423 Similarly, okra fruits can be used as natural antioxidants and natural inhibitors against  
18  
19 424 hyperlipidemia and hyperglycemia in the fields of functional foods and pharmaceuticals <sup>(56)</sup>.  
20  
21 425 Thus, since okra is functional food and pharmaceutical, and also prevents the formation of free  
22  
23 426 radicals, it may make pregnant women healthy and increase their life expectancy.

24 427  
25 428 Apart from these different health benefits, okra is also very important for pregnant women due to  
26  
27 429 its different nutrient composition, as indicated by different evidence. It is especially important  
28  
29 430 for pregnant women for its folate content which prevents the problem of neural tube defects <sup>(12)</sup>.  
30  
31 431 It has great potential in preventing both macro- and micronutrient deficiency in the malnutrition-  
32  
33 432 affected area of rural communities <sup>(13)</sup>. Furthermore, owing to its high dietary fiber content, okra  
34  
35 433 is also consumed to prevent constipation by increasing peristaltic movement of the  
36  
37 434 gastrointestinal tract <sup>(12)</sup>. This was consistent with the finding of this study.

## 37 435 **5. CONCLUSION**

38  
39 436 Utilization of different parts of the okra plant rather than pods were not experienced in the  
40  
41 437 community of western Ethiopia. Lack of awareness and knowledge concerning their importance  
42  
43 438 and their nutritional value were the barriers to utilization. Okra has different traditional and  
44  
45 439 health benefits for pregnant women in the communities of western Ethiopia. It is a good source  
46  
47 440 of different micronutrients, macronutrients, antioxidants, and different pharmacological values.  
48  
49 441 Generally, this edible okra may contribute to maintaining food security to meet the fast-growing  
50  
51 442 human population, especially in developing countries.

52 443  
53 444 The sustainable utilization of different parts of okra requires strong policy support based on  
54  
55 445 scientific evidence to ensure the nutritional security of pregnant women. It could help to support

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2  
3 446 the sustainable development goal of "ensuring sustainable production <sup>(23)</sup>." Moreover, BCC  
4  
5 447 intervention to promote the utilization of different parts of okra was recommended.  
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## 8 449 **6. Abbreviations:**

9 450 IDI; In-depth interviews

10 451 FGD; Focus Group Discussion

11 452 BCC; Behavioral Change Communication

12 453 Km; Kilometer

13 454 HEW; Health Extension Worker

14 455

## 15 456 **7. Acknowledgments**

16 457 We would like to extend our gratitude and appreciation to all data collectors, supervisors,  
17 458 regional and zonal health offices of Benishangul Gumuz, West Ethiopia, and the respective  
18 459 administrative organs of all districts. We also extend our thanks to pregnant women for  
19 460 providing this valuable data for this research work and patient advisers as well.  
20

21 461

## 22 462 **8. Contributorship statements**

23 463 **Efrem Negash Kushi:** investigated the article, performed formal analysis, and wrote the  
24 464 original draft.

25 465 **Dr. Dessalegn Tamiru:** conceptualized the data, verified the methods, made substantial  
26 466 contributions to funding acquisition, supervised the article, reviewed and edited the article,

27 467 **Prof. Tefera Belachew:** conceptualized the data; verified the methods, supervised the article,  
28 468 and reviewed and edited the article.

## 29 469 **9. Competing interests**

30 470 The Authors declare that there is no conflict of interest.  
31

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33 472

## 34 473 **10. Funding**

35 474 This research received no specific grant from any funding agency in the public, commercial,  
36 475 or not-for-profit sectors.

## 37 476 **11. Data sharing statement**

1  
2  
3 477 Data generated by our research that supports our article be made available as soon as  
4 possible, wherever legally and ethically possible.  
5 478

## 6 479 **12. Ethics approval statement**

7  
8 480 The ethical aspects of this study were approved by the Institutional Review Board of Jimma  
9 University, Institute of Health. Verbal informed consent was obtained from all study  
10 481 participants and formally recorded. Accordingly, the study participants were informed about  
11 482 the research and their right to participation (right to decline participation at any time they feel  
12 483 to do so). In addition, those with severe health problems were informed to visit public health  
13 484 facilities. Furthermore, they were informed that the discussions were recorded and  
14 485 confidentiality was maintained. Therefore, only information related to the okra part being  
15 486 utilized and its traditional values were considered.  
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For peer review only

**Reporting checklist for qualitative study: Based on the SRQR guidelines.**

	Reporting Item	Page Number
<b>Title</b>	#1. Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
<b>Abstract</b>	#2. Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
<b>Introduction</b>		
Problem formulation	#3. Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	4-5
Purpose or research question	#4. Purpose of the study and specific objectives or questions	5
<b>Methods</b>		
Qualitative approach and research paradigm	#5. Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed	6

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Researcher characteristics and reflexivity	<b>#6.</b> Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	N/A
17 18 19 20	Context	<b>#7.</b> Setting / site and salient contextual factors; rationale	5-6
21 22 23 24 25 26	Sampling strategy	<b>#8.</b> How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale	6-7
27 28 29 30 31 32 33	Ethical issues pertaining to human subjects	<b>#9.</b> Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	8
34 35 36 37 38 39 40 41 42 43 44	Data collection methods	<b>#10.</b> Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	7
45 46 47 48 49 50 51 52	Data collection instruments and technologies	<b>#11.</b> Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	6-7
53 54 55 56 57 58 59 60	Units of study	<b>#12.</b> Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	6-7

Data processing	#13. Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation /deidentification of excerpts	8
Data analysis	#14. Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	8
Techniques to enhance trustworthiness	#15. Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale	7
<b>Results/findings</b>		
Syntheses and interpretation	#16. Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-13
Links to empirical data	#17. Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	8-13
<b>Discussion</b>		
Integration with prior work, implications, transferability and contribution(s) to the field	#18. Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability;	13-15
Limitations	#19. Trustworthiness and limitations of findings	3
<b>Other</b>		
Conflicts of interest	#20. Potential sources of influence of perceived	16
Funding	#21. Sources of funding and other support; role of funders in data collection, interpretation	16

# BMJ Open

## Understanding the traditional values and use of Okra among pregnant women in western Ethiopia: A qualitative study.

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2023-071612.R1
Article Type:	Original research
Date Submitted by the Author:	09-Mar-2023
Complete List of Authors:	Negash, Efrem; Mettu University; Mettu University Belachew, Tefera; Jimma University College of Public Health and Medical Sciences, Nutrition and Dietetics Tamiru, Dessalegn; Jimma University College of Public Health and Medical Sciences, Department of Nutrition and Dietetics
<b>Primary Subject Heading</b>:	Qualitative research
Secondary Subject Heading:	Nutrition and metabolism
Keywords:	NUTRITION & DIETETICS, Nutritional support < ONCOLOGY, PUBLIC HEALTH, QUALITATIVE RESEARCH, Nutrition < TROPICAL MEDICINE, Public health < INFECTIOUS DISEASES

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3 1 **Understanding the traditional values and use of Okra among pregnant women in Western**  
4  
5 2 **Ethiopia: A qualitative study**

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19 10 P.O.BOX: 318

20 11 **Word count:** 4,208.

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3 **32 Abstract:**

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5 **33 Objectives:** This study explored the traditional values and use of okra among pregnant women,  
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7 **34** how okra plants are obtained, prepared, and utilized by pregnant women, and the associated  
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9 **35** beliefs, and meanings attached to it in Western Ethiopia.

10 **36 Design:** Qualitative research.

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12 **37 Setting:** Rural areas of western Ethiopia

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14 **38 Participants:** A purposive sampling technique was used to select a total of 86 pregnant women  
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16 **39** (14 for in-depth interviews, and 72 for focused group discussions) in western Ethiopia.

17 **40 Results:** Traditionally okra is used as a source of income and is a common food invited for  
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19 **41** guests visiting their homes. In line with this, pregnant women in the western part of Ethiopia  
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21 **42** mainly consumed okra pods. For future consumption and preservation for long period, they  
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23 **43** usually transform okra into the form of powder.

24 **44 Conclusions:** Other parts of the okra plant rather than pods were not known as a food source and  
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26 **45** are the most neglected food sources in rural districts of western Ethiopia. The study provides  
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28 **46** evidence that supports nutritional behavioral change communication (BCC) interventions on  
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30 **47** promoting the utilization of different parts of okra and awareness creation on the nutritional  
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32 **48** values of okra.

33 **49 Keywords:** Pregnant women: traditional value: okra: west Ethiopia

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3 63 **Article Summary:**  
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5 64 **Strengths:**

- 6 65 ❖ This study used the in-depth interview to strengthen the evidence generated through focus  
7 group discussions.  
8 66  
9 67 ❖ Data collection tools were pretested and native language was considered.  
10 68 ❖ Traditional values and beliefs related to okra consumption were considered.  
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14 69 **Limitations:**

- 15 70 ❖ This study did not explore taboos related to okra plant food.  
16 71 ❖ There could be interviewer bias and social desirability bias.  
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## 94 1. Introduction:

95 Women in developing countries face malnutrition because of their limited intake of a diversified  
96 diet <sup>(1)</sup>. Access to and intake of a diverse diet is a cost-effective strategy to overcome this  
97 problem <sup>(2, 3)</sup>. Rural communities depend on indigenous plants to satisfy the diversity of their  
98 food through traditional knowledge <sup>(4)</sup>. Likewise, wild food resources play a role in increasing  
99 the dietary diversity of pregnant women <sup>(5)</sup>.

100  
101 Various wild and edible plant foods are available, particularly in developing countries <sup>(6)</sup>.  
102 Moreover, the use of wild plants in native diets, religious ceremonies, and medicinal purposes is  
103 common and widespread in Ethiopia <sup>(7)</sup>. One of the most common staple diets for indigenous  
104 people of Asossa District, west Ethiopia is a plant locally named "Kenkase." It was commonly  
105 named "Okra" (*Abelmoschus Esculentus*) <sup>(8)</sup>. Okra was first found in Ethiopia and later  
106 distributed to other parts of the world while gaining popularity in the west <sup>(9)</sup>.

107  
108 Edible plants such as okra play a critical role in ensuring food security and are commonly  
109 consumed in food-insecure areas <sup>(10)</sup>. Okra is an important vegetable crop cultivated in tropical,  
110 subtropical, and warm-temperature regions of the world <sup>(11)</sup>. It plays an important role in the  
111 human diet as a good source of essential nutrients <sup>(12)</sup>. Furthermore, it is especially important for  
112 pregnant women for its folate content and prevents both macro- and micronutrient deficiency  
113 problems <sup>(12, 13)</sup>. For this reason, the consumption and demand of okra increased, which brings  
114 more income to the local farmers <sup>(14)</sup>. On the other hand, most diets in developing countries lack  
115 this plant <sup>(15)</sup>. In line with this, different parts of okra are underutilized due to a lack of  
116 knowledge of their nutrient composition <sup>(16)</sup>.

117  
118 Okra seed flour has different nutritional compositions (proteins, fat, and minerals) and  
119 antioxidative potentials which are used for food fortification <sup>(17,18, 19, 20)</sup>. However, okra leaves  
120 showed a predominance of carbohydrates, fibers, proteins, and minerals that were not  
121 significantly affected by food processing <sup>(21)</sup>. Thus, nutritional and the biochemical contents of  
122 okra were higher in the leaves than in the fruits <sup>(22,23)</sup>. On the other hand, dietary fiber, mainly  
123 insoluble dietary fiber is the most abundant macronutrient content of okra pods, followed by total  
124 carbohydrates, proteins, and different minerals <sup>(24, 25)</sup>. In line with this, okra pod is rich in active

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2  
3 125 ingredients which are antioxidant, anti-inflammatory, hypoglycemic, hypolipidemic, and other  
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5 126 functions <sup>(26, 27)</sup>.

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7 127  
8 128 About 85% of households in rural areas of the world use a diversity of wild edible plants to meet  
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10 129 their daily food requirements <sup>(28)</sup>. Likewise, different parts of the Okra plant can be processed in  
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12 130 various forms for consumption in the western parts of the world <sup>(9)</sup>. Even though okra is the  
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14 131 backbone of dietary diversity in developing countries, utilization of its different parts is  
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16 132 neglected and underutilized <sup>(29)</sup>. In addition to this, evidence is too limited that explore the  
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18 133 traditional values and use of okra among pregnant women in different parts of the world  
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20 134 including western Ethiopia. Furthermore, the finding of the preliminary assessment on the  
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22 135 utilization of okra among pregnant women in western Ethiopia indicated that only okra pods  
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24 136 were used as a food source by neglecting other parts of the plant.

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26 137  
27 138 Edible plants have the potential to play a central role in addressing food insecurity in sub-  
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29 139 Saharan Africa <sup>(30)</sup>. The promotion and utilization of nutritive indigenous plants like okra could  
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31 140 be a cost-effective and sustainable method of preventing nutritional problems <sup>(31)</sup>. Similarly, the  
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33 141 promotion and consumption of okra could help mitigate household food insecurity and alleviate  
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35 142 malnutrition in developing countries like Ethiopia <sup>(9,16,32)</sup>. However, studies showed that the  
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37 143 consumption of wild edible plants in Ethiopia is very low covering only 5% of the region in the  
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39 144 country <sup>(33)</sup>.

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42 146 This calls for further evidence that might have inputs that support efforts of sustainable  
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44 147 development goals such as ending hunger, achieving food security, and improving nutrition  
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46 148 among nutritionally vulnerable groups such as pregnant women <sup>(34)</sup>. It could also increase  
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48 149 awareness and the incomes of small-scale food producers (especially women) with the help of  
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50 150 proper research and advocacy.

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53 152 Therefore, employing the qualitative research method, this study explored the traditional values  
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55 153 of the okra plant and its utilization by pregnant women in the study area. Furthermore, this study  
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57 154 aimed to explore how okra was obtained, prepared, and consumed as edible food staples by  
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59 155 pregnant women and the associated beliefs, and meanings attached to it in Western Ethiopia.

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## 158 2. METHODS AND MATERIALS

### 159 2.1. Study setting

160 This study was conducted in the Sherkole and Asossa districts of western Ethiopia. The Asossa  
161 Zone is located in the Benishangul-Gumuz Regional State, of Ethiopia. The indigenous  
162 communities in the region are Berta, Gumuz, Shinasha, Maho, and Komo. The staple diet of the  
163 community was okra. The regional city is Asossa Town which is 670 Km far away from the  
164 capital city of Ethiopia with a total population of 405, 466 <sup>(35)</sup>. There were a total of 8,324 and  
165 30,049 women in the reproductive age group of Berta communities found in the Sherkole and  
166 Asossa districts respectively.

167  
168 The climatic condition of the Asossa zone is tropical <sup>(36)</sup>. The livelihood of the study area is  
169 subsistence farming which accounts for nearly 95% of the population <sup>(37)</sup>. Similarly, the  
170 magnitude of food insecurity in the region (16%) is nearly comparable to that of the national  
171 prevalence of food insecurity (23%) <sup>(38)</sup>. In line with this, 20.1%, 6.9%, and 19.2% of women of  
172 reproductive age in the study area are thin, overweight, and anemic respectively <sup>(39, 40)</sup>.

### 173 2.2. Study design

174 This study employed a qualitative research approach to understand how okra plants are obtained,  
175 prepared, and consumed by pregnant women. In line with this, this study was performed from a  
176 constructivist point of view using an interpretative phenomenological perceived eating  
177 experience of okra among pregnant women of western Ethiopia. The Standards for Reporting  
178 Qualitative Research (SRQR) reporting guidelines were used as well <sup>(41)</sup>.

### 179 2.3. Sampling Procedure

180 One Kebele (the smallest administrative unit of Ethiopia, contained within a district) was  
181 selected purposively from each district. Following the selection of Kebeles, women with known  
182 pregnancies were identified using registry books from health posts and health extension workers  
183 in each kebele <sup>(42)</sup>.

### 184 2.4. Selection of study participants

185 Purposive sampling was used to select participants for this study. Thus, pregnant women of  
186 comparable educational status and age were purposively recruited in the focused group  
187 discussion. Similarly, those pregnant women of older age from the others and who have the  
188 potential to explore the issues were purposively selected for in-depth interviews.

## 189 **2.5. Data collection tool**

190 In-depth interviews (IDI) and focused group discussions (FGD) guides were used for data  
191 collection. The FGD guide was developed to identify parts of the okra utilized during food  
192 processing. They also identified any part of the plant not used and its reason, and the traditional  
193 values of the okra part. Each FGD consisted of 8 - 12 participants and a total of 72 pregnant  
194 women were included in the FGD. Similarly, a total of 14 pregnant women were interviewed.  
195 The topic guides for each tool were initially prepared in English and translated into the local  
196 language (Rutanegna) by a language expert. Then back to English to check the consistency of the  
197 tool. In line with this IDI and FGD guides were developed (Supplementary File 1). Both tools  
198 (FGD and IDI) were used to triangulate individual and group-level opinions towards parts of the  
199 okra plant being utilized and its traditional values <sup>(43)</sup>. Finally, Standards for Reporting  
200 Qualitative Research (SRQR) was used (Supplementary File 2).

## 201 **2.6. Data collection procedure**

202 Data were collected from June 1 to 30/2020 by six trained nurse professionals who have  
203 experience in qualitative interview techniques. Homogenous participants of FGD were gathered  
204 at suitable places for discussion. Likewise, the data collectors welcomed the participants, invited  
205 them to introduce themselves, and introduces the purpose of the discussion. Thus, IDI was also  
206 conducted at the convenience of each participant. Finally, both FGD and IDI were conducted in  
207 the local language (Rutanegna). The FGD guide consisted of themes of traditional and health  
208 benefits of Okra for pregnant women, parts of the okra being utilized, and cultural practices  
209 related to okra food processing.

210  
211 Audiotape recorders and field notes were used during both FGD and IDI sessions. Finally  
212 transcribed verbatim; 45 to 50 minutes were used for each FGD while 25 to 30 minutes were  
213 used for IDI to be covered. Moreover, the FGD and IDI were continued until saturation of  
214 information was reached. Thus, a total of seven FGDS: three from the Sherkole district and four  
215 from the Asossa district were used. Likewise, 14 IDI: six from the Sherkole district and eight  
216 from the Asossa district were also considered for this study.

## 217 **2.7. Data quality control**

218 The trustworthiness of the data was ensured with a pretest of both FGD and IDI guidelines  
219 carried out at the Bambasi district of the Asossa Zone. Furthermore, the recording of the

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3 220 participant discussion and interviewees was also conducted in the local language to minimize  
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5 221 any ambiguities. In line with this, triangulation with the focus group data was used to broaden  
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7 222 the in-depth information from the individual-level in-depth interviews in the analysis. In addition  
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9 223 to this, clarification for any ambiguities was given to them by the research assistant. Moreover,  
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11 224 training of the data collectors and their supervision were also considered.

12 225 **2.8. Patient and Public Involvement:** No patient is involved

### 13 226 **2.9. Data Processing and Analysis**

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15 227 After each FGD and IDI session, an audio-taped voice recorder was replayed to participants to  
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17 228 listen and make the necessary correction to the data. Furthermore, data collected in the local  
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19 229 language were first translated into English and transcribed by two different language experts.  
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21 230 Then their translations were compared for consistency. In line with this, the FGDs results were  
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23 231 confirmed with those of the IDI.

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25 233 An inductive approach was used, where the researchers read and reread the transcripts three  
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27 234 times to get a good understanding of the context. Transcripts were coded line-by-line by the  
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29 235 researchers and categories were developed, discussed, and synthesized to develop broader  
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31 236 themes, and sub-themes. Any discrepancies regarding the codes, categories, themes, and sub-  
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33 237 themes were corrected through team discussions. Then three themes of consumption of okra by  
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35 238 pregnant women; cultural practice related to okra food processing, and traditional and health  
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37 239 benefits of okra for pregnant women were identified. In line with this, six sub-themes were  
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39 240 identified as well. Finally, thematic analysis was used, where interpreting the content of the  
40  
41 241 themes and sub-themes was carried out.

## 42 242 43 243 **3. RESULTS**

### 44 244 **3.1. Socio-Demographic Characteristics of Study Participants,** 45 245 **west Ethiopia**

46  
47 246 A total of 86 participants (72 FGD and 14 IDI) were involved in this study. The majority  
48  
49 247 (97.2%) of the FGD were Muslim in religion. On the other hand, out of the total participants of  
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51 248 IDI, only four (7.4%) attended primary school (Table 1).

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254 **Table 1: Socio-demographic characteristics of study participants (n = 86.0), west Ethiopia,**  
255 **2022**

Variable (Category)	Data collection method	
	In FGD, the number (%)	In IDI, the number (%)
District		
Asossa	42 (58.3)	8 (41.7)
Sherkole	30 (41.7)	6 (58.3)
Educational status		
No formal education	22 (68.8)	10 (31.2)
Primary school	50 (92.6)	4 (7.4)
Marital status		
Married	61 (84.7)	9 (64.3)
Widowed	5 (7.0)	3 (21.4)
Divorced	6 (8.3)	2 (14.3)
Religion		
Muslim	70 (97.2)	13 (92.8)
Orthodox	2 (2.8)	1 (7.2)
Age in years		
< = 31	59 (81.9)	5 (35.7)
32 – 43	13 (18.1)	9 (64.3)

256 Key:

257 FGD - Focus Group Discussion

258 IDI – In-depth Interview

### 259 3.2. Emerging themes and sub-themes

260 Thematic analysis of the transcripts resulted in three themes and six sub-themes including okra  
261 plant parts consumed, knowledge about okra (its nutritional benefits), how okra is obtained, how  
262 okra is prepared, beliefs about okra, and traditional values of okra among pregnant women.

263

264



### 3.2.1. Consumption of okra by pregnant women

#### 3.2.1.1. Okra plant parts consumed

As a result of this study explored, all of the study participants had the common practice of using only okra pods as a food source. As 35 years old participants of this study stated:

*“Only the pods of Okra are prepared in different forms to be used as food. No other parts of the Okra plant were utilized [pregnant women, FGD].”*

Furthermore, other participants in this study whose age was 30 years also explored as:

*“I am not using other parts of Okra rather than Pods. Until now I have not seen any person consuming other parts of Okra [HEW, FGD].”*

Almost all study participants shared common practices in the utilization of the okra plant part as a food source. In addition to the aforementioned practices of okra plant part utilization, 22 years old women also stated:

*“I never practice any parts of the Okra plant as a food rather than its Pods. How can other parts of the plant be edible? How could it be eaten? In my life as well as in my experience no one used other parts of Okra except its Pods. And even I didn't hear this before [pregnant women, FGD].”*

This was also supported by the experience of a 25-year-old participant in this study:

*“Only the Pods of Okra were eaten while the leaves and the steam of Okra were not. Those parts of the plant were not suitable and not known before as a food source. We didn't have any experience of using such parts of Okra [pregnant women, FGD].”*

The practice of okra plant part utilization, which was explored by different FGD members, was also supported by individual-level IDI. Accordingly, one of the 28 years old participants of this study explored the:

*“The seeds, leaves, and the steam of Okra were not eaten. I as well as all my family used only Pods of Okra. Even my grand families were using only Pods of Okra [Pregnant Women, IDI].”*

### 294 **3.2.1.2. Knowledge about okra (its nutritional benefits)**

295 The communities of western Ethiopia used pods of okra for their mucous and viscosity which  
296 increases the palatability of the okra to use as food. This was stated by one of the 37 years old  
297 pregnant women:

298 *“Rather than Pods of Okra, the leaves, and stem of the Okra plant were not eaten because they*  
299 *didn't have any mucous and viscosity. They didn't have also benefits. The mucous nature of okra*  
300  *pods increases my appetite to eat more food [Pregnant women, IDI].”*

301 This study also explored as other parts of the okra plant didn't have any nutritional values except  
302 the pods of okra. This was explored by 29 years old pregnant women:

303 *“The pods of okra had many importance or values. I used to prepare it with different food items*  
304  *to make my food delicious. No other parts of the plant had importance like pods [ pregnant*  
305 *women, IDI].”*

### 306 **3.2.2. Cultural practice related to Okra food processing among pregnant women**

#### 307 **3.2.2.1. How okra is prepared (forms of diet and preservation)**

308 According to the results of this study, there were different practices of pods of okra during food  
309 processing. One of the 25 years old respondents in this study explained okra food processing as:

310 *“The Pods of Okra were first harvested and sundried, grind to a fine powder. Then prepared as*  
311  *a wot, porridge and eaten along other food groups. In addition to this, salt, oil, and onion were*  
312  *added to Okra during its processing to make it easy for cooking and palatable. [Pregnant*  
313 *women, FGD].”*

314 In addition, pods of okra were prepared along with other food groups, as stated by the 35-year-  
315 old respondent of this study:

316 *“I prepared the flour of Okra Pods along with smoked meat, beans, and tomato which made*  
317  *those foods delicious. But I never prepared with Shiro since the mucous nature of Okra is*  
318  *disappeared and become tasteless [Pregnant women, FGD].”*

319 Moreover, okra pods could be preserved for a long period for use after harvest by making them  
320 dry and powdered. This was explained by one of the 32-year-old respondents:

321 *“I made okra pods sundried and ground them to a fine powder to preserve it for a long period. If*  
322  *not sundried, it becomes spoiled. In addition to this, it is not recommended to store the powder*

1  
2  
3 323 *Okra on wet surfaces. I only store it on dry surfaces because if the storage place is dry, okra can*  
4 *be preserved for one year. Then the powder of Okra Pods was prepared with dry meat, and*  
5 324 *beans but not used with cabbage and Potato [Pregnant women, FGD].”*  
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### 9 326 **3.2.2.2. How okra pod is obtained**

10 327 According to the finding of this study, the pods of okra were harvested before drying, and  
11 328 precautions were required during the harvest. This made it comfortable and palatable for use as  
12 329 food. This was explored by 40 years old Pregnant women as follows:

13 330 *“During harvest time, I used gloves for my hand prepared locally to prevent my hand from*  
14 331 *injury. Pods of okra were collected from its plant before it becomes dry. If it became dried on the*  
15 332 *plant, it loses it's mucous and is not comfortable to feed [Pregnant women, IDI].”*  
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### 22 333 **3.2.3. Traditional and health benefits of okra for pregnant women**

#### 23 334 **3.2.3.1. Traditional values of okra**

24 335 As explored by this study, okra had different traditional and health benefits for pregnant women.  
25 336 It relieved the pain related to gastritis and related problems. As indicated by a 19-year-old  
26 337 participant in this study:

27 338 *“Okra is important for health specifically to get relief of pain when I suffered from abdominal*  
28 339 *(gastric) pain. It increases my appetite. When I eat foods with Okra, I was taking more amount of*  
29 340 *food as compared to food taken without Okra. We also used it when we suffer from abdominal*  
30 341 *pain rather than going to the health facility. We prefer to use Okra for abdominal pain treatment*  
31 342 *[Pregnant woman, FGD].”*  
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40 343 According to the finding of this study, okra also gives good strengths, makes them healthy, and  
41 344 is used to increase life expectancy. As one of the 41 years old participants in this study explored:

42 345 *“The secret of my strength and my age is Okra. I am still strong enough. While I am eating food*  
43 346 *prepared from okra pods in the morning, it protects my stomach from any burning sensation*  
44 347 *[Pregnant women, IDI].”*  
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49 348 Accordingly, okra may have a role in neutralizing stomach acids. As stated by a 28-year-old  
50 349 participant:  
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3 350 *“Okra is used to build my body, to provide energy for me, to soften my stool during defecation.*  
4  
5 351 *Okra is the most comfortable food for me as compared to other food sources. Furthermore, Okra*  
6  
7 352 *gives me energy during delivery and makes my labor easy [Pregnant women, FGD].”*  
8

9 353 Okra is also used to increase the income of rural communities in western Ethiopia, especially for  
10  
11 354 pregnant women. As explored by one of the 40-year-old participants of this study:

12 355 *“In addition to use as a food source, okra also increases our income. For example, one Alkela*  
13  
14 356 *(local serving material used for measurement) of okra was sold with 400 Ethiopian Birr*  
15  
16 357 *[Pregnant women, IDI].”*  
17

### 18 358 **3.2.3.2. Beliefs of pregnant women about okra**

19 359 As the finding of this study explored, there were different cultural beliefs related to okra.  
20  
21 360 Accordingly, one of the 32 years old participants in the study explained:

22  
23 361 *“Okra was added to our daily food, and nothing was eaten without okra in our culture. If there*  
24  
25 362 *was no okra, we did not eat enough food. Even we invite Okra food when guests come to our*  
26  
27 363 *home [Health extension worker, FGD].”*  
28

29 364 In line with this, okra could also be used to express happiness and belongingness in the  
30  
31 365 communities of western Ethiopia. As explored by one of the pregnant women:

32 366 *“When there was okra in my dish, I was very happy and also invited this food for whom I want to*  
33  
34 367 *express my belongs [pregnant women, IDI].”*  
35

## 36 368 **4. DISCUSSION**

37 369 According to the findings of this study, pregnant women in western Ethiopia utilized only the  
38  
39 370 pods of okra. However, different parts of Okra were utilized across different parts of the world  
40  
41 371 <sup>(12)</sup>. Fresh leaves, buds, pods, stems, seeds, and immature fruits can be prepared in different  
42  
43 372 forms as vegetables as compared to only pods of okra eaten in western parts of Ethiopia <sup>(9)</sup>.  
44  
45 373 However, those were missed in the diets of pregnant women in western Ethiopia.

46 374  
47 375 The pregnant women in western Ethiopia used pods of okra for their mucous and viscosity which  
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49 376 increases the palatability of the okra plant to be used as food. This was consistent with scientific  
50  
51 377 evidence as okra offers mucilaginous consistency after cooking which has medicinal applications  
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53 378 when used as a plasma replacement and others <sup>(9)</sup>. Thus, the mucous of okra pods during food  
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55 379 preparation may increase the taste of the food and make it delicious.

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3 380 According to the results of this study, there were different practices of pods of okra during food  
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5 381 processing among pregnant women. The pods of okra were prepared along with other food  
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7 382 groups. Moreover, okra pods could be preserved for a long period for use after harvest by  
8  
9 383 making it dry and powdered. This was consistent with different evidence. Dried okra seed flour  
10  
11 384 is rich in nutrients, which could be used for baking and fortification of foods <sup>(44)</sup>. Similarly, the  
12  
13 385 addition of dried okra fruit powder can increase the palatability of different food products <sup>(45)</sup>. On  
14  
15 386 the other hand, okra is exported both in fresh as well as in dried form while size reduction and  
16  
17 387 drying of okra pods can facilitate easy packaging, storage, and transport <sup>(46)</sup>. Therefore, the  
18  
19 388 traditional preservation method of okra pods among pregnant women in western Ethiopia had  
20  
21 389 different importance which was supported by the aforementioned scientific evidence.

22 390  
23 391 The cultural food processing of okra plants among pregnant women in western Ethiopia  
24  
25 392 indicated that; there was no experience of using okra seeds as roasted caffeine-free coffee. In line  
26  
27 393 with this, there was no practice of fortification of okra seed flour with different cereals.  
28  
29 394 Likewise, there were no benefits of okra leaves as cabbage or soup. However, okra seed flour  
30  
31 395 and leaves were used in different parts of the world <sup>(47 9, 48)</sup>. Likewise, okra seeds were used to  
32  
33 396 fortify different cereals to increase their nutrient contents and prevent malnutrition in developing  
34  
35 397 countries <sup>(13, 19,20)</sup>. In line with this, okra seed has significant amounts of protein (22.14%), lipids  
36  
37 398 (14.01%), and high amounts of unsaturated lipids (66.32%), especially the oleic (20.38%) and  
38  
39 399 linoleic acids (44.48%) <sup>(17, 18, 49)</sup>

40 400  
41 401 As explored by this study, okra had different traditional and health benefits for pregnant women,  
42  
43 402 which relieved the pain related to gastritis and related problems. This is supported by different  
44  
45 403 scientific evidence. Antiadhesive compounds of okra do not enhance *H. pylori* virulence which  
46  
47 404 can effectively prevent bacterial adhesion and lead to reduced infection rates (gastritis) <sup>(50)</sup>. In  
48  
49 405 line with this, okra has a gastroprotective effect and it could be a possible therapeutic antiulcer  
50  
51 406 agent <sup>(51)</sup>. Accordingly, okra may have a role in neutralizing stomach acids. Likewise, okra has  
52  
53 407 various bioactive components used for the treatment of gastritis and ulcers comparable to the  
54  
55 408 drug omeprazole <sup>(52)</sup>. Therefore, the mucous of okra pods produced during food processing may  
56  
57 409 neutralize stomach acids and prevents adherence of *H. pylori* bacteria to the gastric mucosal  
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59 410 surface.

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3 412 According to the findings of this study, the consumption of okra gives good strengths. This is  
4  
5 413 also supported by different scientific evidence. The ethanol extracts and polysaccharides of okra  
6  
7 414 have antifatigue effects<sup>(53)</sup>. In line with this, okra seeds were the anti-fatigue part of okra pods  
8  
9 415 which is caused by reducing the levels of blood lactic acid and urea nitrogen and enhancing  
10  
11 416 hepatic glycogen storage<sup>(54)</sup>.

12 417  
13 418 The findings of this study explored that, the consumption of okra makes pregnant women  
14  
15 419 healthy, and is used to increase their life expectancy. There is evidence indicating that; okra is a  
16  
17 420 good source of antioxidants that prevent the formation of free radicals<sup>(12)</sup>. Likewise, okra  
18  
19 421 contains a potentially rich source of natural antioxidants such as polyphenols and flavonoids<sup>(55)</sup>.  
20  
21 422 Similarly, okra fruits can be used as natural antioxidants and natural inhibitors against  
22  
23 423 hyperlipidemia and hyperglycemia in the fields of functional foods and pharmaceuticals<sup>(56)</sup>.  
24  
25 424 Thus, since okra is functional food and pharmaceutical, and also prevents the formation of free  
26  
27 425 radicals, it may make pregnant women healthy and increase their life expectancy. Therefore, the  
28  
29 426 results of this study could have a clinical impact and implication on the healthy of the pregnancy  
30  
31 427 by promoting on utilization of different parts of okra to reduce different nutritional-related health  
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33 428 problems and normal pregnancy outcomes.

34 429  
35 430 Apart from these different health benefits, okra is also very important for pregnant women due to  
36  
37 431 its different nutrient composition, as indicated by different evidence. It is especially important  
38  
39 432 for pregnant women for its folate content which prevents the problem of neural tube defects<sup>(12)</sup>.  
40  
41 433 It has great potential in preventing both macro- and micronutrient deficiency in the malnutrition-  
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43 434 affected area of rural communities<sup>(13)</sup>. Furthermore, owing to its high dietary fiber content, okra  
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45 435 is also consumed to prevent constipation by increasing peristaltic movement of the  
46  
47 436 gastrointestinal tract<sup>(12)</sup>. This was consistent with the finding of this study. Finally, interviewer  
48  
49 437 bias and social desirability bias could be the possible limitations of this study. In line with this,  
50  
51 438 this study did not explore taboos related to okra plant food.

## 50 439 **5. CONCLUSION**

51 440 Utilization of different parts of the okra plant rather than pods was not experienced among  
52  
53 441 pregnant women of western Ethiopia. Lack of awareness and knowledge concerning their  
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55 442 importance and their nutritional value were the barriers to utilization. Okra has different

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3 443 traditional and health benefits for pregnant women in the communities of western Ethiopia. It is a  
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5 444 good source of different micronutrients, macronutrients, antioxidants, and different  
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7 445 pharmacological values. Generally, this edible okra may contribute to maintaining food security  
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9 446 to meet the fast-growing human population, especially in developing countries.

10 447  
11 448 The sustainable utilization of different parts of okra requires strong policy support based on  
12  
13 449 scientific evidence to ensure the nutritional security of pregnant women. It could help to support  
14  
15 450 the sustainable development goal of "ensuring sustainable production <sup>(23)</sup>." Moreover, BCC  
16  
17 451 intervention to promote the utilization of different parts of okra was recommended.

## 18 452 19 453 **6. Abbreviations:**

20  
21 454 IDI; In-depth interviews

22  
23 455 FGD; Focus Group Discussion

24  
25 456 BCC; Behavioral Change Communication

26  
27 457 Km; Kilometer

28  
29 458 HEW; Health Extension Worker

## 30 459 31 460 **7. Acknowledgments**

32  
33 461 We would like to extend our gratitude and appreciation to all data collectors, supervisors,  
34  
35 462 regional and zonal health offices of Benishangul Gumuz, West Ethiopia, and the respective  
36  
37 463 administrative organs of all districts. We also extend our thanks to pregnant women for  
38  
39 464 providing this valuable data for this research work and patient advisers as well.

## 40 465 41 466 **8. Contributorship statements**

42  
43 467 **Efrem Negash Kushi:** investigated the article, performed formal analysis, and wrote the  
44  
45 468 original draft.

46  
47 469 **Dr. Dessalegn Tamiru:** conceptualized the data, verified the methods, made substantial  
48  
49 470 contributions to funding acquisition, supervised the article, reviewed and edited the article,

50  
51 471 **Prof. Tefera Belachew:** conceptualized the data; verified the methods, supervised the article,  
52  
53 472 and reviewed and edited the article.

## 54 473 **9. Competing interests**

55 474 The Authors declare that there is no conflict of interest.

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2  
3 475 **10. Funding**

4 476 This research received no specific grant from any funding agency in the public, commercial,  
5 477 or not-for-profit sectors.

6  
7  
8 478 **11. Data sharing statement**

9  
10 479 Data generated by our research that supports our article be made available as soon as  
11 480 possible, wherever legally and ethically possible.

12  
13 481 **12. Ethics approval statement**

14  
15 482 The ethical aspects of this study were approved by the Institutional Review Board of Jimma  
16 483 University, Institute of Health with approval number of SGS/2040/2019. Verbal informed  
17 484 consent was obtained from all study participants and formally recorded. Accordingly, the  
18 485 study participants were informed about the research and their right to participation (right to  
19 486 decline participation at any time they feel to do so). In addition, those with severe health  
20 487 problems were informed to visit public health facilities. Furthermore, they were informed  
21 488 that the discussions were recorded and confidentiality was maintained. Therefore, only  
22 489 information related to the okra part being utilized and its traditional values were considered.

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## QUALITATIVE DATA COLLECTION APPROCHES

### Consent Form:

Thank you for setting aside time to talk with us today. I am. \_\_\_\_\_ currently studying the traditional values and use of okra, parts of the Okra plant being utilized for food processing by pregnant women of western Ethiopia. The purpose of this study is used to reveal traditional values and use of okra among pregnant women, and also the associated cultural meaning attached to it. Furthermore, parts of the okra plant being utilized by pregnant women will also be explored.

By meeting with you as a researcher, we hope to gain a better understanding of:

*Traditional values and use of okra among pregnant women*

*The edible parts of the Okra plant*

*Commonly utilized parts of okra and the reason behind*

*Importance of purpose Okra during pregnancy*

*Cultural food processing and preservation techniques of okra*

Before we begin, we want to let you know that any information or examples we discuss during this interview or discussion will not be transferred or copied to any specific person or institution and all identifying information will be removed to maintain your privacy. You are free to choose not to respond to any of our questions or stop the interview or discussion at any time. we would like to record this conversation, solely to listen attentively now and take notes. Are you willing to cooperate?

## 1. In-depth Interview (IDI) Guide

Theme	Questions to be interviewed with probes	Remarks
Consumption of okra by pregnant women	<ul style="list-style-type: none"> <li>• Parts of okra being utilized</li> <li>• Which part is commonly utilized?</li> <li>• Reason out?</li> <li>• Which part is rarely utilized?</li> <li>• Reason out?</li> <li>• Knowledge about okra (its nutritional benefits)</li> </ul>	
Cultural practice related to Okra food processing	<ul style="list-style-type: none"> <li>• How okra is prepared (forms of diet and preservation)</li> <li>• How okra pod is obtained</li> </ul>	
Traditional and health benefits of okra	<ul style="list-style-type: none"> <li>• Traditional values of okra</li> <li>• Beliefs of pregnant women about okra</li> </ul>	

## 2. Focused Group Discussion (FGD) Guide

Theme	Questions to be discussed with probes	Rem
<b>Importance</b>	<ul style="list-style-type: none"> <li>• Nutritional importance of Okra for pregnant women &amp; others.</li> <li>• Traditional values and other important of Okra</li> <li>• Composition of Okra</li> </ul>	
<b>Utilization</b>	<ul style="list-style-type: none"> <li>• Parts of Okra utilized</li> <li>• Parts of Okra not utilized</li> <li>• Reasons for not utilized</li> </ul>	
<b>Food processing</b>	<ul style="list-style-type: none"> <li>• Cultural methods of Okra plant food processing</li> <li>• Type of meal used or prepared with Okra</li> <li>• Methods of Okra plant food preservation</li> </ul>	



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	<ul style="list-style-type: none"> <li>• Methods of Okra plant harvestation</li> </ul>	
<b>Precautions</b>	<ul style="list-style-type: none"> <li>• Any precaution with reasons to be considered to use Okra plant food</li> <li>• Any factor responsible for the contamination of okra plant food</li> </ul>	

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**Reporting checklist for qualitative study: Based on the SRQR guidelines.**

	Reporting Item	Page Number
<b>Title</b>	#1. Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
<b>Abstract</b>	#2. Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
<b>Introduction</b>		
Problem formulation	#3. Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	4-5
Purpose or research question	#4. Purpose of the study and specific objectives or questions	5
<b>Methods</b>		
Qualitative approach and research paradigm	#5. Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate	6

	the rationale for several items might be discussed	
Researcher characteristics and reflexivity	<b>#6.</b> Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	N/A
Context	<b>#7.</b> Setting / site and salient contextual factors; rationale	5-6
Sampling strategy	<b>#8.</b> How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale	6-7
Ethical issues pertaining to human subjects	<b>#9.</b> Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	8
Data collection methods	<b>#10.</b> Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	7
Data collection instruments and technologies	<b>#11.</b> Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if / how the instrument(s) changed over the course of the study	6-7
Units of study	<b>#12.</b> Number and relevant characteristics of	6-7

	participants, documents, or events included in the study; level of participation (could be reported in results)	
Data processing	#13. Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation /deidentification of excerpts	8
Data analysis	#14. Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	8
Techniques to enhance trustworthiness	#15. Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale	7
<b>Results/findings</b>		
Syntheses and interpretation	#16. Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-13
Links to empirical data	#17. Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	8-13
<b>Discussion</b>		
Integration with prior work, implications, transferability and contribution(s) to the field	#18. Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability;	13-15
Limitations	#19. Trustworthiness and limitations of findings	3 and 15
<b>Other</b>		

Conflicts of interest	<b>#20.</b> Potential sources of influence of perceived	16
Funding	<b>#21.</b> Sources of funding and other support; role of funders in data collection, interpretation	16

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