

**ASSESSMENT OF NUTRITIONAL STATUS,
KNOWLEDGE AND CONSUMPTION PATTERN OF
MILLETS AMONG THE WOMEN POPULATION OF
SURAT (URBAN): IMPACT EVALUATION ON
KNOWLEDGE GAIN BY NUTRITION HEALTH
EDUCATION (NHE)**

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CONSUMPTION PATTERN OF MILLETS AMONG THE WOMEN
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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR DEGREE OF
MASTER OF SCIENCE
FAMILY AND COMMUNITY SCIENCES
FOOD AND NUTRITION (PUBLIC HEALTH NUTRITION)**

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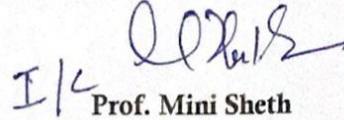
CERTIFICATE

This is to certify that the research work embodied in this thesis has been carried out independently by Ms. Sonal under the guidance of Prof. Komal Chauhan in pursuit of master's degree (Family and Community Sciences) [M.Sc. (F.C.Sc)] with major in Public Health Nutrition, Department of Food and Nutrition, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara and represents her original work.



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ABSTRACT

ABSTRACT

Millet is one of the oldest cultivated grains in the world and has been cultivated throughout Africa and Southeast Asia for thousands of years. Millet can be used to make bread, beer, cereal and other foods. There are different types of millets around the world, such as pearl millet, finger millet, proso and sorghum varieties. These types of millets look a little different, but all of offer the similar type. Thus, there are many benefits of eating millet but the awareness about the importance of millet is low among the population. Health is a common theme in most cultures. Health plays an important role in our life. It is a valuable asset for women in terms of their health. Women have a special role in healthy nutrition of the population. Therefore knowledge about millets is essential.

BROAD OBJECTIVE: Assessment of Nutritional Status, Knowledge and Consumption Pattern of Millets among the Women Population of Urban Surat.

SPECIFIC OBJECTIVES:

To assess demographic profiles of women population, anthropometric measurements, Health status any disease past and present, diet profile, awareness of millet, Millet consumption pattern

Methodology

Using the formula our sample size came to 322 but used round figure 350. A sample of zones was obtained through stratified sampling and snowball sampling was used until the target of one zone was met and rotated in zone. The researcher randomly selected any area of the zone. The study was approved by the institutional Ethics Committee for Human Research (IECHR), and further concluded after their approval under No. IECHR/FCSc/MSc/2022/30.

Findings

According to phase 1 data observation 83.71% women were Hindus, 50.57% were industrialists, illiterate women were 19.48%, 27.22% had studied up to primary school, 25.21% of women had studied up to high school, 24.64% of women had studied up to graduation and 3.44% of women had studied up to post-graduation. Monthly income of 63.43% of women belonged to lower middle class whose monthly income was 27,654-

46,089. Females living in nuclear families were 69.14% and women living in joint families were 30.86%. According to WHO 55.43% of women had normal BMI, 26.57% were overweight, 13.14% were obese and 4.86% of women were underweight. Consuming vegetarian diet were 66.57% of women. Two full meals a day had 88.00% of women and 79.71% women had breakfast once a day. 45.43% women had junk food once normal to twice a week. Reported normal hemoglobin level of women was 43.7%. 86% of women had no major illness. Around 64% women had good knowledge, 34.86% women had fair knowledge and 1.14% women had poor knowledge. Consumption of large and small millets data showed that only 37.43% women consume sorghum millet frequently, 39.43% of the women consume pearl millet frequently. It was found that millet was consumed by 50% women in winter. Reasons for not eating millet showed that 36.29% women do not have family custom, 31.41% of women don't like its taste, and 14% do not eat millet because it is not available nearby store.

In Phase 2, Information about millets, there benefits of recipe information was given through booklet in the first month. In the second month, millet messages and videos through whatsApp and at the end of the second month knowledge was checked through a quiz.

In Phase 3, data on purposively selected subject showed that before NHE intervention education of women who had good awareness about millet were 54.90% and women who had fair awareness about millet were 45.10%. After intervention, women who had good awareness about millet were 92.16% and 7.84% of the women had fair awareness about the millet. Showing knowledge gain none of the subject fall in the poor category showing shift with important.

Conclusion

It can be concluded from the data that in spite of having reasonable knowledge about millet with their health benefits but because of physical, social and mental reasons women showed declined in the consumption, NHE did support in enhanced gave the knowledge and awareness about the magic grains.

INTRODUCTION

INTRODUCTION

Millet, popularly known as nutritional cereals or coarse cereals, is a nutrient-rich group of small-grained cereals grown primarily in developing countries. Millet is one of the oldest foods known to mankind. People in Africa and India use it in many of their recipes. Although millet is one of the most important food crops in the world, it is mostly grown in the Eastern Hemisphere and especially in regions with primitive agricultural practices and high population density. Millet is one of the most important cereals along with wheat, rice, and maize. Millet is an important food source for millions of people, especially those living in hot, dry areas of the world. They are mostly grown in marginal areas under agricultural conditions where major cereals do not produce significant yields (RR chapke et al., 2018). Millet is also unique because of its short growing season. They can develop from planted seeds to mature, harvestable plants in as little as 65 days. The advantages of growing these crops include low labor requirements, drought resistance, resistance to pests, and the robustness of the plants, which can be kept for two or more years if stored properly. (APEDA)

Millet is an important food crop in many underdeveloped countries because it can thrive under adverse weather conditions such as limited rainfall. In contrast, millet is the major source of energy and protein for millions of people in Africa and India. It has been reported that millet contains many good nutrients such as protein, calcium, iron, zinc, phosphorus, potassium and more.

Millet is a good option for healthy living and can reduce the incidence of civilization diseases. Millet is called a nutritional grain because it is rich in micronutrients such as B-complex vitamins, zinc, phosphorus, potassium and minerals. Millet is also a good source of health-promoting phytochemicals. Millet has many nutritional, nutraceutical and health-promoting properties, especially the high fiber content and the type of starch play an important role in reducing the risk of diabetes and other related diseases. In fact, millet acts as a prebiotic that nourishes the micro flora in our internal ecosystem. Millet moisturizes our colon to prevent constipation. The high content of tryptophan in millet produces serotonin,

Which calms our moods. The niacin found in millet can help lower cholesterol, triglycerides and C-reactive protein, preventing cardiovascular disease. All millet varieties have high antioxidant activity. Millet is gluten-free and non-allergenic.

There are mainly eight types of millets, which are well known and widely grown in different parts of India: Sorghum (Jowar), finger millet (Ragi), Kodo millet, barnyard millet (Samo), foxtail millet, pearl millet, proso millet (Cheena) and amaranth seed (Rajagro)

Table 1.1 Local name of different type of millets

<u>Type of Millet</u>	<u>Hindi Name of the Millet</u>	<u>Gujarati Name of the Millet</u>
<u>Major millet</u>		
Sorghum	Jaur	Jowar
Pearl millet	Bajara	Bajri
Finger millet	Ragi	Nagli,/Bavto
<u>Minor millet</u>		
Foxtail millet	Kangani	Raalkang
Little millet	Kutki	Kuri/ Vari
Kodo millet	Kodara	Gajro
Proso millet	Barri	Cheno
Barnyard millet	Sama	Sama
Amaranth millet	Rajgira	Rajagaro

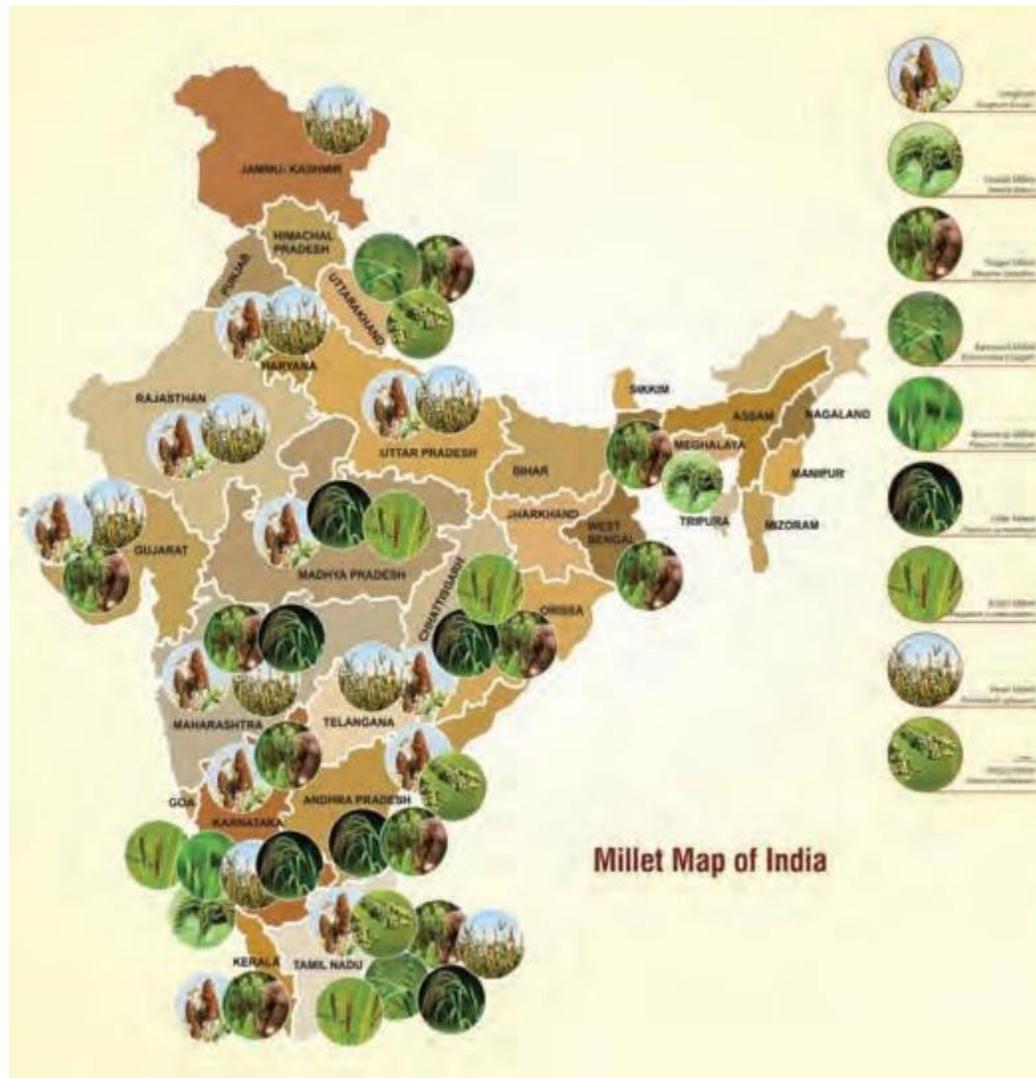
Production of millets in India and Gujarat

According to FAOSTAT of the United Nations (2016), Global production of millet was 28.4 million tones, led by India with 36% of the world total. According to agriculture statistics report 2019, overall production of millet in 2018-2019 in India and Gujarat was 42.95 and 1.74 million tons respectively.

Millets play an important role in rain fed region of the country which contributes 60 percent of the total area. Especially minor millets are very rich nutrients and are minerals and

resistant to drought and stress in rain fed farming. National nutrition monitoring bureau 2006 has reported that the consumption of millets was higher in states of Gujarat, Karnataka, and Maharashtra but negligible in state of Kerala, Orissa and Tamil Nadu where rice is the staple cereal and largely consumed.

Figure 1.1: The map shown below shows the overall millets grown in India:



Source: The Story of millets, 2018 (Sahaja Samrudha)

Table 1.2 Production (tons) of millets and sorghum per state population in 2015–2016 and their frequency of consumption.

City	State/ union territory	Production of finger millet per state population (tons)	Production of pearl millet per state production (tons)	Production of sorghum per state population (tons)	Median frequency of millet/ sorghum consumption in the city
Ahmedabad	Gujarat	0.23	11.92	0.30	Rare
Bengaluru	Karnataka	18.7	2.21	0.15	Frequent
Chennai	Tamil Nadu	3.49	1.82	0.47	Frequent
Delhi	Delhi	-	0.21	-	Moderate
Hyderabad	Telangana	0.01	0.06	0.01	Frequent
Kolkata	West Bengal	0.13	-	0.02	Frequent
Mumbai	Maharashtra	0.77	2.75	0.26	Frequent

Source: Assessing Millets and Sorghum Consumption Behavior in Urban India: A Large-scale Survey (2015-2016).

Table 1.2 showed the state-level production of millets, as well as their levels of consumption, in the cities studied. Karnataka was the largest producer of these crops, followed by Maharashtra, Gujarat, and Tamil Nadu, confirming the concentration of production in southern states of India. Except in Gujarat, urban consumers in Karnataka and Maharashtra consumed these crops at relatively high frequency, with “once or twice a week” being the median. Despite Gujarat being the largest producer of pearl millet, it exhibited the smallest consumption, clearly showing that its large production had little impact on urban consumption. On the other hand, consumers in Delhi consumed these crops moderately (once a month), but their production was small. In contrast to these cities, Telangana and West Bengal consumed millets frequently despite less production. (Kane Potaka J 2015-2016)

Summary:-From the above data we know that the production of millets is good in Gujarat. But consumption of millets is not seen much in Gujarat. Therefore we want to know from this resource through the women population of Surat whether women are knowledgeable about millets and if they are knowledgeable, how much they consume. And if consumption is not done, what are its reasons. Through that we will know why we are not taking it and we will pay more attention to it in the future so that the consumption of millets will be good and the health of women will also be good.

The area, production and consumption of millets in India have come down in the recent decades both due to demand side and supply side factors. There lies significant gap in both the demand and the supply side. And the demand side, the consumption of millet has come down due to increased consumption of ten fine cereals, negative perceptions of millets as a food for poor and policy neglect when compared to other crops. On the supply side, limited productivity of crops and their growing situation, make it unavailable in market. Although millets can be easily incorporated into almost all popular rice- and wheat-based recipes, one of the reasons for not consuming millets regularly is the lack of knowledge on how to incorporate or cook them. Currently, a few recipes are widely used in communities to cook millets. These include finger millet balls, finger millet porridge, millet chapattis/rotis, and finger millet malt. However, as family customs strongly influence what people eat at home, influencing the decision makers at households would have a ripple effect on consumption and be a major way to reach male consumers. Taste was observed to be a major reason why the respondents did/did not eat more millets, indicating that health awareness alone would not significantly boost millet consumption. Together, these insights showed the need for tasty products and simple recipes made from millets. As millets are mostly eaten as traditional porridge, there seem to be abundant opportunities to grow the market through ready-to-eat and ready-to-cook convenience foods and cookies, among others.

Millet's consumption should be promoted due to following reasons

Millet's are one of the oldest foods known to humans and possibly the first cereal grain to be used for consumption and domestic purpose. Millet's grow well in dry areas with little or no rainfall, under marginal condition of soil fertility. Millet's have short growing seasons as compare to other food crops.

Millet's are called power house of micronutrients as well as minerals, various type of millet's have different features. Millet's are helpful in weight management, diabetic condition, blood-pressure, and anemia and resist malnutrition. Millet's are a rich source of 21of micro nutrients, the outer layer of the endosperm and the embryo of the seed containing high protein, fats, calcium, and minerals; minor millet's can thus help to alleviate the widespread prevalence of malnutrition. (Sam path et al., Ram Prasad and Gowda, & Sharma and Bharthakur). Additionally, millet's are less prone to diseases and pests also millet's require minimal use of pesticides and chemical fertilizers for growth.

As millet's are gluten free grains, they are suitable for patients with gluten intolerance and celiac disease. Millet's have considerable potential in foods and beverages. Millet's are used in fermented and non-fermented porridges, alcoholic and non-alcoholic beverages, steamed food items, fermented breads, snack food items etc.

Hence, millet consumption should be promoted more, government should adopt some practical steps towards to increase the awareness about knowledge and consumption of millet's as such government can provide new market for millet's and should encourage research, development and production of millet's. Government should promote millet consumption by providing millet's at ration shop at lowest price. People must have aware about how to incorporate various millet's in their daily diet through attending Nutritional Health Education (NHE) programs and media campaign. All media can broadcast the importance of using millet's and how millet's can help to overcome the problem of malnutrition among children and pregnant women worldwide.

Rationale of the study

There are various studies which are shown to have positive health benefits of millets consumption towards reduce them of the risk of various major and minor disease conditions.

The main consumption pattern in Indian households is mainly wheat and rice based.

There is lack of awareness for millet and its health benefits. Dearth of information on individual population and different millet consumption in Gujarat.

As lifestyle patterns changes, the consumption pattern also changes in case of millets by young individuals.

Through the proposed study, researchers wanted to know the awareness and consumption pattern of millets among women, its correlation if any with health and nutritional status.

Broad Objective

Assessing millets awareness consumption pattern among woman population of urban sutra.

Phase I

To study demographic, diet and disease profiles of study subjects along with Millet awareness and consumption pattern

Phase II

To develop NHE (Nutrition Health Education) tool for imparting education (Predesigned online tool was modified and prepared for offline education)

Phase III

To study impact of NHE on improvement in knowledge score

Specific Objectives

To assess demographic profiles of women population

To assess anthropometric measurements

To assess health status

To assess diet profile, to assess awareness of millet and to assess Millet consumption pattern

REVIEW OF LITERATURE

REVIEW OF LITRATURE

The present study was designed with a broad objective to assess the outcome of imparting Nutrition Health Education (NHE) consumption pattern of millets among women population of Surat (Urban). Assessment of various factors such as education, socioeconomic status, nutrition and health status, anthropometric measurements, and knowledge score of millets was done on women of Surat. Nutrition Health Education have been imparted among purposively selected subjects from one zone and after that the outcome of imparting knowledge based on scores would be checked.

Relevant Literature has been reviewed under following headings in this chapter:

1. Introduction to millets
2. Nutritional composition of millets as compare to wheat and rice
3. Production and Consumption pattern of millets in India and Gujarat
4. Health benefits of millet consumption
5. Knowledge and practices regarding millets consumption
6. Development of millet recipe
7. Policies and programmed for millets promotion

1. Introduction to millets

Size, shape and basic information about millet

There are 2 types of millets, large millets and small millets, which are differentiated by grain size and growing area. Pseudo-millets have the same nutritional properties as major and minor millets, but belong to a different botanical family. Millet is a tall, erect annual grass that resembles corn.

They vary in appearance and size depending on the variety and grow from 1 to 15 feet tall.

The seeds are covered with colored hulls, and the color depends on the variety. Because millet is covered with an unusually hard-to-digest hull, it must be hulled before use. Hulling does not affect the nutritional content, as the germ remains intact during this process.

Type of Millet

Major Millets

Pearl millet:



Bajra, Sajje or pearl millet is a widely grown type of millet. It has been cultivated in the African and Indian subcontinent since ancient times. It is known worldwide as a bird food and is mostly grown in Rajasthan, Gujarat and Haryana because it is well adapted to nutrient-poor, sandy soils in low-rainfall areas. It is the most commonly cultivated millet species. It has been cultivated in Africa and the Indian subcontinent since prehistoric times. The center of diversity and the suspected domestication area of the crop is in the Sahel region of West Africa. Pearl millet has ovoid grains 3 - 4 mm long, the largest grains of all millet species (excluding sorghum). They can be nearly white, pale yellow, brown, gray, slate blue, or purple. Pearl millet is commonly used to make bhakri flatbread. It is also cooked to make a Tamil porridge called kambanchoru or "kambankoozh". In Rajasthani cuisine, bajre ki khatti rabdi is and a traditional dish made with pearl millet flour and yogurt. It is usually made in summers to be served along with meals.

Sorghum Millet



Jowar, jola, or sorghum is a cereal that is considered an important coarse-grained food crop. Most varieties are drought and heat tolerant, nitrogen conserving, and especially important in arid and semi-arid regions where the grain is one of the staple foods for the rural poor. These varieties are an important component of forage in many tropical regions. It is widely grown in Maharashtra, Madhya Pradesh, Uttar Pradesh, Haryana, Andhra Pradesh, Tamil Nadu and Karnataka, and parts of Rajasthan. Popped sorghum is popular as a snack in India. The popped sorghum resembles popcorn, but the puffs are smaller. In China, sorghum flour is used in combination with wheat flour to make noodles and bread.

Finger Millet



Ragi or finger millet is a short, abundant plant with characteristic finger-shaped like terminal inflorescences bearing small reddish seeds. It is an annual plant commonly grown as a cereal in the arid areas of India, especially in the south of the country. Finger millet is a short-day crop with a growth optimum of 12 hours of daylight for most varieties. Its main area of cultivation is from 20°N to 20°S, mainly in the semiarid to arid tropics. However, finger millet is also grown at 30°N in the Himalayan region (India and Nepal). It is generally considered drought tolerant, but prefers moderate rainfall compared to other millet species such as pearl millet and sorghum. There are several recipes for finger millet, including dosa, idli, and laddu. In southern India, finger millet is used to prepare baby food on the recommendation of paediatricians because it is high in nutrients, especially iron and calcium. Ragi malt porridge is made from finger millet that is soaked and shade dried, then roasted and ground. This preparation is boiled in water and used as a substitute for powdered milk-based drinks.

Minor Millets

Foxtail Millet



Foxtail millet is also known as Italian millet, it provides a variety of nutrients and has a sweet nutty flavor. Foxtail millet is an annual grass with slender, vertical, leafy stems that can reach a height of 120-200 cm. Foxtail millet is a gluten-free grain and the second most widely grown species. It is one of the oldest cultivated millet species. The grains closely resemble paddy rice in grain structure. They contain an outer hull that must be removed for use. In India, foxtail millet is still an important crop in arid and semi-arid regions. It is grown in the warm season crop, usually in late spring.

Little Millet



Little millet has smaller and rounder grains than other millet species. It is an annual herbaceous plant that grows straight or with folded leaves, reaching a height of 30 centimeters to 1 meter. The leaves are linear, with sometimes hairy laminate. The grain is round and smooth, 1.8 to 1.9 mm long. It is cultivated throughout India and is a traditional crop in Karnataka. It is generally consumed as rice, and any recipe that calls for staple rice can be prepared with a little millet. Sometimes millets are ground and baked, and most cultivation takes place in central India. It is usually grown with a seed drill. It can also be planted spoiled if necessary. Some of the greens of the plant can also be used as cattle feed. The straw can be mixed with clay or cement and used in construction.

Kodo Millet



Kodo millet is an annual grass species that reaches a growing height of approximately four feet. Kodo millet is a very drought resistant crop. It is the coarsest grain of all the millet categories. It is grown as a minor crop in most of these areas, with the exception of the Deccan Plateau in India, where it is an important food source. It is a very hardy crop that tolerates drought and can survive on marginal soils where other crops cannot, and can yield 450-900 kg of grain per hectare. Kodo millet has great potential to provide nutritious food to subsistence farmers in Africa and elsewhere. Kodo millet or Kodari is generally restricted to Gujarat, Karnataka and parts of Tamil Nadu. The fiber content of the whole grain is very high. In India, kodo millet is ground into flour and made into puddings. In Africa, it is cooked like rice. It is also a good choice as feed for cattle, goats, pigs, sheep and poultry

Barnyard Millet



Barnyard is another type of millet that has high nutrient density and fiber content. Panicle millet has become one of the most important minor millet crops in Asia and is experiencing a significant increase in global production. This genus includes millet species grown as cereals or fodder crops. The best known members are Japanese millet in East Asia, Indian barnyard millet in South Asia, and burgoo millet in West Africa. Collectively, the members of this genus are called barnyard grasses and are also known as barnyard millet or billion-grass. They are less sensitive to biotic and abiotic stresses. Millet grains are a good source of protein, carbohydrates, and fiber and, most importantly, contain more micronutrients than other major cereals. Despite its nutritional and agronomic benefits, barnyard millet has been underutilized. In the past decades, very limited attempts have been made to study the properties of this crop.

Proso Millet



Proso millet is a relatively low-demanding crop, and diseases are not known; consequently, it is commonly used in organic farming systems in Europe. In the United States, it is commonly used as an intercrop. Thus, Proso millet can help avoid summer fallow, and continuous crop rotation can be achieved. Its shallow root system and resistance to atrazine residues make Proso millet a good intercrop between two crops that require water and pesticide-demanding crops. The stubble from the previous crop allows more heat into the soil, resulting in faster and earlier millet growth. Panicle millet is good for balancing blood sugar levels and has a low glycemic index. In India, it is popularly called chena in India and is used as bird feed. Its round seeds are about 1/8 inch wide and covered by a smooth, glossy hull. The grain contains a comparatively high amount of indigestible fiber because the seeds are enclosed in the hulls and are difficult to remove by conventional milling methods. The most commonly consumed products include ready-to-eat breakfast cereals made exclusively from millet flour, and a variety of pasta and baked goods, although these are however, often produced from blends with wheat flour to improve their sensory quality.

Amaranth Millet



One of the lesser known types of millets is amaranth, also known as raj agro, Ramadan and chola. Amaranths is a cosmopolitan genus of annual or short-lived perennial plants collectively known as amaranth. In the United States, amaranth is used primarily for seed production. In U.S. foods, amaranth is most commonly used as milled flour mixed with wheat or other flours to make cereals, crackers, cookies, breads, or other baked goods. Despite usage studies showing that amaranth can be blended with other flours in excess of 50% without compromising functional properties or flavor, most commercial products use amaranth in only a small proportion, even though they are marketed as "amaranth" products.

Quinoa



Quinoa is a flowering plant of the amaranth family. Quinoa is a dicotyledonous annual plant that usually grows about 1-2 meters tall. It has broad, usually powdery, hairy, lobed leaves that are usually arranged alternately. The woody main stem is branched or unbranched, depending on the variety, and may be green, red, or purple. In their natural state, the seeds have a coating that contains bitter-tasting saponins, making them unpalatable. Most of the grain sold commercially available has been processed to remove this coating. It is grown mainly in Peru and the United States, but is now also available in Indian supermarkets. People also use it as a salad by soaking it and pouring it out.

2. Nutritional composition of millets as compared to wheat and rice:

Table 2.1: Nutrition composition of millets as compared to nutrition composition of rice and wheat per 100g

Grain	Carbohydrate (g)	Protein (g)	Fat (g)	Energy (kcal)	Calcium (mg)	Iron (mg)	Dietary fiber (g)	Phosphorus (mg)
Pearl millet	61.8	10.9	5.43	347	27.4	6.4	11.5	289
sorghum	67.7	9.9	1.73	334	27.6	3.9	10.2	274
Finger millet	66.8	7.2	1.92	320	364	4.6	11.2	210
Kudos millet	66.2	8.90	2.55	331	15.3	2.3	6.4	210
Prose millet	70.4	12.5	1.1	341	14	0.8	-	206
Foxtail millet	60.1	12.3	4.3	331	31	2.8	-	188
Little millet	65.5	10.1	3.89	346	16.1	1.2	7.7	130
Barnyard millet	65.5	6.2	2.2	307	20.0	5.0	-	280
Amaranth millet	61	13.3	5.6	356	162	8.0	7.5	412
Quinoa	54	13.1	5.5	328	198	7.5	14.7	212
Wheat	64.7	10.6	1.4	321	39.4	2.9	11.2	315
Rice	78.2	7.9	0.5	356	7.5	-	2.8	96

Source: Indian food composition tables, NIN-2017.

Millet is miles ahead of rice and wheat in terms of their mineral content, compared to rice and wheat. Each one of the millets has more fiber than rice and wheat. Every single millet is extra ordinarily superior to rice and wheat and therefore is the solution for the malnutrition that affects a vast majority of Indian population.

Millets are remarkable in their nutritive value; being nearly 3-5 times nutritionally superior to rice and wheat – be it minerals, vitamins, dietary fiber or other nutrients. Sorghum is an important source of antioxidants, polyphenol and cholesterol-lowering waxes. Due to their high dietary fiber content coupled with low glycemic index, millets can help in curbing overweight/obesity as well as the risk of hypertension, cardiovascular diseases, diabetes, cancer and constipation.

(Augare et al., 2011) Reported that barnyard millet is one of the hardiest millets, which grows well under adverse agro-climatic conditions. This study indicated the potential good benefits of barnyard millet in diet therapy of diabetic patients. The DE hulled and treated grains showed positive impact on blood glucose levels in diabetic volunteers after the intervention study of 28 days. It is an important grain, which possesses good cooking and sensory qualities. Therefore, it could be beneficial if one stated barnyard in his/her daily diet.

(Amadoubr and Le, 2013) Concluded that millets are the staple food for millions of poor people in Africa and Asia. Millets are high carbohydrate energy content and nutritious, making them useful components of dietary and nutritional balance in foods. Combination of millets with other sources of protein would compensate the deficiency of certain amino acids.

(Kumar, 2022) Reported that Finger millet being staple food in different parts of India and abroad is promoted as an extremely healthy food. Vitamins, minerals, fatty acids and antioxidant properties of this make its strong contribution to human nutrition. This could be a strategic grain used to complement the diet in rural/marginal regions where energy protein malnutrition affects most of the population. Finger millet can be used in different food formations for making value added products due to its great protein composition and

its gluten free properties. Although the consumption pattern of this millet is specific and continue to remain as such, therefore its popularization in the broader range is essential and specific design of foods acceptable to the population can help in promoting the consumption Finger millet.

(Chauhan et al., 2022) Concluded that the developed ragi based products on average met almost one-third requirements of Recommended Dietary Allowances (RDA) for 9energy, protein, calcium, iron, and fiber for the elderly. The ragi laddu satisfied one third RDA requirements of the elderly. The Ragi based food products were found to be most acceptable without any digestive problems among the institutionalized elderly. Developed designer Ragi products were soft, easy to chew, and digest and very much liked and accepted depicting the potential of large-scale supplementation to elderly with poor nutritional status for improving quality of life.

(Hassan et al., 2021) Assessed that finger millet and pearl millet can be potentially used as alternative source as feed for animals as they provide adequate amount of energy require in poultry diets. Also, they are more than and equal to the nutrients which are provided from cereals like maize, rice and wheat and the presence of nutraceuticals properties are beneficial for human health.

(Yacoubian, 2022) Concluded that millet has a higher glycemic index compared to rice. Millet is classified as a high glycemic index food with a GI of 71. In comparison, rice is classified as a medium glycemic index with a GI of 60. Millet is composed of 2.5 more carbohydrates compared to rice. Millet contains 73g of carbohydrates which fills 24% of the daily recommended value. Whereas, rice contains 28g of carbohydrates, filling 9% of the daily recommended value. When it comes to comparing the fiber content of each food, millet has a richer fiber content than rice. Millet fulfills 36% of the daily recommended value, whereas rice contains negligible amounts of fibers. Millet is richer in protein than rice. Millet contains 11g of protein compared to rice which contains 2.7g. Millet has a richer vitamin Prof Lie compared to rice. Millet is richer in vitamin B1, B2, B3, B5, B6, and folate. All of these satisfy at least 50% of the daily requirement of vitamins. Millet is higher

in calories and higher in carbs; however, they are also rich in fibers, promoting a healthy gastrointestinal tract and feeling satiated for longer. They are usually part of weight loss diet regimens as an alternative filler food than rice because they are richer in fibers, vitamins, and minerals.

3. Production and Consumption pattern of millets in India and Gujarat

The global production of millets has been lifted up in the past decade. According to FAO, the global millet production has increased from 24.9 million metric tons in 2011-2012 to 31.09 million metric tons in 2018-2019, with the estimated/forecasted production 1.5% up than 2020. (FAOSTAT, 2018) (World food situation, FAO, 2021) According to FAO 2018, India is the leading producing country in the world followed by Niger, Sudan, Nigeria, Mali and china. According to a report, India is the largest global producer with a 41.0% global market share whereas Africa is the largest consumer of millets with more than 40% of global millet consumption in 2019. (Dublin, 2019)

As a result, India has produced 17.96% million tons of nutria-cereals in 2020, (PIB, 2022) with Rajasthan producing highest (6.57 million tons) in terms of major millets and Karnataka and Madhya Pradesh in terms of minor in the year 2018-2019 (India stat, 2018). Millets play an important role in rain fed region of the country which contributes 60 percent of the total area. Especially minor millets are very rich nutrients and are minerals and resistant to drought and stress in rain fed farming. National nutrition monitoring bureau 2006 has reported that the consumption of millets was higher in states of Gujarat, Karnataka, and Maharashtra but negligible in state of Kerala, Orissa and Tamil Nadu where rice is the staple cereal and largely consumed.

Table 2.2 Consumption pattern of millets in India

State	All India		Rural		Urban	
	Kg/hsh/m	Rs/hsh/m	Kg/hsh/m	Rs/hsh/m	Kg/hsh/m	Rs/hsh/m
Andhra Pradesh	6.52	8.39	7.06	84.68	1.11	37.86
Assam	18.82	381.96	18.82	381.96	-	-
Bihar	18.69	354.04	18.69	354.04	-	-
Chhattisgarh	4.18	55.14	4.22	55.41	1.97	40.71
Gujarat	0.39	17.82	0.48	19.81	0.36	16.96
Himachal Pradesh	2.00	50.00	2.00	50.00	3.80	47.03
Karnataka	7.12	87.45	8.41	103.37	1.05	119.96
Madhya Pradesh	1.71	96.48	1.88	90.08	0.86	44.89
Maharashtra	1.06	44.31	1.13	44.11	-	-
Orissa	4.06	48.69	4.06	48.69	-	-
Punjab	3.00	60.00	-	-	3.00	60.00
Rajasthan	0.75	30.00	-	-	0.75	60.00
Tamil Nadu	1.77	33.77	2.60	44.12	0.99	30.00
Uttarakhand	4.15	41.02	4.15	41.02	-	24.05
Uttar Pradesh	4.78	50.01	4.78	50.01	-	-
West Bengal	2.00	160	-	-	2.00	160

Source: NSSO, MOSPI, GoI 2018

(Anbukani, 2018) Consumption pattern of small millets compiled from unit level NSSO data extracted from the 68th round on 'Household Consumer Expenditure' and 'Employment and Unemployment' for urban, rural and all India has been given in the table 2.1. Assam

(18.82 kg/hsh/m) and Bihar (18.69 kg/hsh/m) states where highest consumption of small millets was found in all India and rural areas. Other state is consuming less than the 10 kg/household/month which is lower than that of Assam and Bihar. Consumption pattern of finger millet was also analyzed for rural, urban and all India. Bihar consumed 12.02 kg/hsh/m of finger millet followed by Karnataka (even though area and production of finger millet highest in Karnataka). Maharashtra and Gujarat also consumed significant amount of finger millet in 2011-12.

According to the NNMB, millets consumption is highest in Gujrat, Karnataka and Maharashtra, but lowest in Kerala, Orissa, west Bengal and Tamilnadu, where rice is the mainstay. Millets contributed only 2% of total calories (6.7g/day) according to a NNMB study on the dietary profile of urban Indians from the Chennai urban rural epidemiology study (CURES).

(Parthasarathy et al., 2022) Concluded that despite of overall decline in pearl millet consumption in India (2000 to 2004), it was observed that consumption of pearl millet was consumed by rural poor people and some high-income groups. Other than food consumption of millet other industries demand for pearl millet has increased leading to increase in production from 5% to 55% in 2004-2005.

(Shanmugam & Michael Raj, 2013) Observed that the millet-based cultivation and consumption in India. The study concluded that consumption and harvesting of millets are falling 2012 onwards. Hence, they suggested the developmental effort should be made through mini kit demonstration, state level training programs, providing improved seeds, non-monetary inputs and research, start a massive education and promotional programs on millets and government must use its media campaign funds to take up millet promotion.

(Santhanandham & Rampal, 2019) Two hundred farmers were randomly selected in different districts and data was collected. Study reported that the consumption of finger millet was 27% and 17% among the rural and urban population of south Karnataka whereas Sorghum was largely consumed in North Karnataka with 34% and 13% of urban and rural

population respectively. It was also observed that Karnataka state in 2014 had started implementing millets through Public Distribution System under the act National Food Security Act (NFSA, 2013) as rice and wheat were not nutritionally adequate to meet the requirement of subjects.

(Patil, 2019) Observed that in Karnataka the consumption of minor millets among growers and non-growers was not found in daily bases, in spite being aware about benefits of millets that have used in prevention of diabetes, obesity and other disease. Among the selection 180 subjects it was observed that majority of farmers cultivated little millet and foxtail millet in restricted areas and about 84% of growers and 87.23% of non-growers of same village and 69.05% of non-growers of different village consumed millets occasionally.

(Malathi, 2019) Reported that Majority of the subjects were use millet as a whole grain 61 %, while 39 per cent of the respondent's used millet in the form of rice. Consumption of millet was found to be 30% finger millet, 28% sorghum, 17% kodo millet, 16.7% barnyard millet and 8.3% pearl millet was observed in 120 rural women subjects selected from Mangalrevu village in Peraiyur, Madurai district of Tamil Nadu.

The changes in pearl millet and total consumption between 1973 and 2004-05 in Gujarat, Haryana and Rajasthan in western India from the NSSO consumption survey rounds. The replacement of pearl millet mainly with wheat in Haryana as households became richer due to green revolution leading to higher production and consumption of wheat. Significant difference was seen in consumption among states and within state between rural and urban areas. In 2004-2005 per capita consumption in rural Gujarat was 28kg/annum and in rural Rajasthan was 33kg/annum which is higher than per capita consumption in rural Haryana (5 kg), urban Gujarat (7kg) and urban Rajasthan (7kg) compared just 0.4kg/annum/capita consumption in urban Haryana. It was observed that reason for the decrease in relative consumption of pearl millet might be decrease in price of wheat and paddy, which makes them more affordable to a large population.

(Malathi, 2019 Tamil Nadu) A survey was conducted on Consumption patterns of millets and it was found to be 30% finger millet, 28% sorghum, 17% kodo millet, 16.7% barnyard millet and 8.3% pearl millet was observed in 120 rural women subjects selected from Mangalrevu village in Peraiyur, Madurai district of Tamil Nadu.

(Gandhi H and Negandhi D, 2021) Studied consumption pattern of major and minor millets in selected 100 households of urban Vadodara and development of millet based recipes for prevention of NCDs. Study concluded that 95% of households consumed millet, of which most of them prefer to take it once or twice in a week

(Gandhi & Sharma, 2012) The study reveals that the major staple food was maize. Consumption was pearl and sorghum found to be occasionally. Dietary information revealed that means nutrient intake for macronutrients was less as compared to RDA. Consumption of micronutrients like calcium, iron, vitamin and fiber and Beta carotene was less than 25% RDA for nearly 60% of the elderly. Protective foods like green leafy vegetables and fruits were occasionally consumed by most of the elderly

4. Health benefits of millet consumption

Millets have potential health benefits and epidemiological studies have showed that consumption of millets reduces risk of heart disease, protects from diabetes, improves digestive system, lowers the risk of cancer, detoxifies the body, increases immunity in respiratory health, increases energy levels and improves muscular and neural systems and are protective against several degenerative diseases such as metabolic syndrome and Parkinson's disease.

Pearl millet is known to possess phytochemicals that lowers cholesterol. It also contains folate, magnesium, copper, zinc, and vitamins E and B- complex. "Bajra" has a high energy content compared to other flours. It is also rich in calcium and unsaturated fats which are good for the body. As it is high in iron, it is very useful for anemic patients and good for pregnant women and adolescent girls.

Ragi contains high amount of calcium, protein with well-balanced essential amino acids composition along with Vitamin A, Vitamin B and phosphorous. It also contains high amount of calcium hence it is good for bones; it is beneficial for toddlers to development of new bones as well as for old age people to maintain bones. Its high fiber content also checks constipation, high blood cholesterol and intestinal cancer.

Foxtail millet is good source of blood sugar balancing carbohydrates that make it beneficial for sugar and heart patients. Foxtail millet is a gluten free grain therefore it is beneficial to people who are suffering from celiac disease and gluten intolerance.

Fiber content of the whole grain is very high in kodo millet. As with other food grains, the nutritive value of Kodo millet protein could be improved by supplementation with legume protein. Kodo is easily digestible and contains lecithin. It is vital for strengthening the nervous system. Kodo millet is fantastic source of B-vitamins and folic acid. Since it is gluten free, it is excellence for people who are gluten intolerant.

Barnyard or Sama is another type of millet that is nutritionally dense with high fiber content. If you are planning to lose weight, then incorporating it into your diet can do wonders for your overall well-being. Sama is rich in calcium and phosphorus, which helps in bone building for toddlers and pregnant ladies. This millet can be used as the substitute of rice for diabetic patients.

Proso millet is good for balancing blood sugar levels and has a low glycemic index. The grain contains a comparatively high percentage of indigestible fiber because the seeds are enclosed in the hulls.

Amaranth is high on protein and helps fight hair loss and greying. Amaranth also reduces cholesterol levels and the risk of cardiovascular diseases. It is high in calcium, antioxidants and other minerals. It should be not limited to just only in fast, but also must be included in daily diet too.

(Husemi ET all, 2021) showed the benefits of millets and finally concluded that Millets are easily accessible and inexpensive. This is primarily due to a lack of awareness and

information among the general public about the various types of food available, particularly little millets. Further, they commented that majority population growing with consumption of fast foods and unbalanced diet are unaware of benefits of minor millets that contain anti-oxidants and provide energy throughout the day by digesting slowly.

(Shreenivasana, 2017) Millets have many nutraceutical properties that are helpful to prevent many health problems such as lowering blood pressure, risk of heart disease, prevention of cancer and cardiovascular diseases, decreasing tumor cases etc. Other health benefits are increasing the time span of gastric emptying, provides roughage to gastro intestine. Millet is an alkaline forming food. Alkaline based diet is often recommended to achieve optimal health, meaning when it combines with digestive enzymes. The soothing alkaline nature of millet helps to maintain a healthy pH balance in the body, crucial to prevent illnesses. The fat content in minor millets not only provides energy but also useful for controlling the cholesterol synthesis in the body. Millet protein contains amino acids which are especially beneficial to vegetarian populations who depend on plant food for their protein intakes. The grain contains a high proportion of carbohydrates and dietary fiber which help in prevention of constipation, lowering cholesterol and slow release of glucose to the blood stream during digestion.

(Mann et al., 2015) Reported that there is medical study that proved that whole millets defend the body against age-related diseases like diabetes, cardiovascular diseases and some cancers. This may due to presence of fiber and micronutrients within the outer layer and germ fractions of the grain acting along to combat oxidative stress, inflammation and carcinogenesis. Millets are a good source of B-complex vitamins, folates and other micronutrients which will improve inhibitor status. Whole grain intake for over 70 % of this population fell below dietary recommendation in other countries for decreased risk of cardiovascular disease and type 2 diabetes. The nutrient intakes of whole grain consumers compared with the non-consumers were closer to dietary reference values, particularly for fiber intake, suggesting that increasing whole grain intake is associated with improved diet

quality. The results suggest that even small intakes of whole grain may contribute to better health and diet pattern, and that increased whole grain intake should be encouraged.

Cardiovascular Diseases

Being rich sources of magnesium, millets help in reducing blood pressure and risk of heart strokes especially in atherosclerosis. Also, the potassium present in millets helps in keeping blood pressure low by acting as a vasodilator and help to reduce cardiovascular risk. The high fiber present in millets plays a major role in cholesterol lowering eliminating LDL from the system and increasing the effects of HDL.

Empirical evidences (Slavin, 2003; Slavin and Salvin, 2004) suggest that regular consumption of whole grains reduces the risk of CVD (**Anderson et al., 1999**). A long-term prospective study by Heidemann et al. (2008) showed that regular consumption of balanced diet which includes whole grains, vegetable, fruit, fish and poultry diet reduce the risk of CVD and total mortality. In 2004, Harvard Professionals (Jensen et al., 2004) analyzed the diet records of 27,000 men aged between 40-75 years for a period of 14 years and found intake of whole grains 40g/ per day reduces the risk of CHD by 20%. The consumption of millets can reduce total cholesterol, triglycerides and BMI according to a new study analyzing the data of 19 studies, with nearly 900 people. The study was undertaken by five organizations and led by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

(**Ekta, 2016**) Concluded that millets are good sources of magnesium that is known to be capable of reducing the effects of migraine and heart attack. Millets are rich in phytochemicals containing phytic acid which is known for lowering cholesterol. Finger millet may prevent cardiovascular disease by reducing plasma triglycerides in hyperlipidemia rats.

Diabetes Mellitus

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia with alterations in carbohydrate, protein, and lipid metabolism. It is considered as the most common endocrine disorder and results in deficient insulin production (type 1) or combined resistance to insulin action and the insulin-secretory response (type 2) (Saleh et al., 2013). The efficiency of insulin and glucose receptors in the body is increased by the significant levels of magnesium content present in millets and help in preventing diabetes. Finger millet-based diets have shown lower glycemic response due to high fiber content and also alpha amylase inhibition properties which are known to reduce starch digestibility and absorption. According to study there were 150 patients in the investigation, 80 patients were consuming the millet diet in the age group of 40-55yrs the 70 patients who were consuming non-millet diet with the age group of 40-60 yrs. The millet diet had markedly decreased the weight and BMI levels compared to the non-millet diet. Also, the biochemical parameters such as lipid Prof Iles, fasting and PP blood sugar levels were significantly reduced when comparing the millet with the non-millet diet. The study concluded that the millet diet regulates the glucose level in the diabetic patients better than the non-millet diet. Furthermore, the Diastolic, Systolic values and Lipid Profiles of both the diet demonstrates the potential merits and health benefits of millet diet over the non-millet diet.

(Vedamanickam et al; 2020) A new study has shown that eating millets reduces the risk of developing type 2 diabetes and helps manage blood glucose levels in people with diabetes. The study indicates the potential to design appropriate meals with millets for diabetic and pre-diabetic people as well as for non-diabetic people as a preventive approach. Drawing on research from 11 countries, the study published in *Frontiers in Nutrition* shows that diabetic people who consumed millets as part of their daily diet saw their blood glucose levels drop 12-15% (fasting and post-meal), and blood glucose levels went from diabetic to pre-diabetes levels.

The HbA1c (blood glucose bound to hemoglobin) levels lowered on average 17% for prediabetic individuals, and the levels went from prediabetic to normal status. These findings affirm that eating millets can lead to a better glycemic response. (ICRISAT)

Gastrointestinal Disorders

(Lin et al., 2020) Concluded that since an antioxidant defense mechanism may be critically important in protecting against the development of acute gastric mucosal injury, the antiulcer response and extensive antioxidant effect of foxtail millet and APP diet may be valuable in prevention, which possesses preventive and gastro-protective effects on experimental gastric mucosal lesions in rats. Consumption of whole grains has been associated with reduced risk of developing major chronic diseases. Millet diet retain the advantage of being a natural product with no reported side effects which may prove a promising protective role in gastric ulcer.

Regulating digestive process can increase nutrient retention and reduce chances of more serious gastrointestinal conditions like gastric ulcers or colon cancer. Fiber content in millets helps in eliminating disorders like constipation, excess gas, bloating and cramping. An immune mediated enteropathy disease called celiac disease which is usually triggered by the ingestion of gluten in susceptible individuals. (Aly & Seleem, 2015)

Detoxification (Anti-oxidant Properties)

(Liang & Liang, 2019) Concluded that many of the antioxidants found in millet have beneficial impact on neutralizing the free radicals, which can cause cancer and clean up other toxins from body such as those in kidney and liver. Quercetin, curcumin, ellagic acid and various other beneficial catechins can help to clear the system on any foreign agents and toxins by promoting proper excretion and neutralizing enzymatic activity in those organs. Therefore, tremendous attention has been given to polyphenol due to their roles in human health.

5. Knowledge and practices regarding millets consumption

Study on Iron status of women of reproductive age living in pearl millet consuming areas of Banaskantha, Gujarat concluded that pearl millet (bajri) is the staple cereal of Banaskantha. Adequate dietary intake of iron among the study population can be attributed

to high iron content of bajri; while its rich polyphenol content seems to of protective effect against infections and chronic degenerative diseases as reflected from the morbidity profile. In spite of high intake of iron, prevalence of anemia has been reported as high as 94.5% which states is non-bio-accessibility **(Nambiar et al., 2015)**

(Gruère et al., 2009) Analyzed the role of collective action in the marketing of underutilized plant species like millets. Due to less demand and less cooking knowledge, the establishment of long run market for minor millet will require sustained efforts and will likely need to target a specific, stable segment of consumers and customer subsidies that would enhance their appeal and increase their consumer base.

(Kane-Potaka et al., 2021) Studied about urban consumers' knowledge, attitudes, and practices related to millets despite growing health consciousness among people, increasing non-communicable diseases in India, and the nutritional potential of millets. The survey involving over 15,000 face-to-face interviews across seven major cities in India is arguably the largest survey on consumers about millets. A key aim of this study was to understand the motivation of consumers and how best to position millets in any campaigns while planning agriculture-based nutrition interventions to improve the market, consumption, and nutritional status. The findings imply a need to more actively promote the benefits of millets and to create awareness of various ways of cooking millets or creating millet products to satisfy taste preferences and change the perception of millets, which would in turn lead to an increase in their consumption.

(M, 2017) Stated Millet is a staple food. It contains lots of fibers. Due to occurrence of malnutrition in developing countries, various health problems like obesity, diabetes, cardiovascular disease, breast cancer is occurred. It is the most prominent because of inadequate supply of nutrition. This is mainly due to the unawareness and lack of knowledge of the people.

In the study done on education and consumption of the millets and nutritional status of women employees of the M.S University it was found that the knowledge about millet was

fair in women employees, whereas the awareness regarding the importance of millets was poor. After the intervention was done, positive impact was seen in the subjects for knowledge about millets (**Chauhan&Parmar2022**)

(Mehta et al, 2010) A study of Ragi laddu feeding practice and its health benefits on elderly people of Baroda city A study of Ragiladdu feeding practice and its health benefits on elderly people of Baroda city Result obtained on biochemical estimation showed improvement in Hemoglobin levels with reduction in severity of anemia among subjects belonging to Group A. Post intervention data on lipid profile showed significant change in LDL, TC/HDL ratio and HCL-C among elderly subjects fed with Ragi ladduThe data on minor illness of elderly showed slight reduction in complaint such as lost appetite, lethargy and pain in joints after intervention irrespective of groups.

6. Development of millet recipe

Dr. Khadar vali, who is "the millet man of India" has given many articles about millet and information about benefits and types of millet. Similarly, a booklet has been released which contains about each type of millet and a small millet which gives real wealth health and wealth. Curing Modern Lifestyle Diseases (Diabetes, Blood Pressure, Thyroid, Obesity, Arthritis, Anemia and 14 Types of Cancer) through Desi Foods is every information provided. **(Dr. Khadar Vali Siridhanyalu (millet) Booklet)**

ICAR Indian institute of millet research IIMR September 2021 has uploaded a booklet of recipe of millet in which there are 160 recipes of millet of each millet. And eat millet by stay healthy brand provides all the information about the production of millet.

study related product development and sensory evaluation of little millet In this study, 16 recipes of little millet were developed and color, appearance, aroma, taste, after test, mouth feel of the recipe were obtained through hedonic rating test. 30-35 semi-trained panelists were asked in a sensory Google form that was developed to rate each attribute of their recipe entries. In which every respondent liked every recipe and its score was also good. **(Dhruv &sharma2022 (thesis)** study is relevant product development and sensory evaluation of

foxtail millet incorporated recipe all recipes were acceptable(Dhruva and Thite 2021(thesis).

related to the study is product development and sensory evaluation of brown top millet In this study Sensory evaluation of all the 16 freshly cooked recipes was carried out using a Composite and Hedonic rating test. The 35 semi-trained panelist members were asked to register their responses in the Google form that was developed to rate each attribute of the recipes. The form consisted of two parts: Composite and Hedonic rating tests. The rating for the Composite scale was based on a 10 point scoring for each of the buttes such as color and appearance, aroma, texture, taste, after taste, mouth feel, and overall acceptability. of the product whereas for the hedonic rating test, the overall liking of the product was assessed on a 7 point rating ranging from dislike very much to like very much with neither like nor dislike as the mid-score(Dhruv&sharmashrushti2022(thesis).

Dhruv&jaiswal 2012 product development & sensor evaluation of kodo millet incorporate recipe impact of kodo millet supplementation and management hyperglycemia in type 2 diabetic thus we conclude that kodo millet has the potential to be used as a functional food in the management of T2DM. The findings of the entire study support the hypoglycemia (potential to lower gl and maintenance of glycemic control and hyperlipidemia (potential to lower lipemic response of the recipe incorporated with kodo millet it's effective substitution for recipes incorporated with kodo millet) effects of kodo millet, it's effective substitution for rice and hence it can be incorrect in the diets of the diabetes.

The study reveals that diabetics are not able to follow the regime of usage of millets though are aware of its health benefits. There is a need to propagate traditional easily acceptable millet based recipes among them as a part of their MNT. (Nambiar &Patwardhan, 2015)

7. Policies and Programmed for Millet Promotion

Millet is a nutritional food which has a good amount of protein and fiber than other cereals. Millet also has a very good amount of vitamins and micronutrients which can help to overcome major problems like anemia malnutrition and millet is a good crop in less fertile soils in dry areas. And millet can grow easily even in low rainfall soil, it is climate resilient.

The use of millet can have significant benefits in agriculture against diseases like anemia and many others so the government is promoting its production and consumption. Many people are suffering from hunger and micronutrients deficiency in India and wheat and rice production and Both the production and consumption of millet have decreased due to overexploitation, hence the program to promote millet through various policy interventions from 2012 to 2021 (FAO, 2020)

2012 - Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP).Promotion (INSIMP).

2013 - National Food Security (NFS) Act covers 'coarse grains'

2017 – The NITI Aayog of the Government of India released the National Nutrition Strategy (NNS) for this

'Nutritious India' and recommends that Moa and FW strengthen cereal productivity and Product diversification – including the production of 'coarse' grains such as millet

2018 – Millet of ficially declared as a “Nutrient-Grain” (Appendix 1)

Millet becomes part of National Food Security Mission (NFSM).

2018 – Has been declared by the Government of India as the 'National Year of Millet' (NITI Aayog, 2018).

2018 - Government of India launched Sub-Mission on Nutrient-Grains under NFSM Expenditure of INR 300.00 Crore for 2018-19

2018 - The Government of India sends a proposal to the United Nations to declare 2023 as the 'International Year'.

To promote greater production and consumption of millets

2021 - The UNGA approves and declares 2023 to be observed as the 'International Year'. Millet

Prime Minister Narendra Modi chaired the United Nations General Assembly (UNGA) resolution to declare 2023 as the International Year of Millet. India's proposal was supported by 72 countries and the UNGA declared 2023 as the International Year of Millet on 3 March 2021.

Currently, millets are being promoted through technology dissemination, quality seeds through millet seed hubs, awareness generation, minimum support price and inclusion in PDS. The Government of India’s Millet Mission comes under the National Food Security

Mission (NFSM), launched in October 2007. NFSM-Coarse Cereals is divided into two parts and one of them is the sub-mission on nutria cereals to be implemented in 202 districts of 14 states. Before this, millets were being promoted under INSIMP (Nutritional Security through Intensive Millets Promotion) during 2011-12 to 2013-14. (Sekar, 2020)

To conclude, only limited policies and schemes explicitly include millets. There are no exclusive Government schemes/projects/programs for small millets. The available schemes, the most important ones are Initiative for Nutritional Security through Intensive Millets Promotion (INSIMP) as part of Rashtriya Krishi Vikas Yojana” (RKVY), Rainfed Area Development Programmed (RADP) as part of Rashtriya Krishi Vikas Yojana” (RKVY), Integrated Cereals Development Programmed in Coarse Cereals based Cropping Systems Areas (ICDP-CC) under Macro Management of Agriculture (MMA).

There is a lot of variation across the states on how they utilize these opportunities for promoting millets. Further most of the states usually focus on sorghum, pearl millet and finger millet and leave out many of the small millets while implementing these schemes. There is operative policy is available at national and state levels with a well-defined plan for conserving and expanding agro-biodiversity, not to mention a policy of this kind that includes focus on millets. While conservation of natural resources are taking a more prominent place on the political agenda, a consistent approach to agro-biodiversity with the logical link to on-farm crop varietal conservation and improvement is yet to be formulated. ("**Supporting Millets in India: Policy Review and Suggestions for Action**", 2012)

The year 2018 was declared as the National Year of Millets by India. Food and Agriculture Organization (FAO) Council in 2018, approved India’s proposal to observe an International Year of Millets in 2023.

Intensive Millets Promotion (INSIMP): Launched in 2012 as a part of the Rashtriya Krishi Vikas Yojana, wherein Rs.300 crores has been allocated to advancing equipment and technology related to millet harvest and increasing productivity of inefficient areas. Rainfed Area Development program: Developing and identifying new areas receiving adequate rainfall for millet farming as a part of the Rashtriya Krishi Vikas Yojana (RKVY). In order

to promote ‘millets’, India had on its part notified these climate resilient crops as “Nutri-Cereals” and allowed its inclusion in the Public Distribution System (PDS) for improving nutritional support.

Recognizing millets’ anti-diabetic properties, the government’s notification called it a “powerhouse of nutrients” and identified several varieties of millets for promotion. The millets in the category of “Nutria-Cereals” include Sorghum, Pearl Millet, Finger Millet, Foxtail Millet and Buckwheat among others.

Besides, the government had in July substantially hiked the minimum support price (MSP) of millets so that more and more farmers may opt for cultivation of these less water consuming crops.

Millets are being purchased at the support price and are also being included in the mid-day meal scheme and public distribution system, for encouraging its consumption.

METHODS

METHODS

The study has been planned with the aim of determining the consumption pattern and knowledge about millets in women, Surat (urban). Assessment on various factors like socio-economic status, nutritional status, anthropometric measurements, eating pattern, dietary profile and knowledge score of millets was done on women Surat in relation to outcome of imparting Nutrition Health Education (NHE) on knowledge and consumption pattern about millets. The study was passed by the Institutional Ethics Committee for Human Research (IECHR), under the ethical approval number IECHR/FCSc/MSc/2022/30.

Selection criteria

The selection criteria used for the subjects for the enrolment of the study is as follows:

Inclusion criteria

Subjects who are women and willing to participate and residing in urban Surat.

Age of women should be more than 20 years

Participant must have a smart phone.

Exclusion Criteria:

Subjects who are not willing to participate

The methods and material used in the study are described in this chapter. Snowball sampling technique has been used to select the subjects from Urban Surat to achieve the objectives the study was divided into 3 distinct phases:

BROAD OBJECTIVE

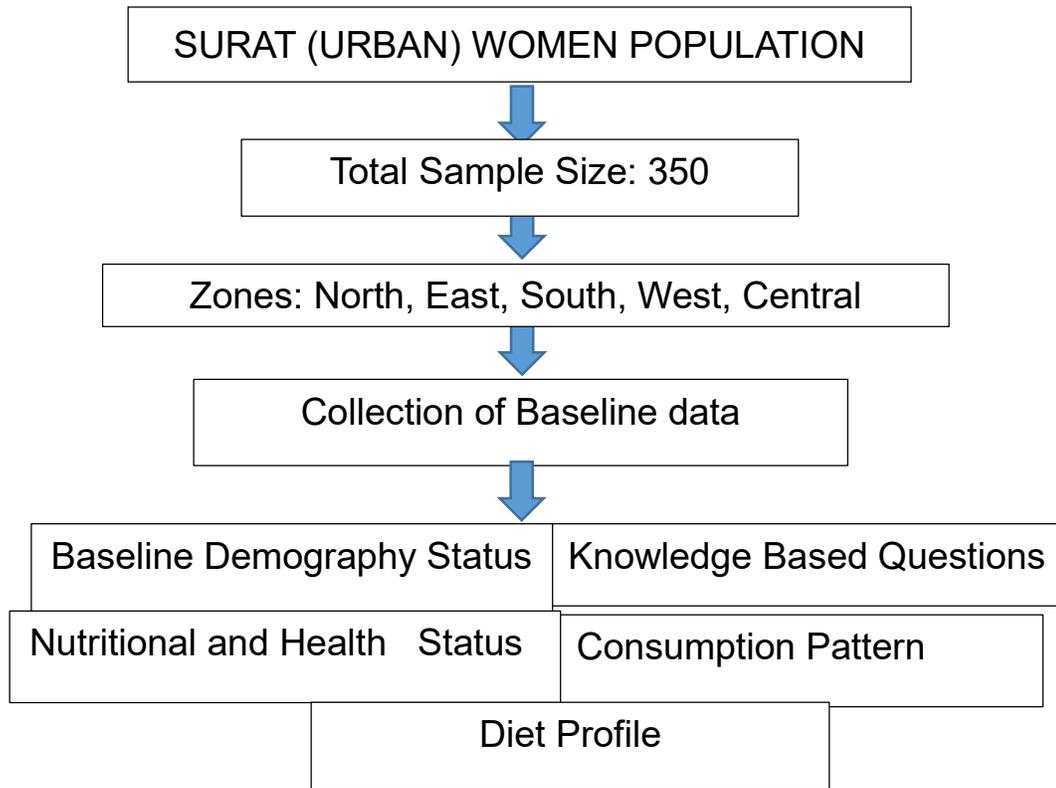
To assess nutritional status and knowledge on millets among women population of urban Surat

Phase I: To study demographic, diet and disease profiles of study subjects along with Millet awareness and consumption pattern

Phase II: To develop NHE tool for imparting education (predesigned online tool was modified and prepared for of offline education)

Phase III: To study impact of NHE on improvement in knowledge score

Phase-1 Cross sectional



PHASE-2 TOOL DEVELOPMENT

1st month: Booklet and brochure:

General information of millets, its health benefits on physical-mental and overall health, availability of different kind of millets, recipe and other details was provided.

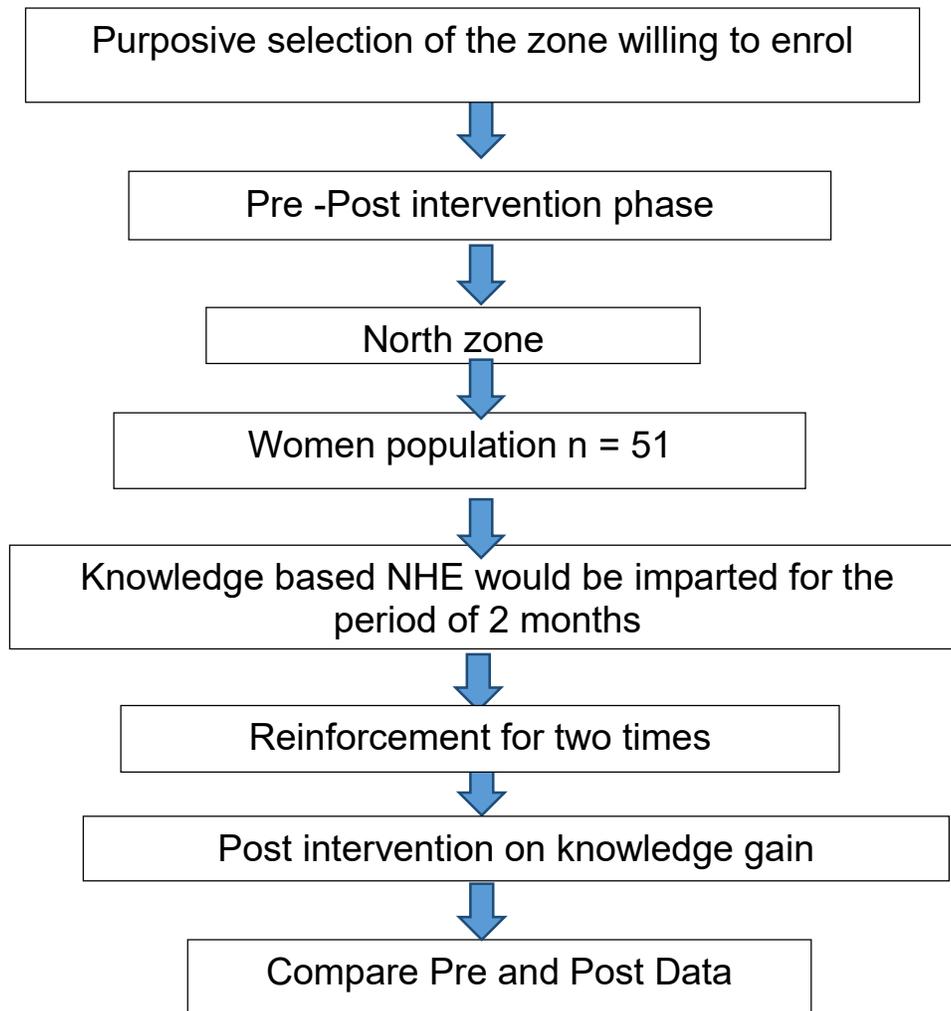
2nd month: WhatsApp information

Reinforce information and message on the importance of millet consumption and their health benefits

2nd month end:

Quiz to judge the score by same questionnaire on knowledge on millets

PHASE 3 Experimental Design – Interventional Phase



During the implementation phase the researcher gave information to all the people through brochures, whatsApp message but post data collection was done only in the purposive zone.

SPECIFIC OBJECTIVES: PHASE I

Demographic profiles of women population

This questionnaire includes information about the age education, occupation, type of family, per capita income and socio-economic status kuppuswamy scale (semi structured questionnaire)

Anthropometric measurements

Anthropometry include parameter height, weight, and BMI (standard tools and calculation)

Body mass index (BMI): the BMI is calculated with formula: $BMI = \text{Weight (kg)} / \text{height (m}^2\text{)}$

The classification for BMI has been shown in the following table (classification of BMI as per Asia pacific, WHO, Classification:

Presumptive diagnosis	BMI (kg/m²)
Underweight	<18.5
Normal	18.5-24.9
Overweight	25.0-29.9
Obese	>30

To assess health status

Major and minor disease profile (Checklist method)

Diet profile

By general dietary information questionnaire like how many meals and snacks a woman spends throughout the day and how many times she eats out, how much water she consumes throughout the day, we can know whether women's dietary preferences are correct or not.(Food frequency questionnaire).

Knowledge and consumption practice of millet

Based on the developed questionnaire and key score would be developed and further it will be classified under poor, fair and good category (questionnaire)

KEY OF SCORING

No. of knowledge aspects		Degree of knowledge
< 60 %	>18	Good
30-60%	9-18	Fair
<30%	< 9	Poor

Total questions: 30

Total score: 30

Consumption pattern

Food frequency questionnaire on millets and consumption pattern, reasons for not consuming and other aspects of women towards it (questionnaire)

METHODOLOGY

The broad objective is to study the outcome of awareness of millet consumption, frequency of the consumption and behavior of the consumption and diet and health status study was planned in women of Surat city. Assessment of various factors such as education, socioeconomic status, nutrition and health status, anthropometric measurements, and knowledge score of millets was done on women of Surat. Nutrition Health Education was imparted among purposively selected subjects from one zone and after that the outcome of imparting knowledge based on scores was checked.

Study Design

Women Population 19, 97,823

Source of: - SMC site <https://www.suratmunicipal.gov.in/TheCity/City/Stml2>

A pilot study was conducted among 50 women in Surat. 35 women's answer is yes

- $P =$ are you aware about millet? 35
- $35/50 = 0.7$
- $P = 0.7$
- $Q = (1-p) = 1-0.7 = 0.3$
- $\Sigma =$ marginal of error = 0.5
- $z(\alpha/2) = 1.96$

- Now, to determine sample size using by this formula

- $$\bar{P} \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\bar{p} \cdot 1 - \bar{p}}{n}}$$

- **Sample size** $n = \frac{\left[z_{\frac{\alpha}{2}} \right]^2 \cdot (\bar{p})(1 - \bar{p})}{\epsilon^2} \dots \dots \dots (1)$

- Put the value in equation (1), we have

- $$n = \frac{(1.96)^2 \cdot 0.7 \cdot 0.3}{(0.5)^2}$$

- $n = 322.692$

- $n \approx 350$

Stratified sampling

N = sample size/ N total population * Ni total population in zone

Zone	Ni	Ni = (n/N)*Ni
North	294603	51
East	583655	102
Center	191749	34
West	337419	60
South	590397	103

Total =350

The researcher randomly select any area of the zone.

zone	Area
North	Katargam, Ved, Dabholi
East	Nanavarachha, Udhana, Piplod
Center	Nanpura, Gopipura, Salabatpura
West	Athwa, Rander, Adajan
south	Utran, ChhaparaBhatha, Motavarachha

Snowball sampling

The researcher collected the sample size using snowball sampling and moved around within a zone until the researcher's goal was met and collected the sample size.

Inclusion Criteria

- Subjects who were women and willing to participate and residing in urban Surat.
- Participant must have a phone.
- Age of women should be more than 20 years

Exclusion Criteria

- Subjects who were not willing to participate

STATISTICAL ANALYSIS

After completing the data collection, mean, SD, t-test and percentage were calculated for all parameters expressed numerically. The data has been then analyses using appropriate statistical test as described.

Statistical software used

Microsoft excel (2013 version)

Microsoft word (2013 version)

Statistical methods used:

- (i) Mean and SD
- (ii) T-test
- (iii) Chi-square test
- (iv) Person's correlation

Prospectively defined hypothesis

NULL HYPOTHESIS: There will not be any change in awareness of millets and of women population of Surat to NHE intervention

ALTERNATE HYPOTHESIS: There will be a beneficial effect of NHE on awareness of millets among women population of Surat post NHE intervention

RESULTS AND DISCUSSIONS

RESULTS AND DISCUSSIONS

The present study was undertaken for Assessment of Nutritional Status, Knowledge and Consumption Pattern of Millets among the Women Population of Surat (Urban): Impact Evaluation on Knowledge Gain by Nutrition Health Education (NHE)

The broad objective of the study was to generate a database on nutrition status, dietary profile and knowledge based assessment of woman Surat (Urban). The relative objective included assessment of social economic status, anthropometric measurement, and diet profile

Phase 1: Situational analysis baseline assessment

To obtain the information on socio-economic and health status of subject a semi structured questionnaire was used, the result of phase 1 have been analyzed and described under the following heading:

1. Baseline demography status
2. Anthropometric measurement
3. Diet profile
4. Nutrition and health status
5. Knowledge of millets
6. Consumption pattern

Baseline Demography status: information on religion, occupation, education economic status and type of family of the subject where studied.

Table 4.1: Percentage of subject showing baseline demography status

Age in year	20 to 40 year women	41 to 60 year women	total		
Mean±SD	29±11	50±6	35±11		
<u>Religion</u>					
Hindu	83.71(294)				
Muslim	14.00 (48)				
Christian	0.29 (1)				
Jain	2.00 (7)				
<u>Occupation</u>					
agricultural	13.71 (47)				
Business	50.57 (177)				
Elementary occupation	27.43 (97)				
Private service	2.29 (8)				
Government services	6.00 (21)				
Education woman	illiterate	Primary school	High school	graduation	Post-graduation
20 to 40 year woman (n249)	15.73 (39)	21.77 (55)	26.21 (65)	31.45 (78)	4.84 (12)
41 to 60 year woman (n101)	28.71 (29)	40.59 (41)	22.77 (23)	7.92 (8)	-
Total (n350)	19.48 (68)	27.22 (96)	25.21 (88)	24.64 (86)	3.44 (12)
<u>Economic status of the subject kuppuswamy scale (income monthly)</u>					
Upper (I) (68967-1843706)	0.29 (1)				
Upper Middle (II) (46095-68961)	8.00 (28)				
Lower Middle (III) (27654-46089)	63.43 (221)				
Upper Lower (IV) (9232-27648)	28.29 (100)				
Lower (V) (<9226)	-				

<u>Type of family</u>	
Nuclear	69.14(242)
Joint	30.86 (108)

Figure in the parenthesis denotes number of subjects

From the observation of Table 4.1 and Figure 4.1 to 4.5, the mean age of women aged between 20 to 40 years in Surat was 29 ± 11 years, the mean age of women aged between 41 to 60 years was 50 ± 6 years and the mean age of the total sample ($n=350$) was 35 ± 11 years. According to the religion survey overall 83.71% were Hindus, 14% Muslims, 0.29% Christians and 2.00% Jains. Data on Occupation: Industrialists were 50.57%, primary occupation was 27.43%, agricultural work was 13.71%, private services were 2.29% and government services were 6%. The education of women, in the age group of 20 to 40 years, women with a post-graduation degree were 4.84%, women with a graduation degree were 31.45%, women who studied up to high school were 26.21% and women who studied up to primary school were 26.21%. Illiterate women were 21.77% and illiterate of women were 15.73%. Among women aged between 41-60 years, graduate women were 7.9%, women with high school education were 22.77%, women with primary school education were 40.59% and uneducated women were 28.71%. In the total sample ($n=350$) 3.44% women did post-graduation, 24.64% of women completed graduation, 25.21% of women studied up to high school, 27.22% of women studied up to primary school, 19.48% illiterate women. The perception of economic status was lower middle class with the highest percentage of 63.43% whose income ranged from 27,654 to 46,089, upper had 0.29% whose income ranged from 68,956 to 18,43,706 upper middle had 8.00% whose income ranged from 46,095 to 68,961. Upper lower had 28.29%, whose income ranged from 9,232 to 27,648. 69.4% of women lived in separate families and 30.86% lived in joint families. The number of women living in nuclear families was highest in Surat.

Figure 4.1: Percentage of subject showing Religion

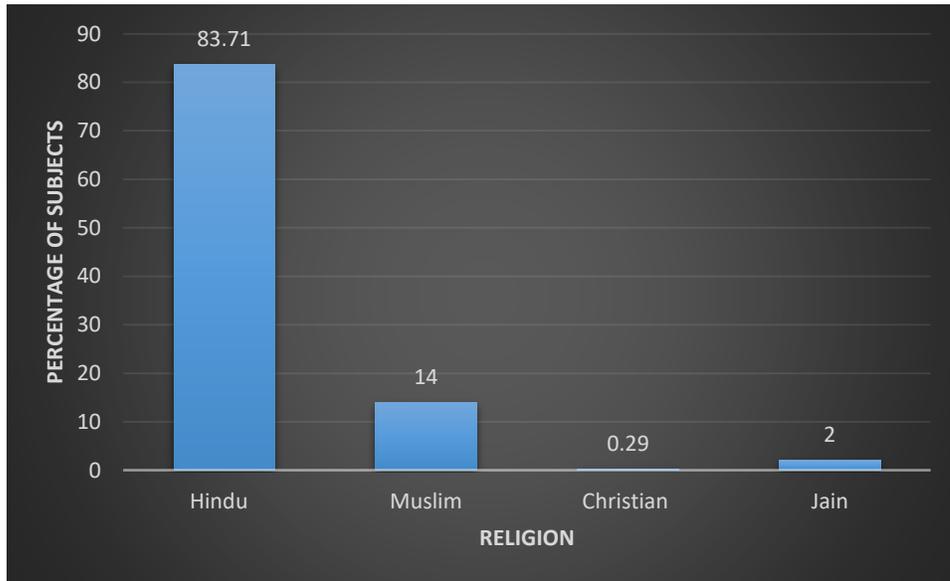


Figure 4.2: Percentage of subject showing Category of Occupation

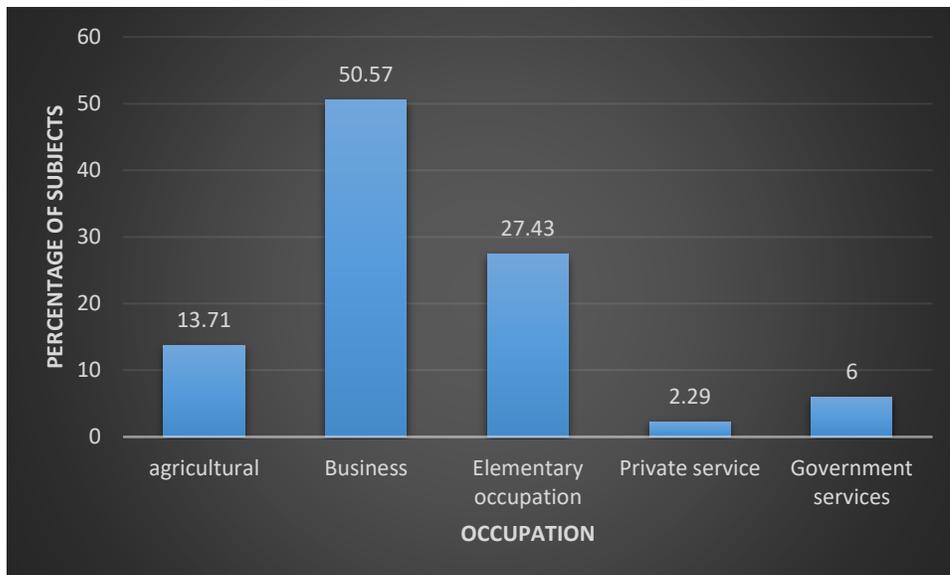


Figure 4.3: Percentage of subject showing Education

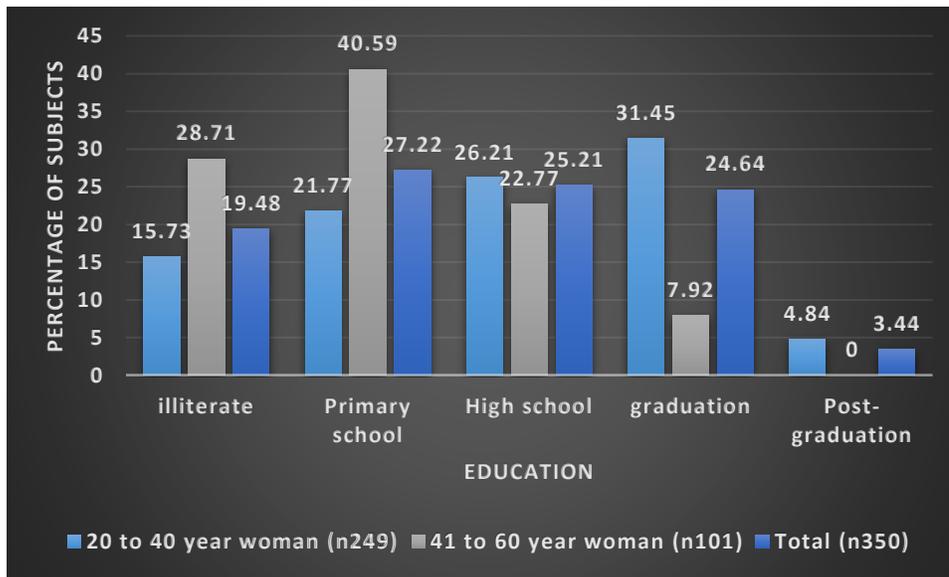


Figure 4.4: Percentage of subject showing economic status

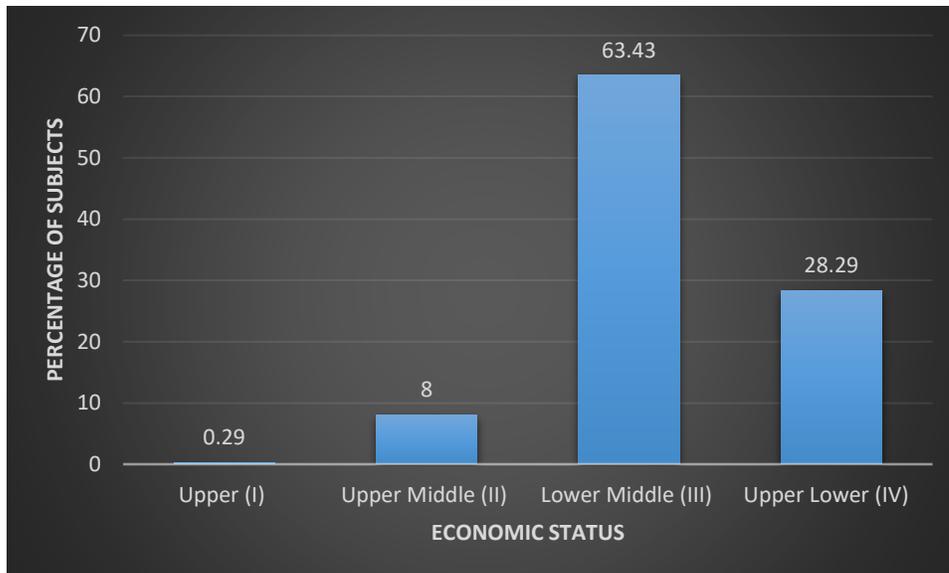
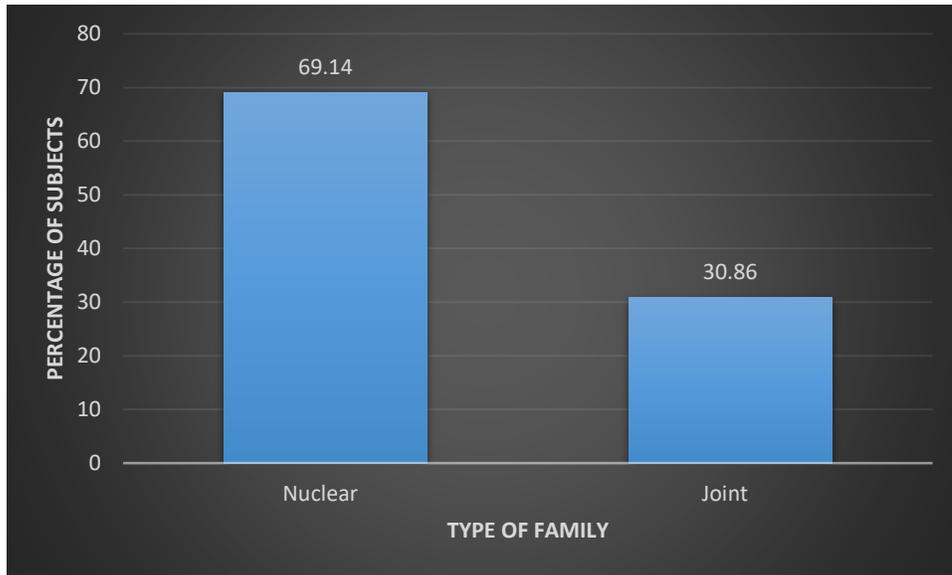


Figure 4.5: Percentage of subject showing Type of Family



Anthropometric measurements: For the anthropometric measurements, the height and weight of the subjects were requested in the questionnaire, and based on the height and weight, BMI was calculated and further categorized.

Table 4.2: Percentage of subject showing anthropometric measurement

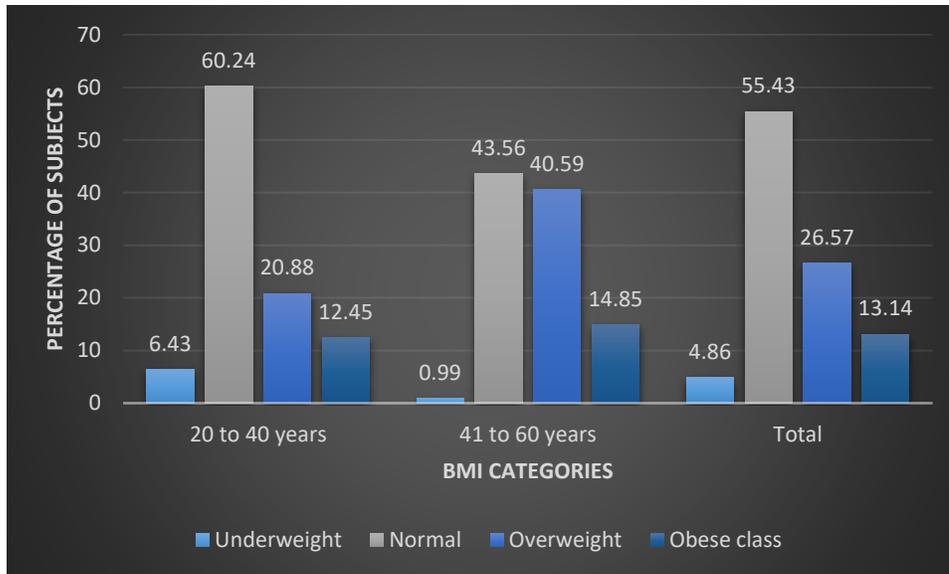
Mean±SD year	20 to 40 (n249)	41 to 60 year(n101)	Total (n350)
Height (cm)	158.19±8.36	158.8±10.18	159±8.49
Weight (kg)	55.9±8.18	63±8.68	57.32±8.60
BMI (kg/m²)	24±4.37	26±4	25±4 T test= 4.12 P value=0.000054***
Category of BMI			
Underweight (<18.5)	6.43 (16)	0.99 (1)	4.86 (17)
Normal (18.5-24.9)	60.24 (150)	43.56 (44)	55.43 (194)

Overweight (25-29.0)	20.88 (52)	40.59 (41)	26.57 (93)
Obese class (≥ 30)	12.45 (31)	14.85 (15)	13.14 (46)

Figure in the parenthesis denotes number of subject ***significant at 0.001

According to Table 4.2 the mean height of women aged between 20 to 40 years was 158+8.36 cm, Mean weight was 55.9+8.18 kg and Mean BMI was 26+4 kg/m². The mean height of women aged between 41 to 60 years was 158.8+10.18 (cm), mean weight was 63+8.68 kg and mean BMI was 26+4(kg/m²). And the average height of women in total subject was 159+8.49 (cm), mean weight was 57.32+8.60 and mean BMI was 25+4(kg/m²). The four categories of BMI are underweight, normal, overweight and obese. As per Table 4.2 and Figure 4.6 to 4.8 given by, 6.43% of women aged between 20 to 40 years were underweight, 60.24% of women with normal BMI, 20.88% of overweight women and 12.45% of obese women. 0.99% of the women who aged between 41 to 60 years were underweight, women with normal BMI were 43.56%, overweight women were 40.59% and obese women were 14.85%. And in the total subject 0.99% of women were underweight, women with normal BMI were 43.56%, overweight women were 40.59% and obese women were 14.85%.When compared between the two age groups it was found that more percentage of women were healthy in young group where as more percentage (almost 55%) wane healthy in older group. Assessment of obesity in girls Ahmedabad, Gujarat it was observed 5.40% subjects were underweight, 57.65% subjects were normal, 28.82% subjects were overweight and 9% subjects were underweight.(J, 2017)

Figure 4.6: Percentage of subject showing Various BMI Categories



Dietary profile: to obtain information on the dietary profile of women in Surat (Urban), questions such as type of diet, total number of meals and snacks and total fluid intake and consumption of food outside the home were included in the questionnaire

Table 4.3: Percentage of subject showing dietary profile

<u>Type of diet</u>	
Vegetarian	66.57 (235)
Ova-lacto vegetarian	4.00 (13)
Non-vegetarian	29.43 (102)
Total number of full meals consume per day	
1	0.57 (2)
2	88.00 (309)
3	11.43 (39)
Total number of snacks consume per day	

1	79.71 (280)
2	16.29 (57)
3	1.43 (5)
Don't eat	2.57 (8)
Total Fluid intake per day	
<2 Liter	72.29 (256)
2-5 Liter	27.14 (92)
>5 Liter	0.57 (2)
Eating outside food (Junk food)	
Daily	16.29 (56)
Weekly (1/2 time)	45.43 (159)
Monthly (2/3 time)	25.14 (89)
Never or once to twice a year	13.14 (46)

Figure in the parenthesis denotes number of subjects

As shown in Table 4.3 and Figure 4.9 to 4.13, women following vegetarian diet were 66.57%, women following ova-lactovegetarian diet were 4.00%, women following non-vegetarian diet were 29.43%. Only 0.57% of women ate one time meal whole day, 88% of women who ate two meals a day and 11.43% of women who ate three meals a day. 79.71% of women eat breakfast once a day, 16.29% eat twice a day and 1.43% eat three times a day. The daily intake of water in winter revealed that 72.29% of women drank less than two liters of water, 27.14% of women drank two to five liters of water and 0.57% women drank more than five liters of water. Daily eating out was 16.29% found among women, weekly eating out was 45.43% of women, monthly eating out was 25.14% and never or once to twice a year was 13.14%. So we can say that only 38.28% women were consume Junk food non-frequently while 61.72% of women were consume Junk food frequently.

Figure 4.7: Percentage of subject showing Type of Diet

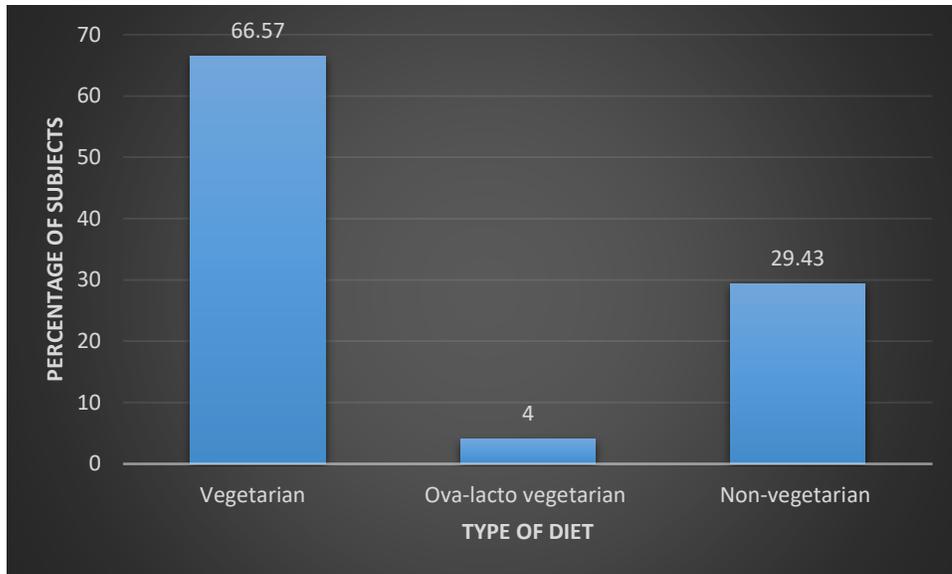


Figure 4.8: Percentage of subject showing Total Number of Full Meal Consume per Day

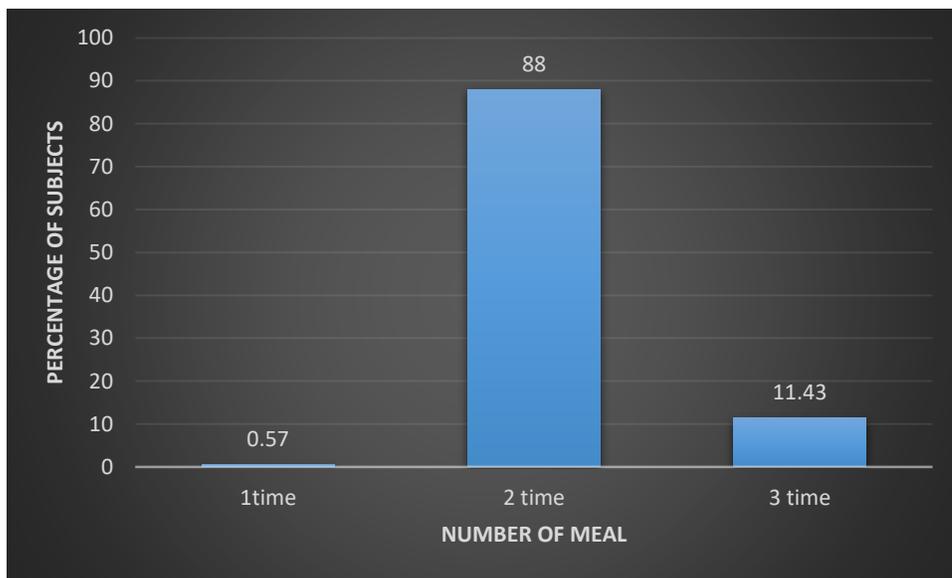


Figure 4.9: Percentage of subject showing Total Number of Snack Consume per Day

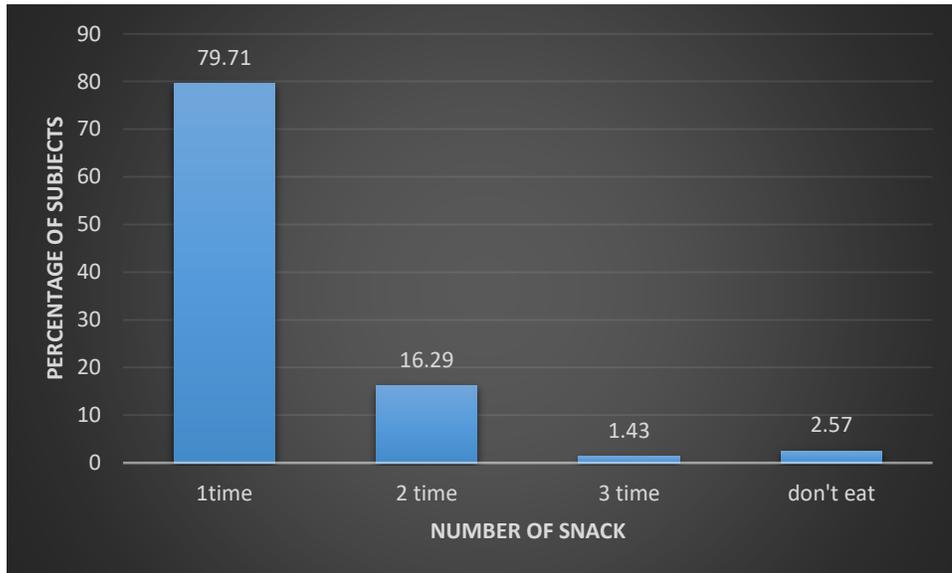


Figure 4.10: Percentage of subject showing Total Water Intake in per Day

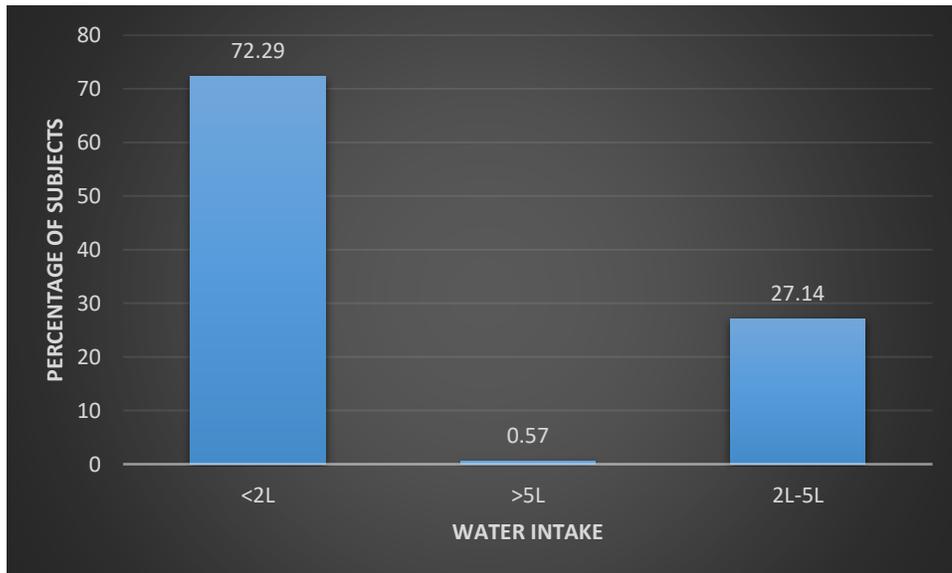
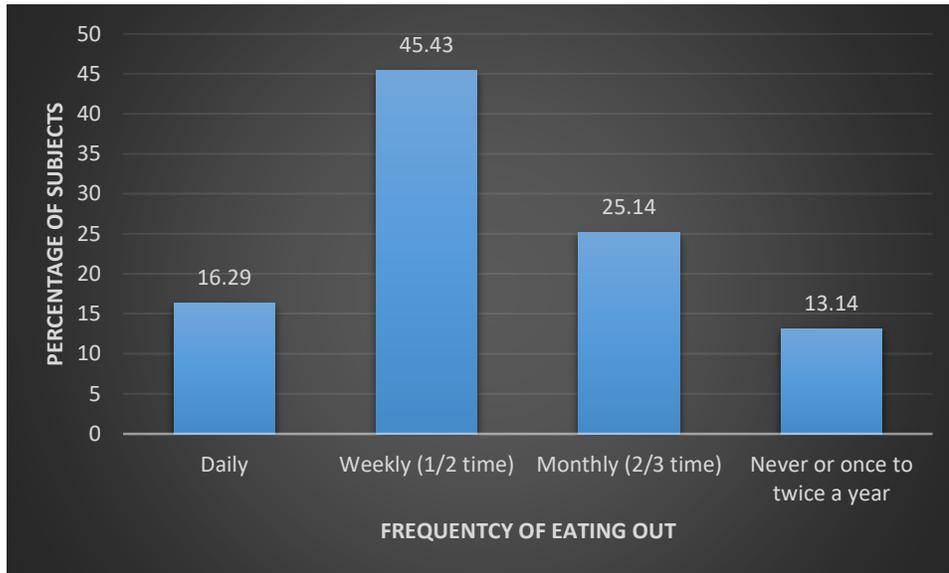


Figure 4.11: Percentage of subject showing Eating junk food



Health profile: Secondary data of last 3 month was collected for the hemoglobin level of subject which is shown table 4.4 Along with the data on major and minor disease profile.

Table 4.4: Percentage of Women Showing Health profile

Hemoglobin level (g/dl) (173)	
Mean±SD	10.53±1.80
Normal >12	41.62 (72)
Mild anemia 11-11.9	16.18 (28)
Moderate anemia 8-10.9	35.89 (62)
Severe <8	6.36 (11)
Major disease	
Diabetes	8.29 (29)
Hypertension	4.57 (16)
Diabetes/ Hypertension	0.57 (2)
Heart disease	-
Lung's disease	-

Renal disease	-
Bone problem	0.57 (2)
None	86.00 (301)
Minor disease	
Constipation	3.14 (11)
Gas	1.71 (6)
Constipation/ gas	1.14 (4)
Gas/ Pain in hands and feet	0.57 (2)
Constipation/ Pain in hands and feet	0.57 (2)
Pain in hands and feet	5.14 (18)
None	87.71 (307)

Figure in the parenthesis denotes number of subjects

As observed in table 4.4 and figure 4.14 to 4.16 according to classification of hemoglobin, women with normal hemoglobin level were 41.62%, women with mild anemia were only 16.18%, women with moderate anemia were only 35.89% and women with severe anemia were only 6.36%. Mean of hemoglobin was 10.53 and SD 1.80. Among women with major diseases, diabetes was present in 8.29% of the women, hypertension in 4.57% of the women, both diabetes and hypertension in 0.57% of the women, bone problem in 0.57% of the women and 86% had no disease. Minor disease prevalent in past one month was collected. Constipated women with minor illness were 3.14%, women with gas were 1.71%, women with both gas and constipation were 1.14%, women with gas and leg pain were 0.57% and women with constipation and leg pain were 0.57%. There were 5.14% women with leg pain and 87.71% women without any minor illness.

Figure 4.12: Percentage of subject showing Hemoglobin Level

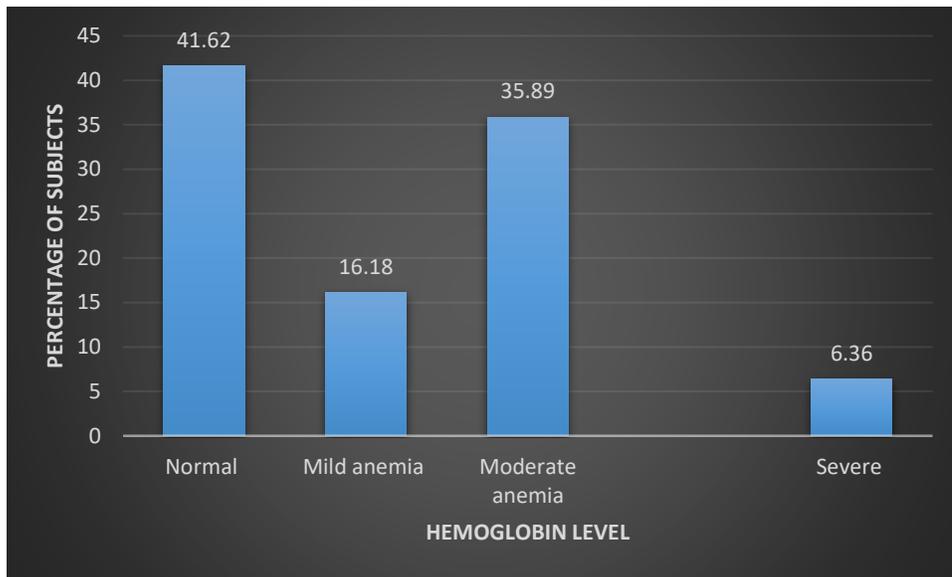


Figure 4.13: Percentage of subject showing Major Disease

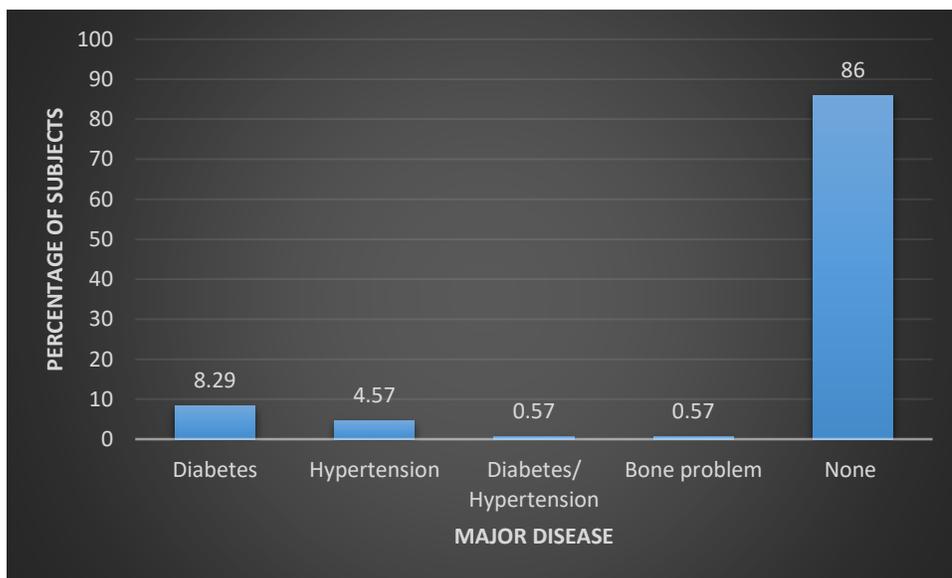
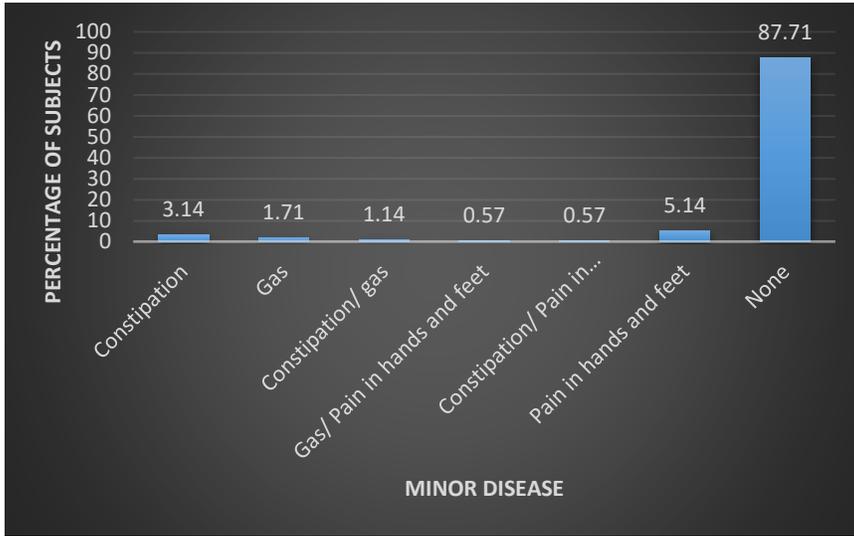


Figure 4.14: Percentage of subject showing Minor Disease



Knowledge of millet: To determine the knowledge of women in Surat (Urban), questions on knowledge and consumption pattern were included in the questionnaire. The subjects were divided into three groups according to their answers: poor, fair, and good.

Table 4.5: Percentage of subject showing knowledge score millet

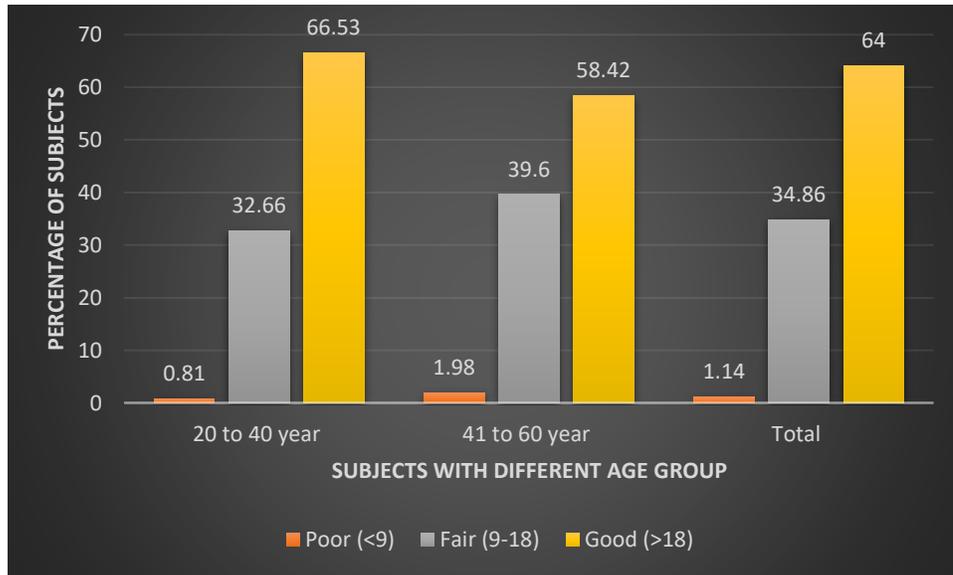
Range	20to40 year of woman (249)	41 to 60 year of women (101)	Total (350)
Poor (<9)	0.81 (2)	1.98(2)	1.14(4)
Fair (9-18)	32.66 (82)	39.60(40)	34.86(122)
Good (>18)	66.53 (165)	58.42(59)	64.00(224)

Figure in the parenthesis denotes number of subject

Table 4.5 and Figure 4.17.1 to 4.17.3 show that millet grain was sold in three levels consisting of 30 basic questions with key criteria such as if >18 was good, <9 was poor and 9-18 fair. In which 66.53% in the age of 20 to 40 years of women had good knowledge about millet, 32.66% had fair knowledge and 0.81% had little knowledge. In the age group of 40 to 60 years, women with good knowledge were 58.42%, women with moderate knowledge were 39.60% and women with poor knowledge were 1.98%. In total subject

64.00% women had good knowledge, 34.86% of women had fair knowledge and 1.14% of women had poor knowledge.

Figure 4.15: Percentage of subject showing knowledge (different category)



Education and knowledge about millet: A comparison of women’s education and millet knowledge is show below.

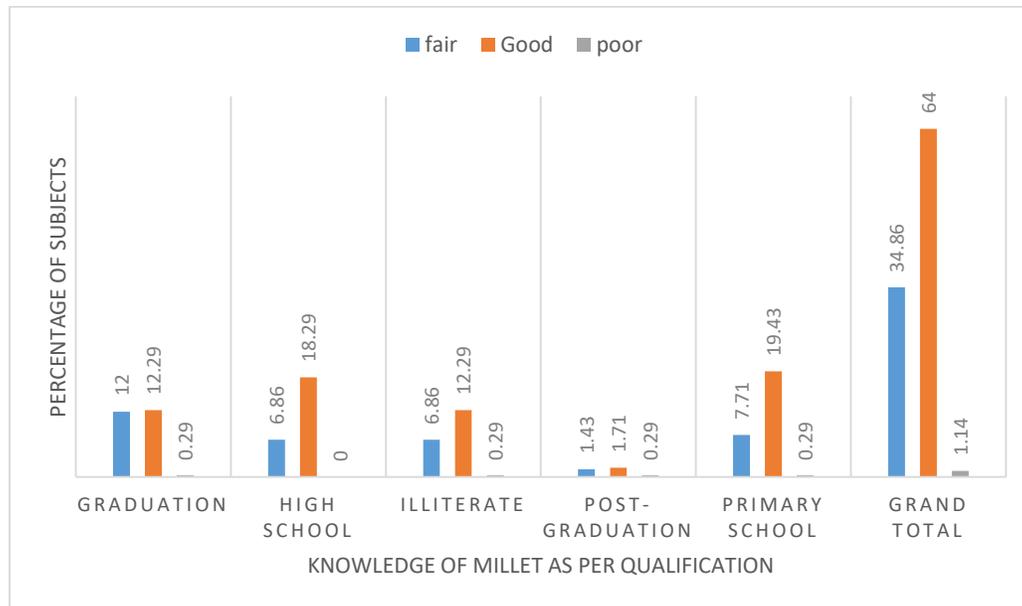
Table 4.6: Percentage of subject showing knowledge about millets and as per education

Knowledge regarding millet	Graduation	high school	illiterate	post-graduation	primary school	Grand Total
fair (122)	12.00(42)	6.86(24)	6.86 (24)	1.43(5)	7.71(27)	34.86(122)
Good (224)	12.29(43)	18.29(64)	12.29 (64)	1.71(6)	19.43(68)	64.00(224)
poor (4)	0.29(1)	0.00	0.29 (1)	0.29(1)	0.29(1)	1.14(4)

Figure in the parenthesis denotes number of subjects

Table 4.6 and Figure no. 4.18, as per the observation of women regarding knowledge about millet & its correlated with the education status it was observed that 0.29% were women who had studied up to graduation, 0.29% were women who had studied up to post-graduation, 0.29% were women who had studied up to primary school And 0.29% were illiterate had poor knowledge of millet. The number of women who had fair knowledge and who had done post-graduation was 1.43%, who had completed graduation was 12.00%, who had studied up to high school was 6.86%, the number of women who had studied up to primary school was 7.71%. 6.86% were illiterate women. The number of women who had good knowledge about millet was 1.71% with post-graduation, 12.29% with graduation, 18.29% with high school, 12.29% with primary school. Thus from the data it was familiar that women with good knowledge had education only up to primary school and high school thus his qualification may not be considered as a defective knowledge on millet.

Figure 4.16: Percentage of subject showing knowledge about millets and as per education



Consumption pattern: Consumption of large and small millet on data frequency of consumption, non-frequent consumption and never consumed in shown in table 4.7.

Table 4.7: Percentage of subject showing frequency of consumption of millets

Millet name	Frequently consumption (Daily/weekly)	Non-Frequently consumption (monthly/yearly)	Never consumed
Sorghum	37.43 (131)	35.72 (124)	26.86 (n95)
Pearl	39.43 (139)	30.83 (107)	29.71 (n104)
Kodo	3.43 (12)	9.55 (31)	87.71 (307)
Foxtail	2 (7)	3.43 (12)	94.57 (331)
Finger	2 (7)	10.28 (37)	87.71 (306)
Barnyard	5.71 (20)	52.28 (183)	42.00 (147)
Proso	0.86 (3)	2.57 (10)	96.57 (337)
Little	0.86 (3)	6.29 (22)	92.86 (325)
Amaranth	4 (14)	49.71 (175)	46.29 (161)

Figure in the parenthesis denotes number of subject

As observed in Table 4.7 and Figure 4.19 to 4.27 the number of women with frequency of consumption of sorghum millet in diet was 37.43%, Non-frequently consumption of sorghum millet was 35.72% and women who never consumed millet were 35.72%. The number was 26.86%. The number of women with pearl millet consumption frequency was 39.43%, the number of women who did not consume pearl millet was 30.83%, and the number of women who never ate pearl millet was 29.71%. Frequency of consumption of kodo millet was 3.72%, non-frequency of consumption was 9.55%, and those who never consumed it was 87.71%. Foxtel millet consumption frequency was 2%, non-frequency was 3.43%, and women who never ate it were 94.57%. The frequency of finger millet consumption was 2%, and non-frequent women were 10.28%, women who had never taken finger millet were 87.71%. The frequency of female consume barnyard millet was 5.71%, non-frequently consuming female was 52.28% and never consuming was 42.00%. The frequency of consumption of proso millet was 0.86%, women who did not consume

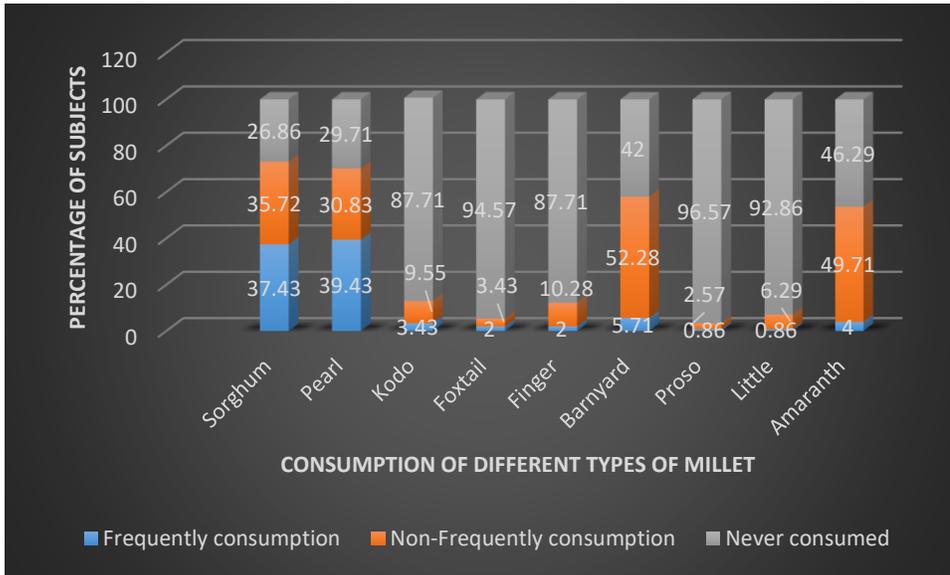
frequently was 2.57% and women who never ate it was 96.57%. Frequency of consumption of little millet was 0.86%, non-frequently consumption women were 6.29% and those who never eat it were 92.86%. Frequency of women who consumed amaranth millet was 4%, non-frequent consumption was 49.71%, 46.29% who never consumed amaranth millet. From the above information it can be revealed that the sorghum and pearl millet were consumed in moderate at quantity and other millets were consumed frequently. In spite millet like kodo, little, finger and available since many years subject don't consume being.

Millet Production and Consumption in Gujarat a household survey was conducted on 100 households in urban Vadodara. It was concluded 86.45% were using pearl millet, 31.35% were using sorghum millet, 8.55% were using finger millet and 6.65% were using kodo. Out of which 10.52% used millet daily, 42.10% used it weekly and 38.94% used it occasionally and 8.42% used millet seasonally. Pearl millet was the most used followed by sorghum and other millets were very less. (Gandhi and Nigandhi 2020)

Studded Assessing millets and sorghum consumption behavior in urban India: it was conducted within the cities in India, including Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai. This resorted and the total sample size was 15,139 (individual). While there was a significant proportion of consumers who ate millet (49.6% ate 1 or more times a week), there was also a fair proportion of those who never or almost never consumed millet (34.9% consumed millet never or twice was more than a year. The city-wise frequency of millet consumption was correlated with the recognition of this crop in each city, with Bangalore leading in terms of consumption, while Ahmedabad and Delhi have the lowest frequency of consumption. In Bengaluru, none of the respondents mentioned that they never/rarely eat millet. In fact, it was the only city where all respondents consumed this crop at least once a month. In Bengaluru about 71.2% of respondents consumed millet at least once a week. This was followed by 57.6 and 56.1% Respondents were frequent consumers with 26.8 and 25% never/rarely consuming millet in Chennai and Hyderabad respectively. Mumbai and Kolkata followed with 52.9 and 52.3% frequent consumers and 29.6 and 29.6% never/rarely consuming millets. Do not bother. Delhi and Ahmedabad had the lowest frequency with 41.9 and 37.7% frequent

consumption and 47.1 and 55.5% never/rarely consuming millets. This shows that South India is a very large consumer of millets. (Joanna kana-potaka and at all 2021)

Figure 4.17: Percentage of subject showing Consumption of Different types of Millets



Pearl millet consumption: - Health conditions have been compared with the consumption of pearl millet by comparing the frequency of pearl millets consumed by those with normal hemoglobin and the frequency consumed by anemic women. And how often do those with a normal BMI take the pearl millet diet, also with BMI status of women.

Table 4.8: Percentage of subject showing Health conditions have been compared with the consumption of pearl millet

Pearl millet consumption			
	Frequently consumption	Non-frequency consumption	Never consumed
Hemoglobin normal (n83)	45.83 (33)	34.72 (25)	19.44 (14)
Anemic woman (n111)	37.83 (42)	27.92 (31)	34.23 (38)

BMI normal woman(n190)	40.00 (76)	35.27 (67)	24.74 (47)
Overweight and obese women(139)	38.13 (53)	23.74 (33)	38.13 (53)
No disease (n276)	37.68 (104)	32.97 (91)	29.35 (81)
Disease (n74)	47.28 (35)	21.64 (28)	31.08 (38)

Figure in the parenthesis denotes number of subjects

As observed from Table 4.8 and Figure 4.28 to 4.31 the frequency of consumption of pearl millet was 45.83% of the person whose hemoglobin was normal, non-frequent consumption was 34.72%, never consumed was 19.44% and those who had anemia problem consumed pearl millet frequently was 37.83%, non-frequent consumption was 27.92% and never consumed were 34.23%. Among the women with normal BMI the frequency of consumption was 39.80%, non-frequently consumption was 35.60% and never consumed were 24.60%. And the frequency of consumption pearl millet among overweight and obese women was 38.13%, non-frequent consumption was 23.74% and the number of never consumed women were 38.13%. According to this data it can be understood that those who had normal hemoglobin and normal BMI had high pearl millet intake (around 10% subject) and those who were anemic women, overweight and obese had low pearl millet intake. It was not significant but a slight difference between the two variables.

Frequent consumption by subject with some disease were 47.28%, non-frequent were 21.64% and the women who never consumed were 31.8%. Women with no disease had frequency of consumption among 37.68%, subject 32.97% with non-frequent and 29.35% of subject never consumed. Therefore the data revealed that almost 25% of subject who were suffering from some kind of disease as per minor & major disease checklist data consumed millet more frequently.

Figure 4.18: Correlated between Pearl Millet Consumption & hemoglobin level

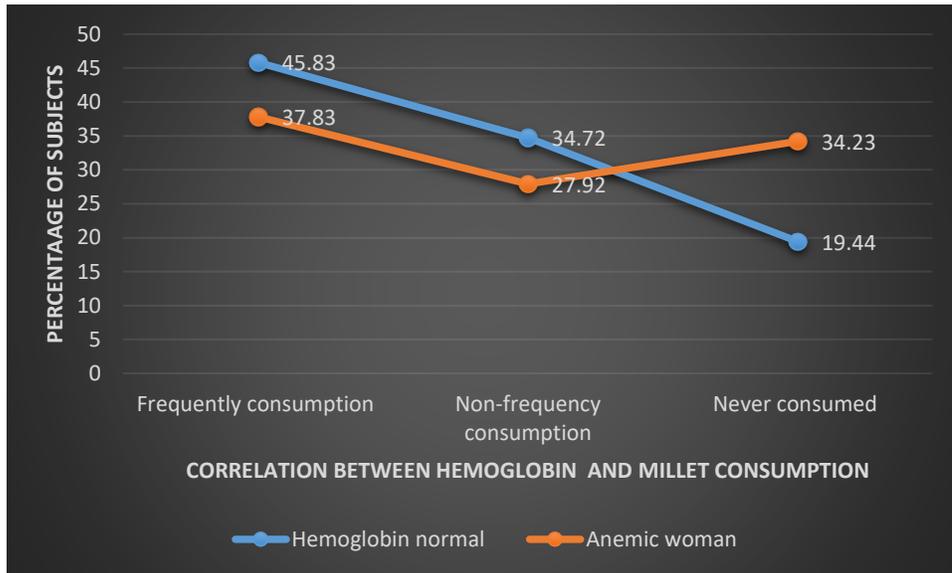


Figure 4.19: Correlated between Pearl Millet Consumption & BMI (Body Mass Index)

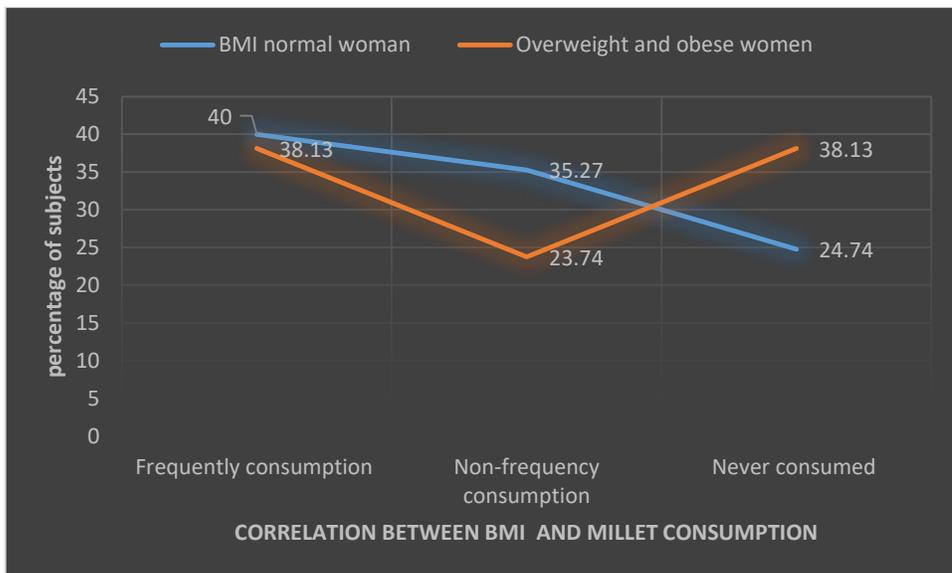
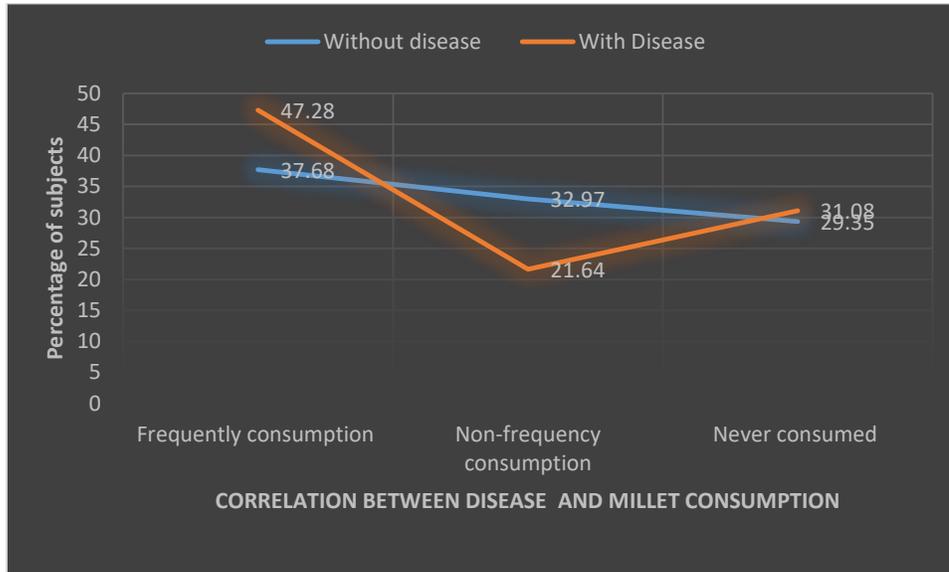


Figure 4.20: Correlated between Pearl Millet Consumption & Disease.



Use of millet: the form of millet used has consumption subject with variance cooking method & season was checked the data of percentage in table 4.9

Table 4.9: Percentage of subject showing Use of millets of women

Use of millets	
Powder (flour)	90.00 (324)
Whole grain	2.86 (6)
Powder/ Reedy to mixed	4.85 (13)
Whole grain/ Powder	1.15 (4)
Reedy to mixed	1.14 (3)
From to cook millet	
Roasting (roti/chapatti/pops)	92.00(328)
baking (biscuits)	-
fermented (Dosa)	-
fry (bhajiya)	-
by soaking or sprouting	-

boiled (khichadi /soup) Roasting (roti/chapatti/pops)	3.99 (10)
Roasting (roti/chapatti/pops) / by soaking or sprouting (used in any dish)	4.01 (11)
Prefer to eat millet in season	
Winter Summer Monsoon	38.29(138)
winter & monsoon	11.17 (35)
Winter	50.00 (177)

Figure in the parenthesis denotes number of subject

Table 4.9 and Figure 4.34 to 4.36 observed that 90% women used millet in flour form, 2.86% used whole grain, 1.15% women used both whole grain and powder, 1.14% women used ready to mix millet. 4.85% Women used powdered and ready to mix millet. The women who used for cooking in different method showed that in roasting form 92%, 3.99% women used boiled method, 4.01% women used both roasting and soaking methods. According to observation in different season millet were used - 38.29% women used millet in all three seasons of winter, summer and monsoon, 11.7% women used millet in winter and monsoon, 50.0% of the women used millet only in winter.

Figure 4.21: Percentage of subject showing Consumption of different forms

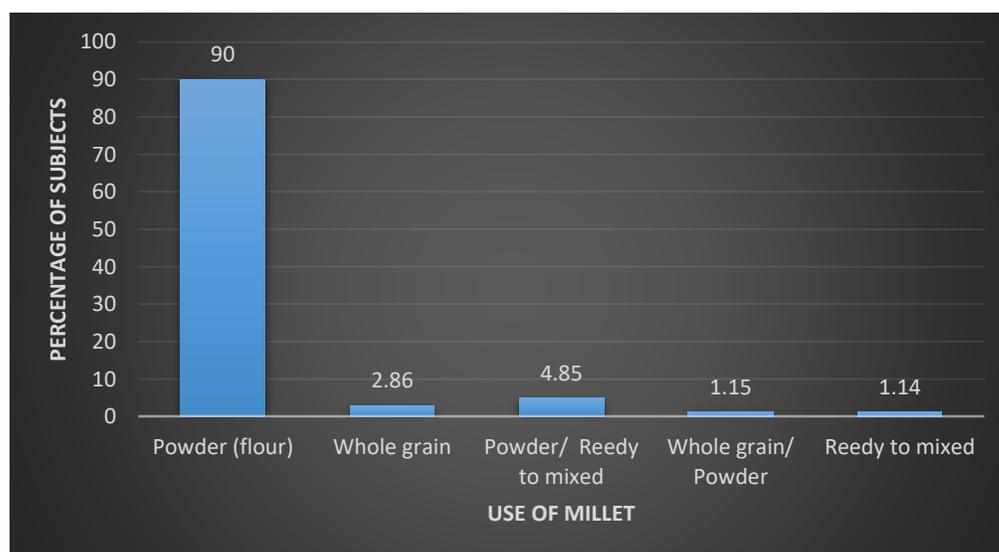


Figure 4.22: Percentage of subject showing use of different cooking methods of millet

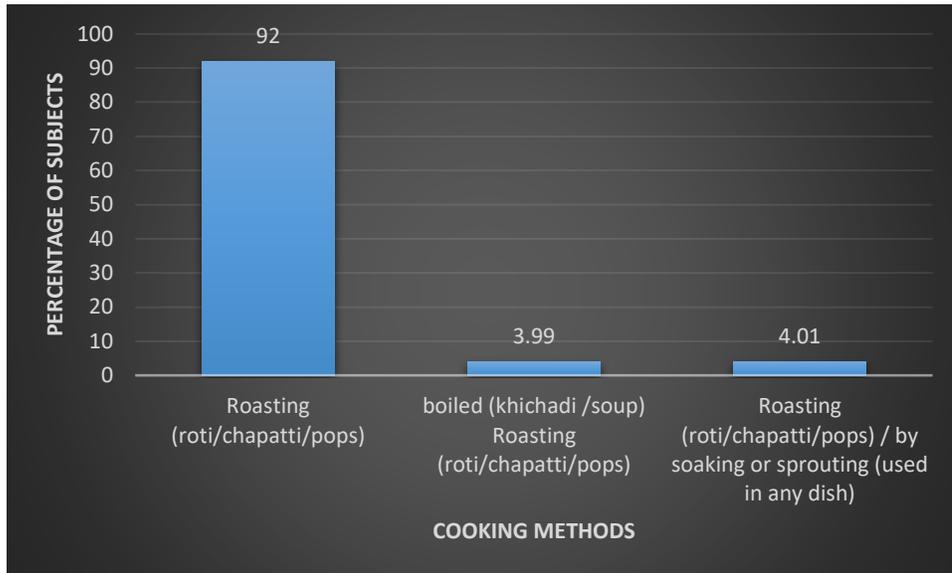
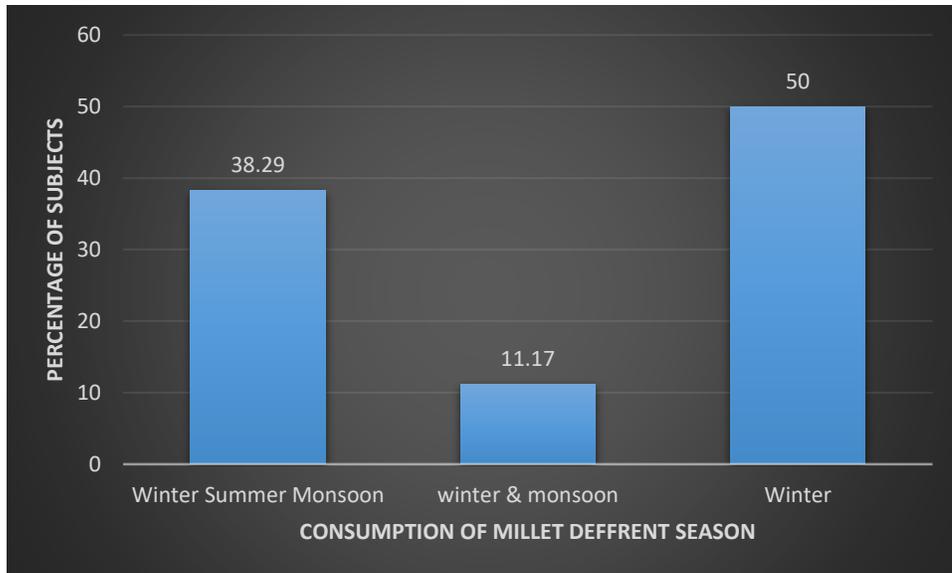


Figure 4.23: Percentage of subject showing consumption of millet in different Season



Reason for not consuming millet: The reasons for not consuming various millet are: reported in table 4.10

Table 4.10: Percentage of subject showing Reason for not consuming millets

Consumption pattern	20 to 40 year women (n249)	41 to 60 year women (n101)	Total
Sorghum			
Don't like the taste	16.47(37)	15.84(16)	14.86 (53)
Limited available	1.20(3)	4.95 (8)	3.14(11)
High price	1.20(3)	0.99 (1)	0.86 (4)
Family custom of not eating millet	6.83(21)	13.86 (12)	9.14(33)
Eating millet makes the body feel warm	0.81(2)	0.99 (2)	0.86 (4)
Skip	73.49(183)	63.37 (62)	71.14 (245)
Pearl			
Don't like the taste	15.73 (39)	8.91(10)	13.71(49)
Limited available	2.82 (7)	3.96 (4)	3.14(11)
High price	1.21 (3)	-	0.86(3)
No time to make meal	-	2.97 (5)	1.71 (5)
Family custom of not eating millet	6.45 (16)	13.86(14)	8.57 (30)
Eating millet makes the body feel warm	11.69 (30)	10.89 (11)	11.71 (41)
Skip	61.69 (154)	59.41(57)	60.29 (211)
Kodo			
Don't like the taste	30.24 (75)	32.67 (33)	31.14 (108)
Limited available	12.50 (31)	17.82 (18)	14.00 (49)
High price	2.02 (5)	-	1.43 (5)
No time to make meal	1.21 (3)	1.98 (2)	1.43 (5)
Family custom of not eating millet	35.89 (90)	37.62(38)	36.29 (128)

Eating millet makes the body feel warm	0.40 (1)	2.97 (3)	1.14 (4)
Haven't heard the name	4.03 (10)	1.98 (2)	3.43 (12)
Skip	13.71 (34)	4.95(5)	11.14 (39)
Foxtail			
Don't like the taste	24.60 (61)	40.59 (41)	29.14 (102)
Limited available	16.94 (42)	20.79 (21)	18.00 (63)
High price	5.65 (14)	0.99 (1)	4.57 (15)
No time to make meal	2.02 (5)	2.97 (3)	2.29 (8)
Family custom of not eating millet	37.10 (93)	25.74 (26)	33.71 (119)
Eating millet makes the body feel warm	0.81 (2)	0.99 (1)	0.86 (3)
Haven't heard the name	12.10 (30)	7.29 (8)	10.86 (38)
Skip	0.81 (2)	-	0.57 (2)
Finger			
Don't like the taste	27.42 (66)	34.65 (35)	29.43 (99)
Limited available	19.35 (49)	17.82 (18)	18.86 (67)
High price	4.44 (11)	0.99 (1)	3.71 (12)
No time to make meal	1.21 (3)	1.98 (2)	1.43 (5)
Family custom of not eating millet	33.87 (86)	28.71 (29)	32.29 (116)
Eating millet makes the body feel warm	0.81 (2)	0.99 (1)	0.86 (3)
Haven't heard the name	9.27 (23)	9.90 (10)	9.43 (34)
Skip	3.63 (9)	4.95 (5)	4.00 (14)
Barnyard			
Don't like the taste	21.77 (54)	16.83 (17)	20.29 (71)
Limited available	10.48 (26)	8.91 (9)	10.00 (35)
High price	4.03 (10)	0.99 (1)	3.43 (11)
No time to make meal	0.40 (1)	-	0.29 (1)
Family custom of not eating millet	15.73 (40)	12.87 (13)	15.14 (53)

Eating millet makes the body feel warm	0.40 (1)	0.99 (1)	0.57 (2)
Haven't heard the name	2.42 (6)	3.96 (4)	2.86 (10)
Skip	44.76 (111)	55.45 (56)	47.43 (167)
Proso			
Don't like the taste	25.00 (62)	43.56(44)	30.29 (106)
Limited available	19.35 (48)	18.81 (19)	19.14 (67)
High price	3.63 (9)	0.99 (1)	2.86 (10)
No time to make meal	0.40 (1)	0.99 (1)	0.86 (2)
Family custom of not eating millet	31.85 (80)	24.75 (25)	29.71 (105)
Eating millet makes the body feel warm	0.81 (2)	-	0.57 (2)
Haven't heard the name	12.90 (32)	9.90 (10)	12.00 (42)
Skip	6.05 (15)	0.99 (1)	4.57 (16)
Little			
Don't like the taste	25.00 (62)	40.59 (41)	29.43 (103)
Limited available	19.35 (48)	17.82 (18)	18.86 (66)
High price	2.82 (7)	-	2.29 (7)
No time to make meal	1.21 (3)	1.98 (2)	1.43 (5)
Family custom of not eating millet	30.24 (76)	26.73 (27)	29.14 (104)
Eating millet makes the body feel warm	0.40 (1)	-	0.29 (1)
Haven't heard the name	10.89 (27)	7.92 (8)	10.00 (35)
Skip	10.08 (25)	4.95 (5)	8.57 (29)
Amaranth			
Don't like the taste	20.56 (51)	20.79 (21)	20.57 (72)
Limited available	9.68 (24)	9.90 (10)	9.71 (34)
High price	3.68 (9)	-	2.86 (9)
No time to make meal	1.61 (4)	0.99 (1)	1.43 (5)
Family custom of not eating millet	14.52 (36)	11.88 (12)	13.71 (48)

Eating millet makes the body feel warm	0.40 (1)	0.99 (1)	0.57 (2)
Haven't heard the name	2.42 (6)	3.96 (4)	2.86 (10)
Skip	47.18 (118)	51.49 (52)	48.29 (170)

Figure in the parenthesis denotes number of subject

As observed from Figure 4.37.1 to 4.37.2 and Table 4.10, among the reasons for not eating millet, women aged between 20 to 40 years who do not like the taste and do not eat were 0.40%, 41 to 60 years were 15.84%. And total 14.86% women do not like taste. Women aged “between” 20 to 40 years who did not eat due to limited availability were 2.02%, women aged “between” 41 to 60 years were 4.95% and total subjects were 3.14%. The number of women not eating due to high price was 1.21% in age group of 20 to 40 years, 0.99% in age group of 41 to 60 years and total 0.86% women did not eat due to high price. Between 20 to 40 years age group not consuming millet due to lack of family custom was 7.26%, between 41 to 60 years age group was 13.86% and total 9.14% women were not consuming millet due to lack of family custom. Eating millet seems to warm the body so women who did not eat it were 0.40% in the age group of 20 to 40 years, 0.99% in the age group of 41 to 60 years and 0.86% in total subject. Women who skip the question of consumption of Sorghum millet was 74.19% in age group 20 to 40 years, 60.37% in age group of 41 to 60 years and 71.40% in total subject.

As observed from Figure 4.38.1 to 4.38.2 and Table 4.10, the reasons for not eating pearl millet which did not like taste were 15.73% in age group of 20 to 40 years, in the age group of 41 to 60 years were 8.91%. And total was 13.71%. The number of non-consumers due to limited availability in the market was 2.82% of women in the age group of 20 to 40 years, 3.96% of women in the age group of 41 to 60 years and 3.14% of the total. The number of women not eating due to high prices was 1.21% in the age group of 20 to 40 years and 0.86% in total subject. The number of women not eating due to lack of time to prepare food was 2.97% in the age group of 41 to 60 years and 1.71% in total subject. Women who do not eat due to family reasons were 6.45% in the age group of 20 to 40 years, 13.86% in the age group of 41 to 60 years and the total was 8.57%. Due to

consumption of millet body feel warm so for that reason women who were not consume it was 11.69% between age group of 20 to 40 years, 10.89% between age group of 41 to 60 years and 11.71% in total. The number of people who skip the question of consumption of millet was 61.69% in the age group 20 to 40, 59.41% in the age group 41 to 60 and 60.29% in total subject.

As observed from Figure 4.39.1 to 4.39.2 and Table 4.10, the reasons for not eating kodo millet which did not like taste were 30.24% in age group of 20 to 40 years, in the age group of 41 to 60 years were 32.67%. And total was 31.14%. The number of non-consumers due to limited availability in the market was 12.50% of women in the age group of 20 to 40 years, 17.82% of women in the age group of 41 to 60 years and 14% of the total subject. The number of women not eating due to high prices was 2.02% in the age group of 20 to 40 years and 1.43% in total subject. The number of women not eating due to lack of time to prepare food was 1.21% in the age group of 20 to 40 years, 1.98% of woman in the age group of 41 to 60 year and 1.43% in total subject. Women who do not eat due to family reasons were 35.89% in the age group of 20 to 40 years, 37.62% in the age group of 41 to 60 years and the total subject was 36.29%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.40% between age group of 20 to 40 years, 2.97% between age group of 41 to 60 years and 1.14% in total subject. The number of women not eating haven't heard the name 4.03% in the age group of 20to40 years, 1.98%of woman in the age group of 41to 60 years and total subject was 3.43%. The number of people who skip the question of consumption of millet was 13.71% in the age group 20 to 40, 4.95% in the age group 41 to 60 and 11.14% in total subject.

As observed from Figure 4.40.1 to 4.40.2 and Table 4.10, the reasons for not eating foxtail millet which did not like taste were 24.60% in age group of 20 to 40 years, in the age group of 41 to 60 years were 40.59%. And total subject was 29.14%. The number of non-consumers due to limited availability in the market was 16.94% of women in the age group of 20 to 40 years, 20.79% of women in the age group of 41 to 60 years and 18% of the total subject. The number of women not eating due to high prices was 5.65% in the age group of 20 to 40 years in the age group of 41 to 60 years were 0.99% and 4.57% in total subject. The number of women not eating due to lack of time to prepare food was 2.02% in the age

group of 20 to 40 years, 2.97% of woman in the age group of 41 to 60 years and 2.29% in total subject. Women who do not eat due to family reasons were 37.10% in the age group of 20 to 40 years, 25.74% in the age group of 41 to 60 years and the total subject was 33.71%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.81% between age group of 20 to 40 years, 0.99% between age group of 41 to 60 years and 0.86% in total subject. The number of women not eating haven't heard the name 12.10% in the age group of 20to40 years, 7.29%of woman in the age group of 41to 60 years and total subject was 10.86%. The number of people who skip the question of consumption of millet was 0.81% in the age group 20 to 40 and 0.57% in total subject.

As observed from Figure 4.41.1 to 4.41.2 and Table 4.10, the reasons for not eating finger millet which did not like taste were 27.42% in age group of 20 to 40 years, in the age group of 41 to 60 years were 34.65%. And total subject was 29.43%. The number of non-consumers due to limited availability in the market was 19.35% of women in the age group of 20 to 40 years, 17.82% of women in the age group of 41 to 60 years and 18.86% of the total subject. The number of women not eating due to high prices was 4.44% in the age group of 20 to 40 years in the age group of 41 to 60 years were 0.99% and 3.71% in total subject. The number of women not eating due to lack of time to prepare food was 1.21% in the age group of 20 to 40 years, 1.98% of woman in the age group of 41 to 60 years and 1.43% in total subject. Women who do not eat due to family reasons were 33.87% in the age group of 20 to 40 years, 28.71% in the age group of 41 to 60 years and the total subject was 32.29%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.81% between age group of 20 to 40 years, 0.99% between age group of 41 to 60 years and 0.86% in total subject. The number of women not eating haven't heard the name 9.27% in the age group of 20to40 years, 9.90%of woman in the age group of 41to 60 years and total was 9.43%. The number of people who skip the question of consumption of millet was 3.63% in the age group 20 to 40, 4.95% in the age group 41 to 60 and 4.00% in total subject.

As observed from Figure 4.42.1 to 4.42.2 and Table 4.10, the reasons for not eating barnyard millet which did not like taste were 21.77% in age group of 20 to 40 years, in the age group of 41 to 60 years were 16.83%. And total subject was 20.29%. The number of

non-consumers due to limited availability in the market was 10.48% of women in the age group of 20 to 40 years, 8.91% of women in the age group of 41 to 60 years and 10% of the total subject. The number of women not eating due to high prices was 4.03% in the age group of 20 to 40 years in the age group of 41 to 60 years were 0.99% and 3.43% in total subject. The number of women not eating due to lack of time to prepare food was 0.40% in the age group of 20 to 40 years, and 0.29% in total subject. Women who do not eat due to family reasons were 15.73% in the age group of 20 to 40 years, 12.87% in the age group of 41 to 60 years and the total subject was 15.14%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.40% between age group of 20 to 40 years, 0.99% between age group of 41 to 60 years and 0.57% in total subject. The number of women not eating haven't heard the name 2.42% in the age group of 20to40 years, 3.96%of woman in the age group of 41to 60 years and total subject was 2.86%. The number of people who skip the question of consumption of millet was 44.76% in the age group 20 to 40, 55.45% in the age group 41 to 60 and 47.43% in total subject.

As observed from Figure 4.43.1 to 4.43.2 and Table 4.10, the reasons for not eating proso millet which did not like taste were 25.00% in age group of 20 to 40 years, in the age group of 41 to 60 years were 43.56% And total subject was 30.29%. The number of non-consumers due to limited availability in the market was 19.35% of women in the age group of 20 to 40 years, 18.81% of women in the age group of 41 to 60 years and 19.14% of the total subject. The number of women not eating due to high prices was 3.63% in the age group of 20 to 40 years in the age group of 41 to 60 years were 0.99% and 2.86% in total subject. The number of women not eating due to lack of time to prepare food was 0.40% in the age group of 20 to 40 years, 0.99% of women in the age group of 41 to 60 years and 0.86% in total subject. Women who do not eat due to family reasons were 31.85% in the age group of 20 to 40 years, 24.75% in the age group of 41 to 60 years and the total subject was 29.71%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.81% between age group of 20 to 40 years, and 0.57% in total subject. The number of women not eating haven't heard the name 12.90% in the age group of 20to40 years, 9.90%of woman in the age group of 41to 60 years and total subject was 12.00%. The number of people who skip the question of consumption of millet was 6.05% in the age group 20 to 40, 0.99% in the age group 41 to 60 and 4.57% in total subject.

As observed from Figure 4.44.1 to 4.44.2 and Table 4.10, the reasons for not eating little millet which did not like taste were 25.00% in age group of 20 to 40 years, in the age group of 41 to 60 years were 40.59%. And total subject was 29.43%. The number of non-consumers due to limited availability in the market was 19.35% of women in the age group of 20 to 40 years, 17.82% of women in the age group of 41 to 60 years and 18.86% of the total subject. The number of women not eating due to high prices was 2.82% in the age group of 20 to 40 years and 2.29% in total subject. The number of women not eating due to lack of time to prepare food was 1.21% in the age group of 20 to 40 years, 1.98% of women in the age group of 41 to 60 years and 1.43% in total subject. Women who do not eat due to family reasons were 30.24% in the age group of 20 to 40 years, 26.73% in the age group of 41 to 60 years and the total subject was 29.14%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.40% between age group of 20 to 40 years, and 0.29% in total subject. The number of women not eating haven't heard the name 10.89% in the age group of 20to40 years, 7.92%of woman in the age group of 41to 60 years and total subject was 10.00%. The number of people who skip the question of consumption of millet was 10.08% in the age group 20 to 40, 4.95% in the age group 41 to 60 and 8.57% in total subject.

As observed from Figure 4.45.1 to 4.45.2 and Table 4.10, the reasons for not eating amaranth millet which did not like taste were 20.56% in age group of 20 to 40 years, in the age group of 41 to 60 years were 20.79% and total subject was 20.57%. The number of non-consumers due to limited availability in the market was 9.68% of women in the age group of 20 to 40 years, 9.90% of women in the age group of 41 to 60 years and 9.71% of the total subject. The number of women not eating due to high prices was 3.68% in the age group of 20 to 40 years and 2.86% in total subject. The number of women not eating due to lack of time to prepare food was 1.61% in the age group of 20 to 40 years, 0.99% of women in the age group of 41 to 60 years and 1.43% in total subject. Women who do not eat due to family reasons were 14.52% in the age group of 20 to 40 years, 11.88% in the age group of 41 to 60 years and the total subject was 13.71%. Due to consumption of millet body feel warm so for that reason women who were not consume it was 0.40% between age group of 20 to 40 years, 0.99% in the age group of 41 to 60 years and 0.57 in total subject. The number of women not eating haven't heard the name 2.42% in the age group

of 20to40 years, 3.96% of woman in the age group of 41to 60 years and total subject was 2.86%. The number of people who skip the question of consumption of millet was 47.18% in the age group 20 to 40, 51.49% in the age group 41 to 60 and 48.29% in total subject.

Figure 4.24.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Sorghum Millet

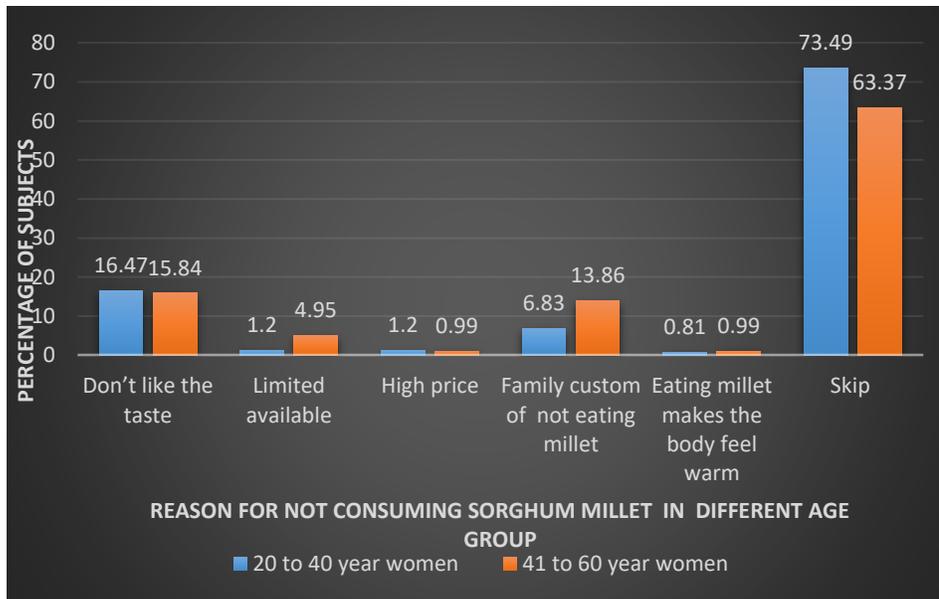


Figure 4.24.2: Percentage of subject showing Reason for Not Consuming Sorghum Millet

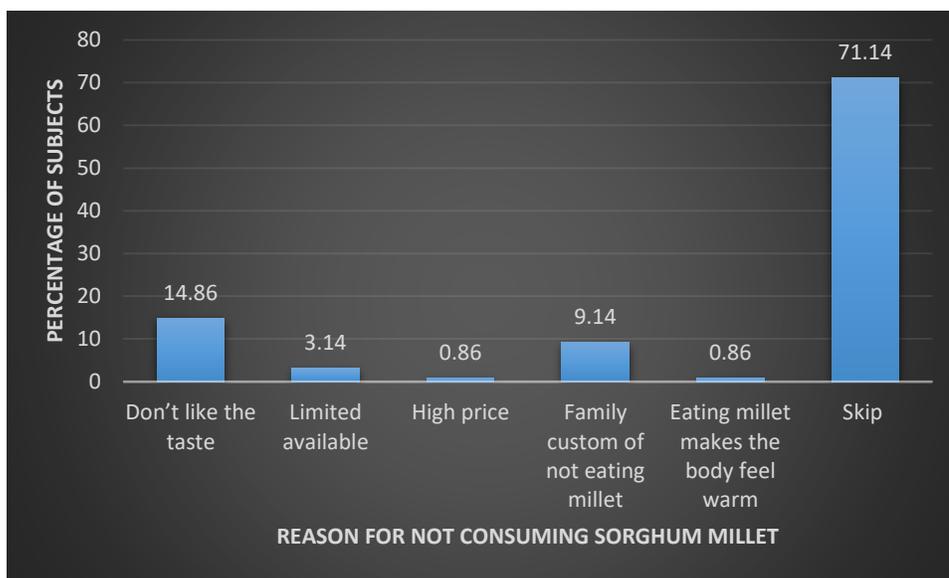


Figure 4.25.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Pearl Millet

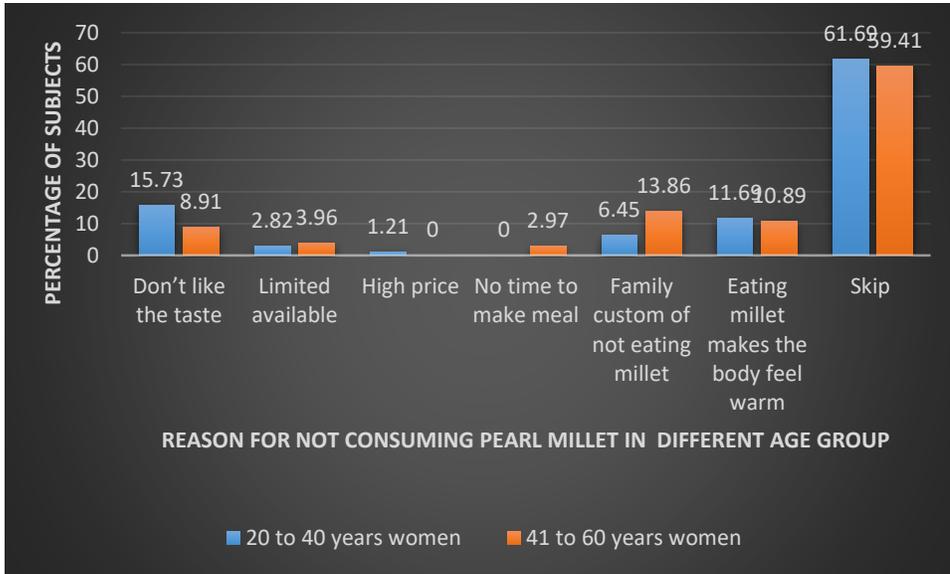


Figure 4.25.2: Percentage of subject showing Reason for Not Consuming Pearl Millet

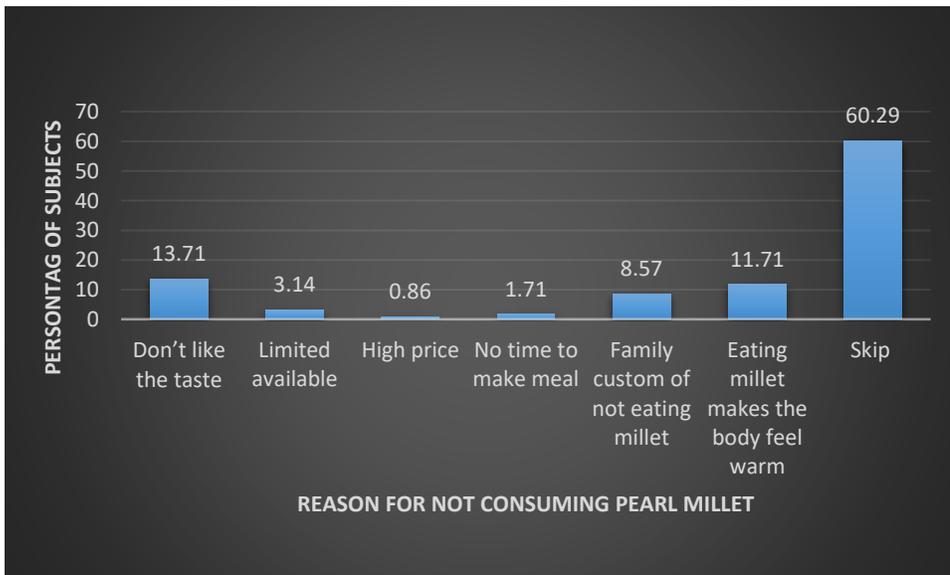


Figure 4.26.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Kodo Millet



Figure 4.26.2: Percentage of subject showing Reason for Not Consuming Kodo Millet

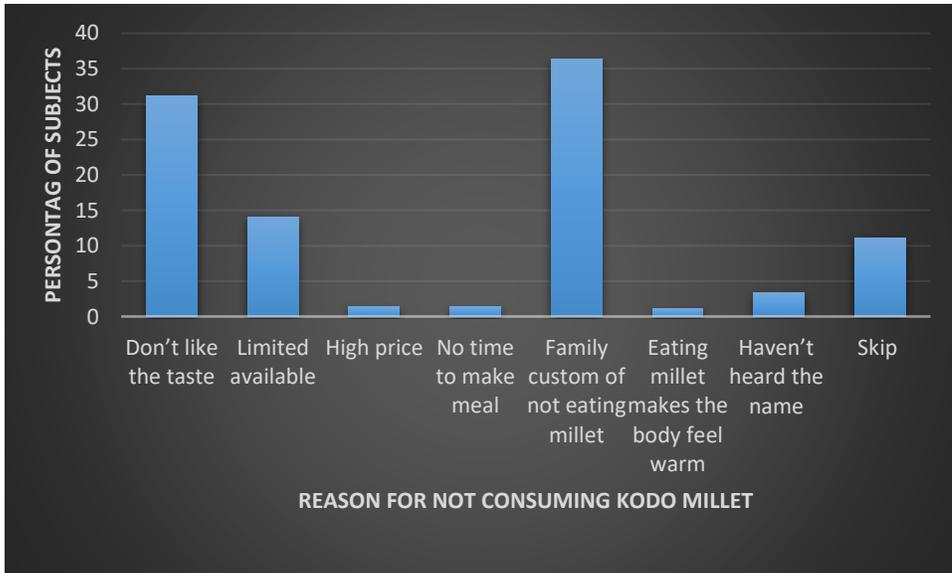


Figure 4.27.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Foxtail Millet

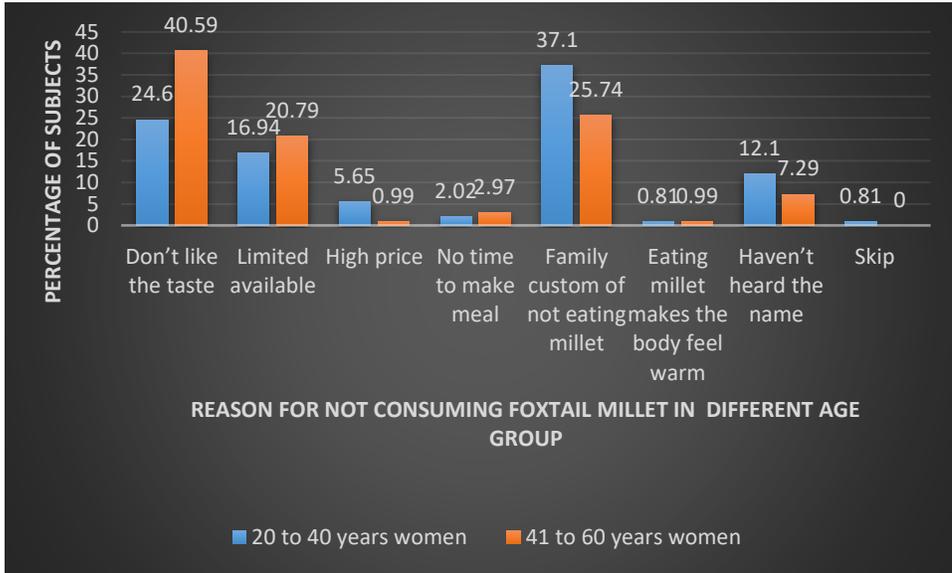


Figure 4.27.2: Percentage of subject showing Reason for Not Consuming Foxtail Millet

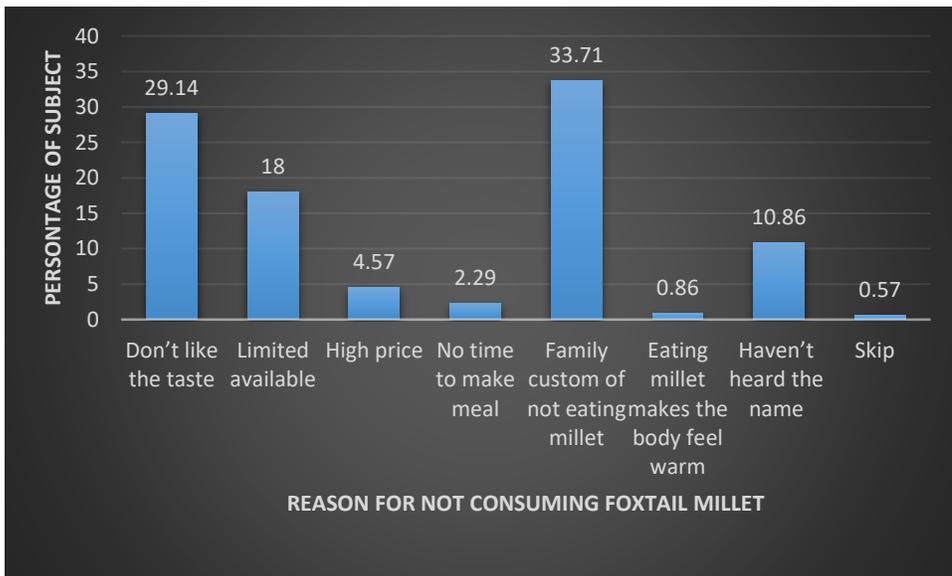


Figure 4.28.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Finger Millet

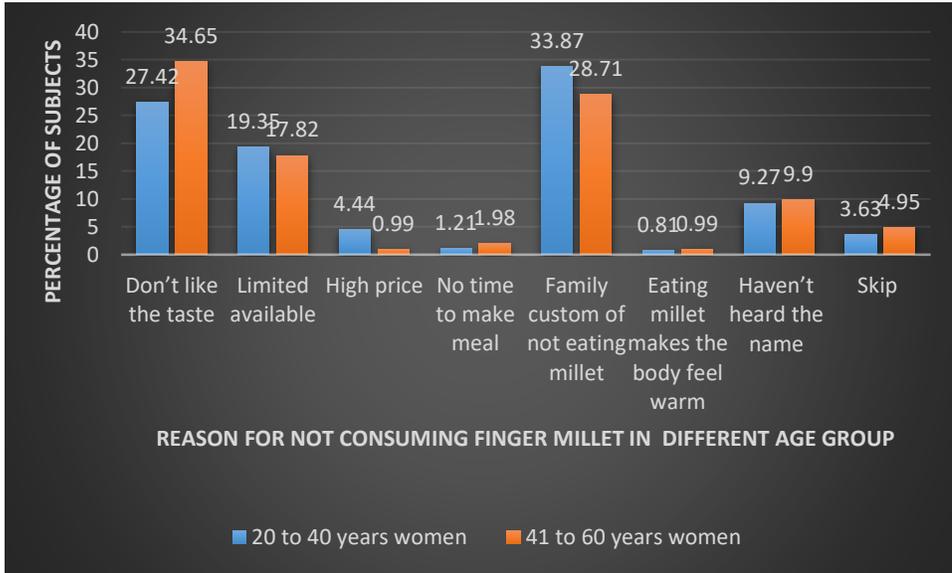


Figure 4.28.2: Percentage of subject showing Reason for Not Consuming Finger Millet

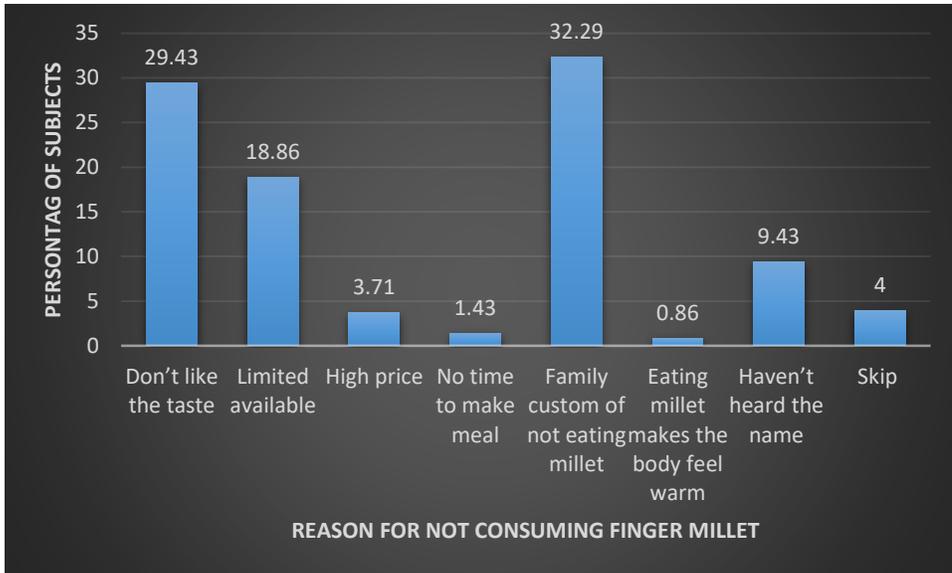


Figure 4.29.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Barnyard Millet

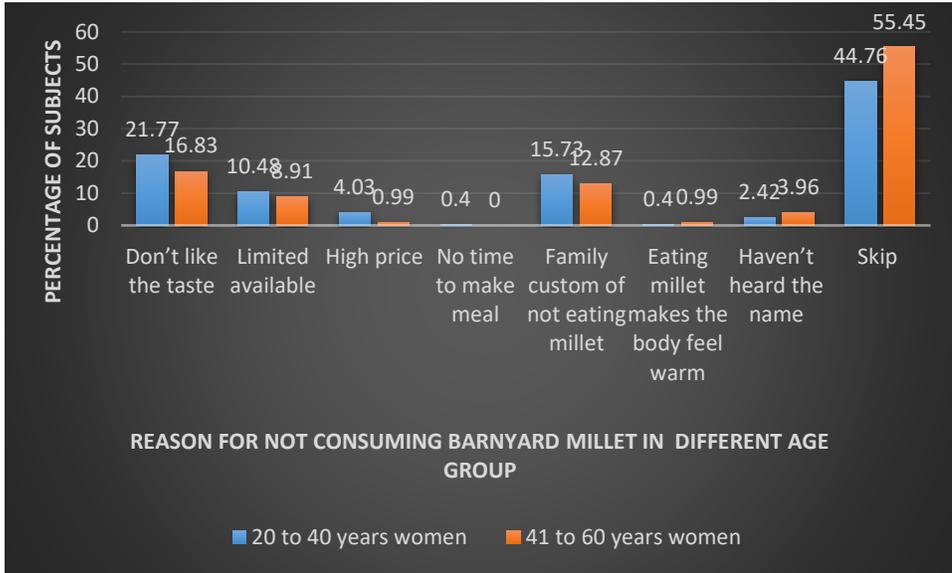


Figure 4.29.2: Percentage of subject showing Reason for Not Consuming Barnyard Millet

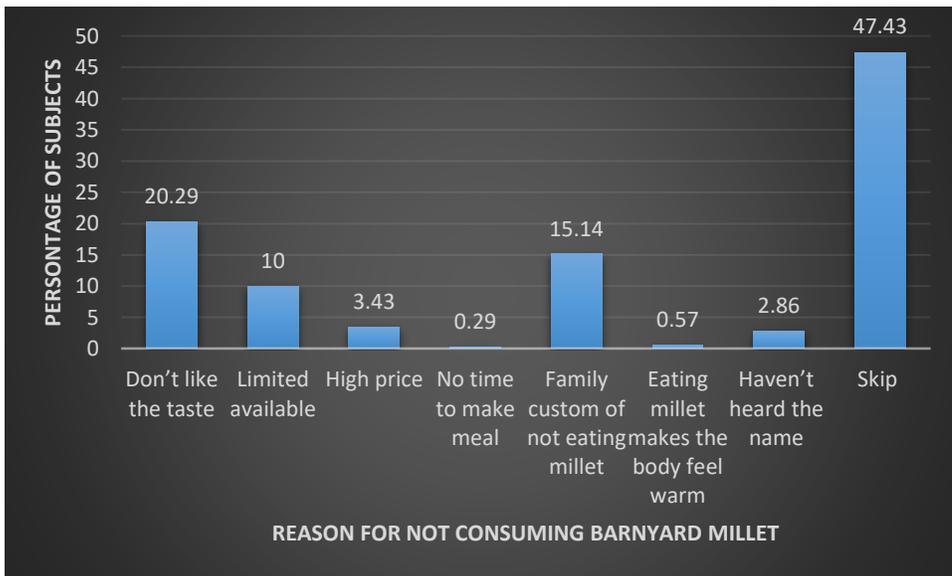


Figure 4.30.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Proso Millet

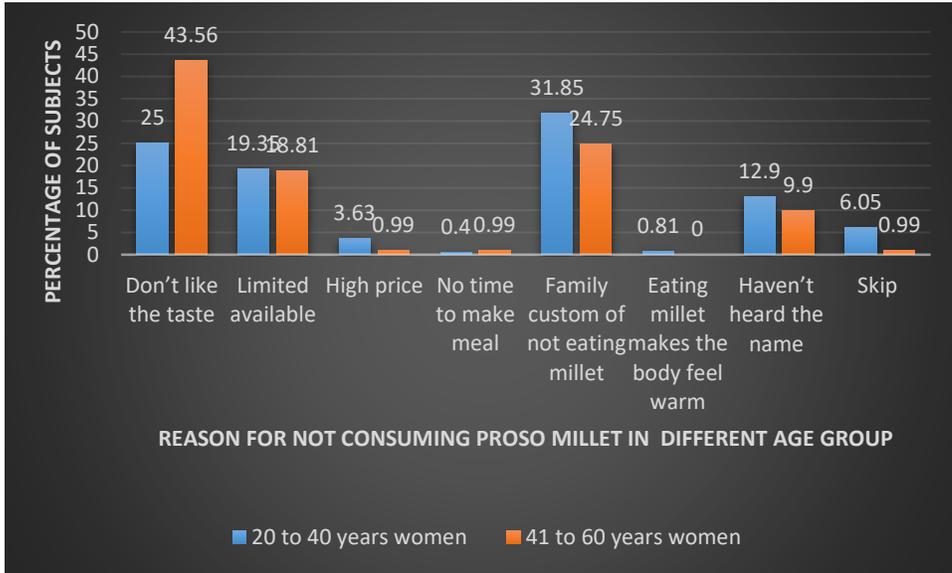


Figure 4.30.2: Percentage of subject showing Reason for Not Consuming Proso Millet



Figure 4.31.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Little Millet



Figure 4.31.2: Percentage of subject showing Reason for Not Consuming Little Millet

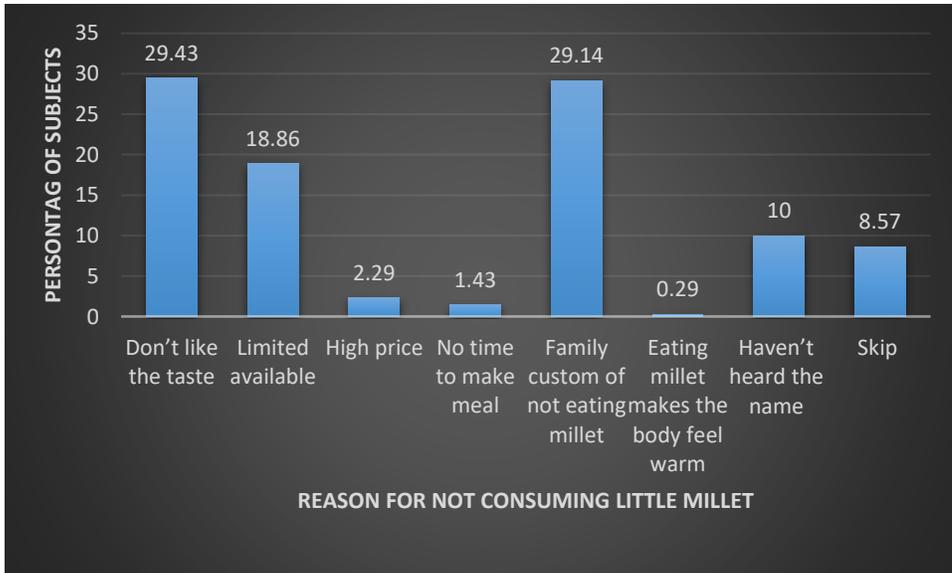


Figure 4.32.1: Percentage of subject (20 to 40 or 41 to 60 Yrs.) showing Reason for Not Consuming Amaranth Millet

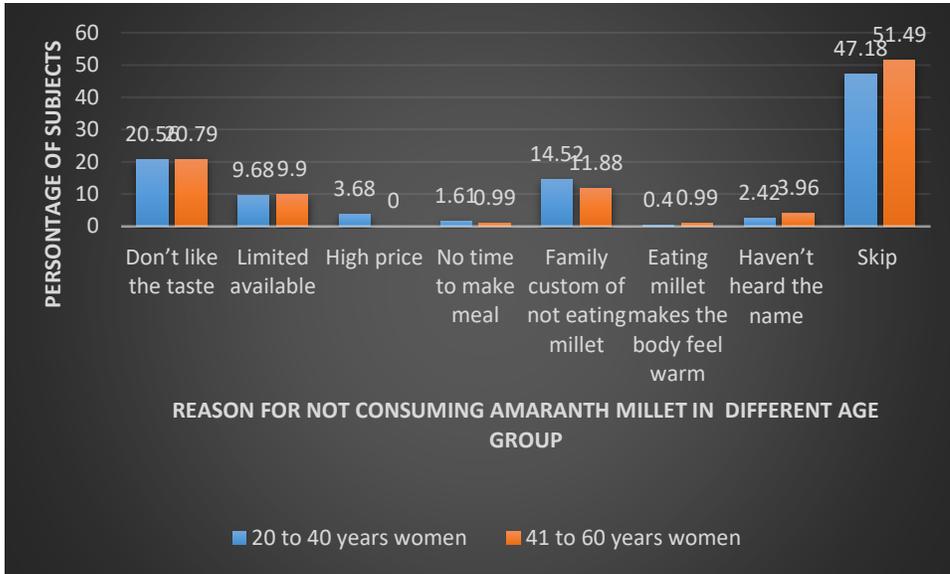


Figure 4.32.2: Percentage of subject showing Reason for Not Consuming Amaranth Millet



Highlight phase1:

- Majority subjects were Hindu and lived in nuclear families. Women aged 20 to 40 were better educated than women aged 41 to 60.
- According to BMI (Body Mass Index) 55.43% women were found normal. Almost 67% followed vegetarian diet and consume two full meals a day and one snack.
- 14.00% women was found diseases and 13.00% women had mild diseases.
- 64% women had good knowledge about millet and 34.86% women had fair knowledge and 1.40% women had poor knowledge.
- 26% of women have never consumed sorghum millet, 29.71% women have never consumed pearl millet. Barnyard and amaranth millet was non-frequent consumed and others kodo, foxtail, finger, proso and little millet were never consumed.
- Those with normal hemoglobin and BMI level were found with higher consumption of millet. Qualification and knowledge on millets were not found to be correlated
- Subject prepare millet flour and roasting as cooking method for consumption. more than half of the subject were normal as per BMI classification & more overweight or obese in older age group
- Kodo millet, foxtail millet, finger millet, little millet, proso millet, barnyard millet and amaranth millet recipe taste were not liked by subject along with limited availability nearby store, family custom of not eating millet and haven't heard the name were the main reasons for not frequently consumption.
- Majority subject not found with major and minor disease. winter season was found most comfortable for consumption of millet
- Inspire good to fair knowledge about millets of its health benefits, the consumption pattern was found very low.

PHASE-2 TOOL DEVELOPMENT

Intervention was given to 51 women in north zone. First, researcher learned the knowledge through quiz. After that, knowledge was given through booklet in the first month and WhatsApp information was given in the second month and again at the end of the second month, the knowledge of 51 women of North zone was checked through a quiz.

1st month: Booklet and brochure:

Booklet and brochure: General information of millets, its health benefits on physical-mental and overall health, availability of different kind of millets, recipe and other details will be provided.

2nd month: WhatsApp information

Reinforce information and message on the importance of millet consumption and their health benefits

2nd month end:

Quiz to judge the score by same questionnaire on knowledge on millets

PHASE 3 Experimental Design – Interventional Phase

Based on the data of phase 1 regarding the knowledge on millets, the necessary aspects were more focused and included in the NHE material like types of minor, nutrition benefits recipes how & form data collection on the of consumption. After baseless knowledge booklet was administered and explained thoroughly. Again at the start of 2nd month reinforcement was given using smart phone application of WhatsApp & end of 2nd month through post intervention quiz data was collected the data in presented in later.

Table 4.11: The pre and post intervention data about knowledge score for millets of woman

Range	Mean±sd score of the post intervention data about knowledge score for millets of Surat(urban)	
	Pre-Intervention (n51)	Post-Intervention (n51)
Poor (<9)	-	-
Fair (9-18)	13.5±2.77	14.75±1.89
Good (>18)	24±3.89	26.53±2.91

Table 4.12: Percentage of subject showing woman in different categories of knowledge score about millets

Range	North Zone of Surat(Urban)	
	Pre-Intervention	Post-Intervention
Poor (<9)		
Fair (9-18)	45.10 (23)	7.84 (04)

Figure in the parenthesis denotes number of subjects

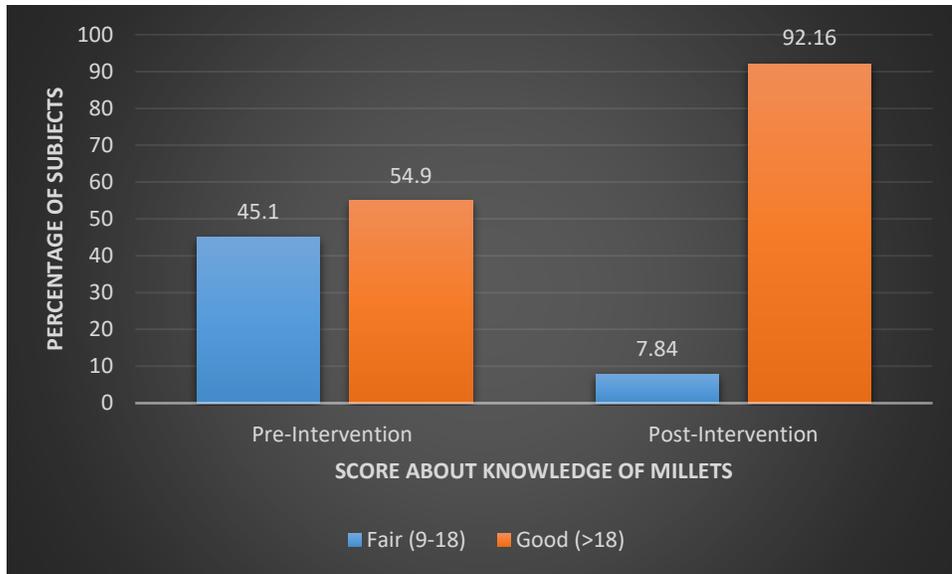
Good (>18)	54.90 (28)	92.16 (47)
chi square value = 18.183		chi square tab = 5.99
Calculated chi > tab chi therefore we reject null hypothesis.		
p value = 0.00011		a = 0.05
since p value < a , therefore we reject null hypothesis		

North zone was selected randomly for research for intervention in which (n-51) women were intervened. Women were given knowledge about millet and the score obtained from the tool was divided into three categories were designated poor, fair and good. The data revealed that women with good knowledge were 54.90% (n28) and women with fair knowledge were 45.10% (n- 23) After two months of intervention the post data of knowledge about millet was taken There was gain scores where women with good knowledge were 92.16%. Thus 37% subject increased in good category of knowledge depicted positive impact of NHE.

The chi square values suggest the accepted of Alternative hypothesis showing benefits effect on score of knowledge.

(Chauhan&Parmar2022)In the study done on education and consumption of the millets and nutritional status of women employees of The M.S University, it was found that the knowledge about millet was fair in women employees, whereas the awareness regarding the importance of millets was poor. It was observed that before investigation there were 11.53% of subject fell in poor category but after investigation there were no subject found in this category after the intervention was done. More subject were fell in good category after investigation done. Positive impact was seen in the subjects for knowledge about millets.

Figure 4.33: Percentage of Pre-Post Intervention Score about Knowledge of Millets



Highlights of Phase 2:

- Positive impact after intervention program on the knowledge of subject about millets with increased in 37% subject with good score.
- Nutrition health education a tool with into on number of health benefits have shown a beneficial effects in learning awareness among intervention study subject.

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS

Millets are important crops in the semiarid tropics of Asia and Africa. This crop is favored due to its productivity and short growing season under dry, high-temperature conditions. Millets are indigenous to many parts of the world. Millets are major food sources in arid and semiarid regions of the world, and feature in the traditional cuisine of many others... Millet consumption decreases triglycerides and C-reactive protein, thereby preventing cardiovascular disease. All millets are rich in that dietary fiber that has water absorbing and bulking property. It increases transit time of food in the gut which helps in reducing risk of inflammatory bowel disease and acts as detoxifying agent in the body.

The present study was planned with the following objective:

BROAD OBJECTIVE: Assessment of Nutritional Status, Knowledge and Consumption Pattern of Millets among the Women Population of Urban Surat: Impact Evaluation on Knowledge Gain by Nutrition Health Education (NHE)

Phase-1 experimental design- cross sectional data

Phase-2 tool development

Phase 3 experimental design – interventional phase

SPECIFIC OBJECTIVES:

- To assess demographic profiles of women population
- To assess anthropometric measurements
- To assess health status any disease past and present
- To assess diet profile
- To assess awareness of millet
- To assess Millet consumption pattern

Methodology summary

The study was approved by the institutional Ethics Committee for Human Research (IECHR), and further concluded after their approval under No. IECHR/FCSsc/MSc/2022/30.

The study was concluded on the women of the Urban Surat Baseline data was collected on all enrolled women of the urban Surat (N=350) on socio economic status, dietary profile, anthropometric measurements, nutritional status and knowledge and consumption pattern regarding to millets. Phase 2 was Millet's education tool development and phase 3 was the interventional phase

A summary of the finding are as follows:

Socio-Economic Status: Showing the subject had the highest number of Hindus and women living in nuclear families. In terms of socioeconomic status lower middle families were found to be the most followed by upper lower families. Female education was highest up to primary school and high school and females aged 20 to 40 years were more educated than females aged 41 to 60 years.

Anthropometric measurements: Total subject nutrition status data normal weight women were 55.43%, overweight women 26.57%, obese women 13.14% and underweight women 4.36%. Women aged 41 to 60 years were more overweight and obese than women aged 20 to 40 years.

Diet Profile: There were more women consuming a vegetarian diet. Most of them used to have two full meals and one breakfast a day. Consumption of < 2 liters of water per day was mostly. Found most of the subject used to prefer to eat outside once or twice a week.

Nutritional status: 45.83% women had normal hemoglobin (secondary data), and 87.71% women had no minor disease also 86% subject had no any major disease.

Knowledge of millets: Three scores of millet knowledge were given, namely good, fair and poor. In which majority of women had fair knowledge about millets.

Education and knowledge about millet: The data showed that women with good knowledge had education only up to primary school so there was no correlation found between knowledge and education

Use of millet: Majority of subjects used millet in powder (flour) form and cooked it by roasting method and used millet only in winter.

Consumption Pattern: There was frequent consumption of sorghum millet and pearl millet. Amaranth millet and barnyard millet were non-frequently consumed and kodo millet, foxtail millet, finger millet, proso millet, little millet were never consumed.

Reason for not consumption

- The two main reasons for not eating sorghum millet were not liking the taste which was and family custom of not eating millet was.
- The three main reasons for not eating pearl millet were who did not like the taste, who did not eat pearl millet because the body felt warm after eating it and because of family custom of not eating millet.
- The main three reasons for not eating kodo millet were of those who did not like taste, who did not eat because of limited availability and family custom of not eating millet which was.
- The main reasons for not eating foxtail millet, finger millet, proso millet and little millet were don't like the taste, limited availability, family custom of not eating millet and Haven't heard the name .
- The reason for not eating barnyard millet and amaranth was don't like taste, limited availability, family custom of not eating millet.

Phase 2

1st month: Booklet and brochure:

General information of millets, its health benefits on physical-mental and overall health, recipe and other details was provided.

2nd month: WhatsApp information

Reinforce information and messages on the importance of millet consumption and their health benefits.

2nd month end:

Quiz to judge the score by same questionnaire on knowledge of millets.

Phase 3

Before intervention 54.9% with good knowledge and 45.10% with fair knowledge about millet after intervention was 92.16% with good knowledge and 7.84% with fair knowledge rise in score good knowledge score was seen 37% of women.

Conclusion

Phase 1

- Majority of the women were Hindus and lived in nuclear family. Major occupation was businessman and economics status were lower middle class.
- People with normal BMI and hemoglobin consumed more millet compared to overweight and anemic women.
- Women with major to minor disease consumed more millet than women without disease.
- The main three reasons for not eating millet were lack of family custom, taste aversion, limited availability nearby store.
- Pearl and sorghum millets which were used daily were found to be used non-frequently and those who never used them were more.
- Majority had good knowledge among total women population.
- Less educated women also had good knowledge about millet and those who had more education also had good knowledge about millet so there was no correlation.
- Millet was mostly used in powdered form and roasted form to prepare its dishes. Only winter season was preferred to use millet by majority of the subjects.

- Participate booklet & WhatsApp information was well received by the subject
Positive impact was seen in 37% of the subjects with gain in good category of knowledge about millets

Future recommendation:

- Millets should be made available in the market with knowledge and consumers should be given for tasting few population production.
- Programs should be organized to make people aware about the importance of millet in various institutes like schools, universities, clubs, etc.
- At the local level one should start small programs for awareness like workshops, competition, hotel/restaurants where theme based menus can be prepared.
- The role of mass media in informing, influencing and motivating individuals, organizations and communities can be very important for the promotion of millet and its health benefits to the population.
- Integrated approaches and interventions such as provision of high quality seeds, development of decentralized processing infrastructure in support of small scale local entrepreneurs and NGO are key actions to promote small millet consumption and cultivation.
- Food fairs, demonstration fairs and seed exchange fairs should be organized regularly at farm sites to create greater awareness not only among farmers but also among government officials and general public.

Limitation

Age (>20), Place (Surat), Gender (women)

Future Scope

- Availability of different types of millets and their uses in different setups.
- Comparison of Consumption Patten of millet in rural and tribal population.
- To bridge the gap between consumer and millet product manufacturer, millet products should be promoted to the consumers by getting them tasted.

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Annexure

Annexure 1 (consent form)

Consent form

Informed consent form for female participating in the research Title: A study on Assessment of Nutritional Status and Knowledge on the consumption practice of Millets, among the women population of urban Surat impact evaluation by national health education (NHE)

Research Guide : Dr. Komal Chauhan

Research Student : Sonal Suva

: Assessment of Nutritional Status and Knowledge of consumption practice of millets, among the of female

Population Evaluation by nutrition health education (NHE) This informed consent form has two parts:

- Information sheet (to share information about the study with you)
- Certificate of consent (for signature if you agree that you may participate).

You will be given a copy of the full informed

Part 1: Information Sheet

Introduction

With the advances in modern science, the nutritional characteristics of millets have gradually been discovered. Almost all the millets are used for human consumption in most of the developing countries, but their use has been primarily restricted to animal feed in developed countries and urban areas of developing countries. Nutritional insecurity is a major threat to the world's population that is highly dependent on cereals - based diet, deficient in micronutrients. Millets are nutritionally superior as their grains contain high amount of proteins, essential amino acids, minerals, and vitamins.

Milletts have potential health benefits and epidemiological studies have showed that consumption of millets reduces risk of heart disease, protects from diabetes, improves digestive system, lowers the risk of cancer, detoxifies the body and increases immunity in respiratory health. But most of the time may be because of lack of awareness about millets and their health benefits its consumption may also affected. However nutrition health education (NHE) is an important tool for making people aware about the consumption of millets and their health benefits to human body, and just not let it limited to staple food for poor people or animal feeding.

Nutrition health education (NHE) is the key to cover not only large number of subjects to improve their health but also helps to improve their family member's health and nutritional status also , so on these bases in the study nutrition health education is given as an intervention for 3 months to the subjects . As per our Indian tradition woman of the house is main who really incorporated with whole family's food consumption pattern it would be more important to focus on them about giving information and make them aware about health benefits of millet consumption which is main high - lighted point of the intervention.

Purpose: To generate a database on nutritional status and knowledge on the consumption practice of millets among female population urban Surat.

Voluntary Participation: Participation in the study is entirely voluntary.

Procedure

You will have to participate in interview which will include questionnaire with respect to background information, socio - economic status, knowledge related to nutrition, food frequency and morbidity related questions followed by of fline.

If you do not wish to answer any of the questions during the interview, you may say so and the interviewer will move to the next question. The interview will take place in form of an of fline interview. The information recorded is confidential, and no one else except interviewers, staff and students of foods and Nutrition Department, The Maharaja Sayajirao University of Vadodara will have access to the information documented during your

interview. You will fill out a questionnaire which will be provided by interviewers as per of fine survey and collected by them only.

Benefits

As you are actively participating in this activity, with help of nutrition health education, you are gaining more knowledge about millets and their great health benefits.

Confidentiality

The data collected through interview and other investigations will be used for research purpose only. The name and personal information of the participant will be kept confidential. The data will be shared with staff and students of the Foods and Nutrition Department for academic purpose only.

Following parameters will be checked

- Height
- Weight
- Knowledge based questionnaire

Whom to contact Sonal Suva: 7265995619

Part 2: Certificate of consent.

I.....have read the information in this form. I was free to ask any questions and they have been answered, hereby give my consent to be included as a participant in this study.

1. I have read and understood this consent form and the information provided to me.
2. I have had the consent document explained to me.
3. I have been explained about the nature of the study.
4. My rights and responsibilities have been explained to me by the investigator.
5. I have advised about the risks associated with my participation in the study.

1. I agree to cooperate with the investigator and I will inform him / her immediately if I suffer unusual symptoms
2. I have not participated in any research study within the past _____month(s)
3. I hereby give the permission to the investigation to release the information obtained from me as result of participation in this study to the sponsors, regularly authorities, Government agencies, and the ethics committee. I understand that they may inspect my original records.
4. My identity will be kept confidential if my data are publically presented.
5. I have had my questions answered to my satisfaction
6. I have decided to be in the research study.

Date:

For participants:

Name and signature / thumb impression of the participant

(Or legal representative if participant who is not able to sign):

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by him / her have been answered correctly and to the best of my ability. I confirm that the individual has not been forced into giving consent, and the consent has been given freely and voluntarily.

.....

(Signature)

(Name: _____)

સંમતિ ફોર્મ

સંશોધનમાં ભાગ લેનારી મહિલાઓ માટે જાણકાર સંમતિ ફોર્મ શીર્ષક: રાષ્ટ્રીય આરોગ્ય શિક્ષણ (NHE) દ્વારા શહેરી સુરતની મહિલાઓની વસ્તીમાં પોષણની સ્થિતિનું મૂલ્યાંકન અને બાજરીના વપરાશ પ્રથા પર જ્ઞાન પરનો અભ્યાસ (NHE)

સંશોધન માર્ગદર્શક: ડૉ. કોમલ ચૌહાણ

સંશોધન વિદ્યાર્થી: સોનલ સુવા

નામ

: પોષણની સ્થિતિનું મૂલ્યાંકન અને સ્ત્રીઓમાં બાજરીના વપરાશની પ્રથાનું જ્ઞાન

પોષણ આરોગ્ય શિક્ષણ દ્વારા વસ્તી મૂલ્યાંકન (NHE) આ જાણકાર સંમતિ ફોર્મના બે ભાગ છે:

- માહિતી પત્રક (તમારી સાથે અભ્યાસ વિશેની માહિતી શેર કરવા માટે)
- સંમતિનું પ્રમાણપત્ર (જો તમે સંમત થાઓ છો કે તમે ભાગ લઈ શકો છો તો સહી માટે).

તમને સંપૂર્ણ માહિતીની નકલ આપવામાં આવશે

ભાગ 1: માહિતી પત્રક

પરિચય

આધુનિક વિજ્ઞાનની પ્રગતિ સાથે, બાજરીના પોષક લક્ષણો ધીમે ધીમે શોધવામાં આવ્યા છે. મોટાભાગના વિકાસશીલ દેશોમાં માનવ વપરાશ માટે લગભગ તમામ બાજરીનો ઉપયોગ કરવામાં આવે છે, પરંતુ તેનો ઉપયોગ મુખ્યત્વે વિકસિત દેશો અને વિકાસશીલ દેશોના શહેરી વિસ્તારોમાં પશુ આહાર પૂરતો મર્યાદિત છે. પોષક અસુરક્ષા એ વિશ્વની વસ્તી માટે એક મોટો ખતરો છે જે અનાજ - આધારિત આહાર, સૂક્ષ્મ પોષકતત્ત્વોની ઉણપ પર અત્યંત નિર્ભર છે. બાજરી પોષણની દૃષ્ટિએ શ્રેષ્ઠ છે કારણ કે તેના અનાજમાં પ્રોટીન, આવશ્યક એમિનો એસિડ, ખનિજો અને વિટામિન્સ વધુ પ્રમાણમાં હોય છે.

બાજરીના સંભવિત સ્વાસ્થ્ય લાભો છે અને રોગચાળાના અભ્યાસોએ દર્શાવ્યું છે કે બાજરીનું સેવન હૃદય રોગનું જોખમ ઘટાડે છે, ડાયાબિટીસથી રક્ષણ આપે છે, પાચનતંત્રમાં સુધારો કરે છે, કેન્સરનું જોખમ ઘટાડે છે, શરીરને ડિટોક્સિફાય કરે છે અને શ્વસન સ્વાસ્થ્યમાં રોગપ્રતિકારક શક્તિમાં વધારો કરે છે. પરંતુ મોટાભાગે બાજરી વિશે જાગૃતિના અભાવને કારણે અને તેના સેવનથી તેના સ્વાસ્થ્યને થતા ફાયદાઓ પર પણ અસર થઈ શકે છે. જો કે, પોષણ આરોગ્ય શિક્ષણ (NHE) એ લોકોને બાજરીના વપરાશ અને માનવ શરીર માટે તેના સ્વાસ્થ્ય લાભો વિશે જાગૃત કરવા માટેનું એક મહત્વપૂર્ણ સાધન છે, અને તેને માત્ર ગરીબ લોકો માટેના મુખ્ય ખોરાક અથવા પશુ આહાર પૂરતું મર્યાદિત ન રહેવા દો.

ન્યુટ્રિશન હેલ્થ એજ્યુકેશન (NHE) એ તેમના સ્વાસ્થ્યને સુધારવા માટે માત્ર મોટી સંખ્યામાં વિષયોને આવરી લેવાની યાવી છે પરંતુ તે તેમના પરિવારના સભ્યના સ્વાસ્થ્ય અને પોષણની સ્થિતિને પણ સુધારવામાં મદદ કરે છે, તેથી અભ્યાસમાં આ પાયા પર પોષણ આરોગ્ય શિક્ષણને હસ્તક્ષેપ તરીકે આપવામાં આવે છે. વિષયો માટે ૩ મહિના માટે. આપણી ભારતીય પરંપરા મુજબ ઘરની સ્ત્રી મુખ્ય છે જેણે ખરેખર આખા કુટુંબની ખાદ્ય વપરાશની પેટર્નનો સમાવેશ કર્યો છે, માહિતી આપવા વિશે તેમના પર ધ્યાન કેન્દ્રિત કરવું અને બાજરીના સેવનના સ્વાસ્થ્ય લાભો વિશે તેમને જાગૃત કરવું વધુ મહત્વપૂર્ણ છે જે મુખ્ય ઉચ્ચ - પ્રકાશિત બિંદુ છે.

હેતુ: શહેરી સુરતની સ્ત્રી વસ્તીમાં બાજરીના વપરાશની પ્રથા પર પોષણની સ્થિતિ અને જ્ઞાન પર ડેટાબેઝ બનાવવો.

સ્વૈચ્છિક ભાગીદારી: અભ્યાસમાં સહભાગિતા સંપૂર્ણપણે સ્વૈચ્છિક છે.

પ્રક્રિયા

તમારે ઇન્ટરવ્યુમાં ભાગ લેવો પડશે જેમાં પૃષ્ઠભૂમિની માહિતી, સામાજિક-આર્થિક સ્થિતિ, પોષણ સંબંધિત જ્ઞાન, ફૂડ ફીક્વન્સી અને રોગિષ્ટતા સંબંધિત પ્રશ્નો અને ઓફલાઇન પછીના પ્રશ્નોના સંદર્ભમાં પ્રશ્નાવલીનો સમાવેશ થશે.

જો તમે ઇન્ટરવ્યુ દરમિયાન કોઈપણ પ્રશ્નોના જવાબ આપવા માંગતા ન હોવ, તો તમે આમ કહી શકો છો અને ઇન્ટરવ્યુઅર આગળના પ્રશ્ન પર જશે. ઇન્ટરવ્યુ ઓફલાઇન ઇન્ટરવ્યુના સ્વરૂપમાં થશે. નોંધવામાં આવેલી માહિતી ગોપનીય છે, અને ઇન્ટરવ્યુ લેનારાઓ, સ્ટાફ અને ફૂડ એન્ડ ન્યુટ્રિશન વિભાગના વિદ્યાર્થીઓ સિવાય અન્ય કોઈને તમારા ઇન્ટરવ્યુ દરમિયાન દસ્તાવેજીકૃત

માહિતી વડોદરાની મહારાજા સયાજીરાવ યુનિવર્સિટીની એક્સેસ હશે નહીં. તમે એક પ્રશ્નાવલી ભરશો જે ઓફલાઇન સર્વેક્ષણ મુજબ ઇન્ટરવ્યુઅર દ્વારા પ્રદાન કરવામાં આવશે અને ફક્ત તેમના દ્વારા જ એકત્રિત કરવામાં આવશે.

લાભો

જેમ જેમ તમે આ પ્રવૃત્તિમાં સક્રિયપણે ભાગ લઈ રહ્યા છો, પોષણ સ્વાસ્થ્ય શિક્ષણની મદદથી, તમે બાજરી અને તેના મહાન સ્વાસ્થ્ય લાભો વિશે વધુ જ્ઞાન મેળવી રહ્યા છો.

ગોપનીયતા

ઇન્ટરવ્યુ અને અન્ય તપાસ દ્વારા એકત્રિત કરવામાં આવેલ ડેટાનો ઉપયોગ માત્ર સંશોધન હેતુ માટે કરવામાં આવશે. ભાગ લેનારનું નામ અને અંગત માહિતી ગુપ્ત રાખવામાં આવશે. આ ડેટા માત્ર શૈક્ષણિક હેતુ માટે ખોરાક અને પોષણ વિભાગના સ્ટાફ અને વિદ્યાર્થીઓ સાથે શેર કરવામાં આવશે.

નીચેના પરિમાણો તપાસવામાં આવશે

- ઊંચાઈ
- વજન
- જ્ઞાન આધારિત પ્રશ્નાવલી

સોનલ સુવા કોનો સંપર્ક કરવો: 72659956

ભાગ 2: સંમતિનું પ્રમાણપત્રમેં આ ફોર્મમાંની માહિતી વાંચી છે .હું કોઈપણ પ્રશ્નો પૂછવા માટે મુક્ત હતો અને તેમને જવાબ આપવામાં આવ્યો છે, આથી આ અભ્યાસમાં સહભાગી તરીકે સામેલ થવા માટે મારી સંમતિ આપો.

1. મેં આ સંમતિ ફોર્મ અને મને આપેલી માહિતી વાંચી અને સમજી લીધી છે.
2. મારી પાસે સંમતિ દસ્તાવેજ મને સમજાવવામાં આવ્યો છે.
3. મને અભ્યાસની પ્રકૃતિ વિશે સમજાવવામાં આવ્યું છે.

4. તપાસકર્તા દ્વારા મારા અધિકારો અને જવાબદારીઓ મને સમજાવવામાં આવી છે.
5. મેં અભ્યાસમાં મારી સહભાગિતા સાથે સંકળાયેલા જોખમો વિશે સલાહ આપી છે.1. હું તપાસકર્તાને સહકાર આપવા માટે સંમત છું અને જો હું અસામાન્ય વલ્લણો અનુભવું તો હું તેને/તેણીને તરત જ જાણ કરીશ
2. મેં છેલ્લા _____ મહિના) ઓ (માં કોઈપણ સંશોધન અભ્યાસમાં ભાગ લીધો નથી
3. હું આ દ્વારા આ અભ્યાસમાં ભાગ લેવાના પરિણામે મારી પાસેથી પ્રાપ્ત માહિતીને પ્રાયોજકો, નિયમિતપણે સત્તાવાળાઓ, સરકારી એજન્સીઓ અને એથિક્સ કમિટીને પ્રકાશિત કરવાની પરવાનગી આપું છું .હું સમજું છું કે તેઓ મારા મૂળ રેકોર્ડની તપાસ કરી શકે છે.
4. જો મારો ડેટા સાર્વજનિક રીતે રજૂ કરવામાં આવશે તો મારી ઓળખ ગુપ્ત રાખવામાં આવશે.
5. મેં મારા પ્રશ્નોના જવાબ મારા સંતોષ માટે આપ્યા છે
6. મેં સંશોધન અભ્યાસમાં ભાગ લેવાનું નક્કી કર્યું છે.

તારીખ:

સહભાગીઓ માટે:

સહભાગીનું નામ અને હસ્તાક્ષર / અંગૂઠાની છાપ(અથવા કાનૂની પ્રતિનિધિ જો સહભાગી જે સહી કરવા સક્ષમ ન હોય તો:(

હું પુષ્ટિ કરું છું કે સહભાગીને અભ્યાસ વિશે પ્રશ્નો પૂછવાની તક આપવામાં આવી હતી, અને તેણી/તેણી દ્વારા પૂછવામાં આવેલા તમામ પ્રશ્નોના સાચા અને મારી શ્રેષ્ઠ ક્ષમતા મુજબ જવાબ આપવામાં આવ્યા છે .હું પુષ્ટિ કરું છું કે વ્યક્તિને સંમતિ આપવા માટે ફરજ પાડવામાં આવી નથી, અને સંમતિ મુક્તપણે અને સ્વેચ્છાએ આપવામાં આવી છે.

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Annexure 2

QUESTIONNAIRE

Baseline preforma / demographic status:

1. Name: Date:
2. Date of Birth:
3. Age (yrs.):
4. Age of menarche:
5. Menstrual cycle:

(A) Regular

(b) Irregular
6. Address:
7. Contact Number:
8. Religion:

(a) Hindu (b) Muslim (c) Christian (d) Any other, Specify
9. Level of education:
10. Qualification
(a) HSC (b) Undergraduate (c) Graduate (d) Post Graduate
11. Type of family:
(a) Nuclear (b) Joint

12. Total family members:

(a) Adults :

(b) Children :

(c) Total :

13. Family income per month (Rest)

- A. $\geq 184,376$
- B. 92,191-184,370
- C. 68967-92185
- D. 46095-68961
- E. 27654-46089
- F. 9232-27648
- G. ≤ 9226

NUTRITIONAL HEALTH STATUS

(Reported Data)

1. Height (cm):
2. Weight (kg):
3. BMI (kg/m²):
4. Hemoglobin (g/dl) : secondary data from last 6 months medical report
5. Present have any disease

Major

Minor

(a) Diabetes

(a) Constipation

- (b) Hypertension
 - (c) Heart Disease
 - (d) Lungs Disease
 - (e) Renal Disease
 - (f) Bone Disease
- (b) gas
 - (c) leg pain

6. Past have any disease
Minor major

DIET PROFILE

1. Type of diet:

(a) Vegetarian (b) Ovo -vegetarian (c) Non-vegetarian

2. Total meals on regular days (full or half):

(a) 2 (b) 3 (c) 4

3. Total snacks on regular days (only items):

(a) 1 (b) 2 (c) 3 (d) do not eat

4. How often do you eat outside?

(a) Daily (b) frequent (1/ more time a weeks) (c) moderate (2/3 time in a month) (d) never or up (2 to 3 time in a year)

5. Fluid intake / day (winter):

(a) <2L (b) 2-5L (c) >5

KNOWLEDGE BASED QUESTIONS

1. Do you know what millets are?

(a) Yes (b) no

2 .Do you think millets are healthy?

(a) Yes (b) No (c) May be (d) Don't Now

3. Do you know the following millets?

Millets Name	Yes/No
Sorghum millet(jowar)	
Pearl millet(bajra)	
Kodo millet(kodri)	
Foxtail millet(ralkang)	
Finger millet(nachani/nagli)	
Barnyard millet(samo)	
Proso millet(varagu)	
Little millet(kangani)	
Amaranth seeds(rajagaro)	

4. Do you know the various millets available in market? (a)Yes (b) no

5. Do you know millet are available in market? (a) Yes (b) no

6. Do you know millets take less time for cooking? (a) Yes (b) no

7. Do you know millets are consumable at all ages (infants to old people)?(a) Yes
(b) no

8. 8. Do you know millets are easy to store?(a) Yes (b) no

9. Do you know by using millets you are helping environment, agriculture farming?
(a)Yes (b) no

10. Do you know millets are good for weight management? (a) Yes (b) no

11. What you think about millet for digestion?

(A) Easy to digest (b) heavy to digest

12. Do you know millets are good source of proteins, calcium, fiber etc. as compare to wheat and rice?

(a) Yes (b) no

13. Are millets suitable for human consumption? (a) Yes (b) no

14. Do you know the nutritional benefits of millets as compared to wheat and rice?

(a) Yes (b) No

15. Are seasons really affecting millet consumption? (a) Yes (b) no

16. Do you know millets can be incorporate with your daily meal? (a) Yes (b) no

17. Do you know millets have more diversity across all? (a) Yes (b) no

18. Do you prefer physiological changes in your body to take millet during pregnancy and lactating etc.?

(a) Yes (b) no

19. Do you think that eating millet will have the following benefits?

- Good for women
- high iron
- high calcium
- good for babies
- good for diabetes

- good for cancer
(a) Yes (b) no

20. Doctor suggested you to take millet, so are you taking it?

(a) Yes (b) no

21. Do you know millets are gastro protective? (a) Yes (b) no

22. Do you know that millets boots your immunity? (a) Yes (b) no

23. Do you know millets can prevents asthma? (a) Yes (b) no

24. Do you know millets have more diversity across all? (a) Yes (b) no

25. Do you know millets are good for weight management? (a) Yes (b) no

26. Do you know millets good for bone, hair, skin health? (a) Yes (b) no

27. Are u aware that millet has high fiber so need to consume more water after it? (a) Yes
(b) no

29. Do you think millets are necessary for adequate nutrition in our diet? (a) Yes (b) no

30. Do you think taking millets can have any benefits in the body? (a) Yes (b) no

CONSUMPTION PATTERN

1. Frequency of consumption of millets

Millets Name	Daily	frequent (1/ more time a weeks)	moderate (2/3 time in a month)	never or up (2 to 3 time in a year)	Never eat

Sorghum millet(jowar)					
Pearl millet(bajra)					
Kodo millet(kodri)					
Foxtail millet(ralkang)					
Finger millet(nachani/nagli)					
Barnyard millet(samo)					
Proso millet(varagu)					
Little millet(kangani)					
Amaranth seeds(rajagaro)					

2. How long have you been taking millets in your diet?

3. Which forms are you use millets

(a) Powder (b) whole (c) reedy to mixed (d) other

4. Which forms are you cooked

(a) Roasting (roti/chapatti/pops) (b) baking (biscuits) (c) fermented (Dosa) (d) fry (bhajiya) (e) by soaking or sprouting (f) boiled (khichadi / soup)

5. In which season do you prefer to eat millet?

(a) Winter Summer Monsoon (b) winter & monsoon (c) winter

6. Reasons for not consuming millets

Millets Name	Don't like the taste	limited availability	high price	cooking time	family custom of not eating millets	Other reasons

Sorghum millet(jowar)						
Pearl millet(bajra)						
Kodo millet(kodri)						
Foxtail millet(ralkang)						
Finger millet(nachani/nagli)						
Barnyard millet(samo)						
Proso millet(varagu)						
Little millet(kangani)						
Amaranth seeds(rajagaro)						

પ્રશ્નાવલી

બેઝવાઇનપ્રીફોર્મા / ડેમોગ્રાફીસ્ટેટસ:

1. નામ: તારીખ:

2. જન્મતારીખ:

3. ઉંમર (વર્ષ):

4. માસિકસ્રાવનીઉંમર:

5. માસિકચક્ર:

(a) નિયમિત (b) અનિયમિત

6. સરનામું:

7. સંપર્કનંબર:

8. ધર્મ:

(a) હિન્દુ (b) મુસ્લિમ (c) ખ્રિસ્તી (d) અન્યકોઈપણ, સ્પષ્ટકરો

9. શિક્ષણનુંસ્તર:

10. લાયકાત

(a) HSC (b) અંડરગ્રેજ્યુએટ (c) સ્નાતક (d) અનુસ્નાતક

11. કુટુંબનો પ્રકાર:

(a) ન્યુક્લિયર (b) સંયુક્ત

12. પરિવારના કુલ સભ્યો:

(a) પુખ્ત (b) બાળકો (c) કુલ

13. દરમિયાને કુટુંબની આવક (બાકીના)

A. $\geq 184,376$

B. 92,191-184,370

C. 68967-92185

D. 46095-68961

E. 27654-46089

F. 9232-27648

G. ≤ 9226

પોષક આરોગ્ય સ્થિતિ (અહેવાલ કરેલ ડેટા)

1. ઊંચાઈ (સેમી):

2. વજન (કિલો):

3. BMI (kg/m²):

4. હિમોગ્લોબિન (g/dl): છેલ્લા 6 મહિનાના તબીબી અહેવાલમાંથી ગૌણ ડેટા

5. હાલમાં કોઈ રોગ છે.

- (a) ડાયાબિટીસ (a) કબજિયાત
(b) હાયપરટેન્શન (b) ગેસ
(c) હૃદયરોગ (c) હાથ પગ દુખવા
(d) ફેફસાનારોગ
(e) રેનલરોગ
(f) બૂનરોગ

ડાયેટપ્રોફાઇલ

1. આહારનો પ્રકાર:

(a) શાકાહારી (b) ઓવો - શાકાહારી (c) માંસાહારી

2. નિયમિત દિવસોમાં કુલ ભોજન (સંપૂર્ણ અથવા અડધા મીલ):

(a) 2 (b) 3 (c) 4

3. નિયમિત દિવસોમાં કુલ કેટલી વખત નાસ્તો લો છો?

(a) 1 (b) 2 (c) 3 (d) ખાતા જ નથી

4. તમે કેટલી વખત બહાર નું ખાઓ છો?

(a) દૈનિક (b) વારંવાર (અઠવાડિયામાં 1/ વધુવખત) (c) મધ્યમ (એકમહિનામાં 2/3 વખત) (d) ક્યારેયનહીં અથવા વધુ (વર્ષમાં 2 થી 3 વખત)

5. પ્રવાહીનું સેવન દિવસ કેટલી વખત કરો છો? (શિયાળો)

(a) <2L (b) 2-5L (c) >5

ધાન્ય ના જ્ઞાનઆધારિત પ્રશ્નો

1. શું તમે જાણો છો કે ધાન્ય શું છે?

a) હા (b) ના

2. શું તમને લાગે છે કે ધાન્ય એ પૌષ્ટિક છે?

a) હા (b) ના (c) હોઈશકે (d) હવેનહીં

3. શું તમે નીચે આપેલા ધાન્ય ને જાણો છો?’

મિલેટનાનામ	હા/ના
જુવારમિલેટ(જુવાર)	
મોતીમિલેટ(બાજરી)	
કોડોમિલેટ(કોદરી)	
ફોક્સટેલમિલેટ (રાલકાંગ)	
ફિંગરમિલેટ (રાગી)	
બાર્નયાર્ડમિલેટ(સમો)	
પ્રોસોમિલેટ(વરાગુ)	
નાનીમિલેટ(કાંગ)	
આમળાનાબીજ (રાજગરો)	

4. શું તમને લાગે છે કે આ તમામ મિલેટ એ બજારમાં અવેલેબલ છે? _____

5. શું તમને લાગે છે કે ધાન્ય બજાર માં અવેલેબલ છે?

(a) હા (b) ના

6. શું તમે જાણો છો કે ધાન્ય રાંધવામાં ઓછો સમય લે છે?

(a) હા (b) ના

7. શું તમે જાણો છો કે ધાન્ય દરેક ઉંમરે વાપરી શકાય છે? (બાળકોથી લઈને વૃદ્ધ લોકો સુધી)?

(a) હા (b) ના

8. શું તમે જાણો છો કે ધાન્ય નો સંગ્રહ કરવો સરળ છે?

(a) હા (b) ના

9. શું તમે જાણો છો કે ધાન્યનો ઉપયોગ કરીને તમે પર્યાવરણ, કૃષિ ખેતીમાં પણ મદદ કરી શકો છો?

(a) હા (b) ના

10. શું તમે જાણો છો કે ધાન્ય વજન જાળવવા માટે પણ સારું છે?

(a) હા (b) ના

11. પાચન માટે તમે ધાન્ય વિશે તમે શું વિચારો છો?

(a) પચવામાં સરળ (b) પચવામાં ભારે

12. શું તમે જાણો છો કે ઘઉં અને ચોખ્ખાની સરખામણીમાં ધાન્ય એ પ્રોટીન, કેલ્શિયમ, ફાઇબર વગેરેનો સારો સ્ત્રોત છે?

(a) હા (b) ના

13. શું તમને લાગે છે કે ધાન્ય વ માનવ વપરાશ માટે યોગ્ય છે?

(a) હા (b) ના

14. શું તમે ઘઉં અને ચોખ્ખાની સરખામણી માં ધાન્યના પોષક ફાયદા ઓ જાણો છો?

(a) હા (b) ના

15. શું ઋતુઓ ખરેખર ધાન્ય ના વપરાશને અસર કરે છે?

(a) હા (b) ના

16. શું તમે જાણો છો કે ધાન્યને તમારા રોજિંદા ભોજનમાં સામેલ કરી શકાય છે?

(a) હા (b) ના

17. શું તમે જાણો છો કે દરેક ધાન્યમાં અલગ અલગ વિવિધતા છે?

(a) હા (b) ના

18. શું તમે મિલેટની પોષક રચના જાણો છો?

(a) હા (b) ના

19. શું તમને લાગે છે કે ધાન્ય ખાવાથી નીચેના ફાયદા થશે?

• સ્ત્રીઓ માટે સારું

• ઉચ્ચ આયર્ન

• ઉચ્ચ કેલ્શિયમ

• બાળકો માટે સારું

• ડાયાબિટીસ માટે સારું

• કેન્સર માટે સારું

(a) હા (b) ના

20. ડોક્ટરે તમને ધાન્ય લેવાનું સૂચન કર્યું, છે આથી તમે ધાન્ય આહાર મા લો છો?

(a) હા (b) ના

21. શું તમે જાણો છો કે ધાન્ય માં ગેસ્ટ્રો પ્રોટેક્ટિવ છે? (a) હા (b) ના

22. શું તમે જાણો છો કે બાજરી તમારી રોગપ્રતિકારક શક્તિને વધારે છે? (a) હા (b) ના

23. શું તમે જાણો છો કે ધાન્ય અસ્થમાને રોકી શકે છે? (a) હા (b) ના

24. શું તમે જાણો છો કે ધાન્યમાં બધામાં વધુ વિવિધતા છે? (a) હા (b) ના

25. શું તમે જાણો છો કે બ વજન વ્યવસ્થાપન માટે સારી છે? (a) હા (b) ના

26. શું તમે જાણો છો કે ધાન્ય હાડકાં, વાળ, ત્વચાના સ્વાસ્થ્ય માટે સારી છે

(a) હા (b) ના

27. શું તમે જાણો છો કે ધાન્યમાં ઉચ્ચ ફાઇબર હોય છે તેથી તેના પછી વધુ પાણી પીવાની જરૂર છે?

(a) હા (b) ના

29. શું તમને લાગે છે કે આપણા આહારમાં પૂરતા પોષણ માટે ધાન્ય જરૂરી છે?

(a) હા (b) ના

30. શું તમને લાગે છે કે ધાન્ય લેવાથી શરીરમાં કોઈ ફાયદો થઈ શકે છે?

(a) હા (b) ના

વપરાશપેટન

1. ધાન્ય કેટલી વખત વાપરો છો?

નાનામ	દૈનિકવારંવાર	(અઠવાડિયામાં 1/ વધુવખત)	(મહિનામાં 2/3 વખત)	(વર્ષમાં 2 થી 3 વખત)	ક્યારેય નહીં
જુવારમિલેટ (જુવાર)					
મોતીમિલેટ (બાજરી)					
કોડોમિલેટ (કોદરી)					
ફોક્સટેલમિલેટ (રાલકાંગ)					

ફિંગરમિલેટ (રાગી)					
બાર્નયાર્ડમિલેટ (સમો)					
પ્રોસોમિલેટ (વરાગુ)					
નાનીમિલેટ (કાંગણી)					
આમળાનાબીજ (રાજગરો)					

2. તમે તમારા આહારમાં કેટલા સમયથી ધાન્ય લો છો?

3. તમે ધાન્યને કયા સ્વરૂપ માં ઉપયોગ કરો છો?

(a) પાવડર (b) આખા અનાજ (c) રેડી ટુ કૂક (d) અન્ય સ્વરૂપ

4. તમે કયા સ્વરૂપ ધાન્ય ને રાંધો છો?

(a) શેકીને (રોટલી/ચપાટી/પોપ્સ) (b) બેકિંગ પ્રોડક્ટ (બિસ્કીટ) (c) ફર્મેન્ટેડ પ્રોડક્ટ આથો (ડોસા)

(d) ફાય (ભજીયા) (e) પલાળીને અથવા ફણગાવીને કરીને (f) બાફેલી (ખીચડી/સૂપ)

5. તમે કઈ ઋતુમાં મિલેટ ખાવાનું વધારે પસંદ કરો?

(A) શિયાળુ ઉનાળુ ચોમાસું (B) શિયાળો અને ચોમાસું (C) શિયાળો

6. ધાન્ય ન ખાવાના કારણો

મિલેટનાનામ	ટેસ્ટપસંદન થી	મર્યાદિત પ્રાપ્યતા	ઉંચીકિં મત	જમવાનુંબ નાવાનોસ મય	બાજરી ન ખાવાનો કૌટુંબિક રિવાજ	અન્ય કાર ણોસર
જુવારમિલેટ (જુવાર)						

મોતીમિલેટ (બાજરી)						
કોડોમિલેટ (કોદરી)						
ફોક્સટેલમિલેટ (રાલકાંગ)						
ફિંગરમિલેટ (રાગી)						
બાર્નયાડમિલેટ (સમો)						
પ્રોસોમિલેટ (વરાગુ)						
નાનીમિલેટ (કાંગણી)						
આમળાનાબી જ (રાજગરો)						

Annexure 3 (Booklet-Gujarati)



ધાન્ય સૂક્ષ્મ પોષકતત્ત્વો તેમજ ખનીજનું (મિનરલ્સ) પાવર હાઉસ કહેવામાં આવે છે, વિવિધ પ્રકારની ધાન્યમાં વિવિધ વિશેષતાઓ હોય છે. ધાન્ય વજન વ્યવસ્થાપન, ડાયાબિટીસની સ્થિતિ, બ્લડ-પ્રેશર, એનિમિયા અને કુપોષણનો પ્રતિકાર કરવામાં મદદરૂપ છે. બાજરી એ 21 સૂક્ષ્મ પોષકતત્ત્વોનો સમૃદ્ધ સ્ત્રોત છે, એન્ડોસ્પર્મનું બાહ્ય પડ અને ઉચ્ચ પ્રોટીન, ચરબી, કેલ્શિયમ અને ખનિજો ધરાવતા બીજનો ગર્ભ; નાની ધાન્ય આમ કુપોષણના વ્યાપક વ્યાપને દૂર કરવામાં મદદ કરી શકે છે. વધુમાં, ધાન્યમાં રોગો અને જીવાતોનું જોખમ ઓછું હોય છે. ધાન્ય વૃદ્ધિ માટે જંતુનાશકો અને રાસાયણિક ખાતરોના ન્યૂનતમ ઉપયોગની જરૂર પડે છે.

વિવિધ પ્રકારના અવેલેબલ ધાન્ય ના નામ

ધાન્ય ના પ્રકાર	હિન્દી નામ	ગુજરાતી નામ
Sorghum	જવાર	જુવાર
Pearl millet	બાજરા	બાજરી
Foxtail millet	કંગની	લાલ કાંગ
Finger millet	રાગી	બાવતો

Little millet	कुटकिक	मोरयो
Kodo millet	कोदरा	कोदरी
Proso millet	बैरिक	वरी
Barnyard millet	सामा	सामा
Amaranth millet	राजगरा	राजगरो

100 ग्राम दही योषा अने घडिनी पोषण रचनानी तुलनामां धान्यमां रहेवा पोषक तत्वो

धान्य	कार्बोहाइड्रेट (g)	प्रोटीन (g)	यरपी (g)	शक्ति (kcal)	केल्शि यम (mg)	Iron (mg)	डायेटरी फाइबर (g)	इस्कर स (Mg)
शरीरमां अनेनर्जी माटे जरूरी छे	वृद्धि माटे स्नायु माटे जरूरी छे	अनेनर्जी आपे छे			डाडका माटे जरूरी छे	लोडी माटे जरूरी छे	संतोषवा अने कोन्सटीपेशन जेवी बीमारीओ माटे मद्दरूप थाय छे	दांत अने पेढा, आर्थां छटिस माटे महत्व नुं छे.
बाजरी	61.8	10.9	5.43	347	27.4	6.4	11.5	289
जुवार	67.7	9.9	1.73	334	27.6	3.9	10.2	274
बावतो	66.8	7.2	1.92	320	364	4.6	11.2	210
कोदरी	66.2	8.90	2.55	331	15.3	2.3	6.4	210
वरी	70.4	12.5	1.1	341	14	0.8	-	206

લાલ કાંગ	60.1	12.3	4.3	331	31	2.8	-	188
મોર યો	65.5	10.1	3.89	346	16.1	1.2	7.7	130
સામા	65.5	6.2	2.2	307	20.0	5.0	-	280
રાજગરો	61	13.3	5.6	356	162	8.0	7.5	412
ઘઉં	64.7	10.6	1.4	321	39.4	2.9	11.2	315
ચોખ્ખા	78.2	7.9	0.5	356	7.5		2.8	96

સ્ત્રોત: ભારતીય ખાદ્ય રચના કોષ્ટકો, NIN-2017

ધાન્યના લેવાથી શરીરમાં થતા ફાયદા રિસર્ચ દ્વારા દર્શાવવામાં આવે છે કે જુવાર નું સેવન હૃદય રોગનું જોખમ ઘટાડે છે, ડાયાબિટીસથી રક્ષણ આપે છે, પાચનતંત્રમાં સુધારો કરે છે, કેન્સરનું જોખમ ઘટાડે છે, શરીરને ડિટોક્સિફાય કરે છે, શ્વસન સ્વાસ્થ્યમાં રોગપ્રતિકારક શક્તિ વધે છે, ઉર્જા સ્તરમાં વધારો કરે છે અને સ્નાયુઓમાં સુધારો કરે છે. અને ન્યુરલ સિસ્ટમ્સ અને મેટાબોલિક સિન્ડ્રોમ અને પાર્કિન્સન રોગ જેવા અનેક રોગો સામે રક્ષણાત્મક છે.

મોતી બાજરીમાં ફાયટોકેમિકલ્સ હોય છે જે કોલેસ્ટ્રોલ ઘટાડે છે. તેમાં ફોલેટ, મેગ્નેશિયમ, કોપર, જસત અને વિટામિન E અને B- કોમ્પ્લેક્સ પણ હોય છે. અન્ય લોટની સરખામણીમાં "બાજરા"માં ઉર્જાનું પ્રમાણ વધુ હોય છે. તે કેલ્શિયમ અને અસંતૃપ્ત ચરબીથી ભરપૂર હોય છે જે શરીર માટે સારી હોય છે. તેમાં આયર્નનું પ્રમાણ વધુ હોવાથી તે એનિમિયાના દર્દીઓ માટે અને સગર્ભા સ્ત્રીઓ અને કિશોરો માટે ખૂબ જ ઉપયોગી છે.

રાગીમાં વિટામિન એ, વિટામિન બી અને ફોસ્ફરસ સાથે સારી રીતે સંતુલિત આવશ્યક એમિનો એસિડની રચના સાથે કેલ્શિયમ, પ્રોટીનની વધુ માત્રા હોય છે. તેમાં કેલ્શિયમનું પ્રમાણ પણ વધુ હોય છે તેથી તે હાડકાં માટે સારું છે, તે નવા હાડકાંના વિકાસ માટે તેમજ વૃદ્ધાવસ્થાના લોકો માટે

હાડકાંની જાળવણી માટે ફાયદાકારક છે. તેમાં ઉચ્ચ ફાઇબર સામગ્રી કબજિયાત, હાઈ બ્લડ કોલેસ્ટ્રોલ અને આંતરડાના કેન્સરને પણ તપાસે છે.

લાલકાંગ એ બ્લડ સુગર સંતુલિત કાર્બોહાઇડ્રેટ્સનો સારો સ્ત્રોત છે જે તેને ખાંડ અને હૃદયના દર્દીઓ માટે ફાયદાકારક બનાવે છે. ફોક્સટેલ બાજરી ધાન્યના લોટમાં રહેલું નત્રિલ દ્રવ્ય મુક્ત અનાજ છે તેથી તે એવા લોકો માટે ફાયદાકારક છે જેઓ સેલિયાક રોગ અને ગ્લુટેન અસહિષ્ણતાથી પીડિત છે.

કોદરી આખા અનાજમાં ફાયબરનું પ્રમાણ ખૂબ વધારે હોય છે. અન્ય ખાદ્ય અનાજની જેમ, કોડરી પ્રોટીનનું પોષક મૂલ્ય લીગ્યુમ પ્રોટીન સાથે પૂરક બનાવીને સુધારી શકાય છે. કોડો સરળતાથી સુપાય્ય હોય છે અને તેમાં લેસીથિન હોય છે. તે નર્વસ સિસ્ટમને મજબૂત કરવા માટે મહત્વપૂર્ણ છે. કોડો બાજરી બી-વિટામિન્સ અને ફોલિક એસિડનો ઉત્તમ સ્ત્રોત છે. તે ધાન્યના લોટમાં રહેલું નત્રિલ દ્રવ્ય મુક્ત હોવાથી, તે ધાન્યના લોટમાં રહેલું નત્રિલ દ્રવ્ય અસહિષ્ણુ લોકો માટે શ્રેષ્ઠ છે.

બાર્નયાર્ડ અથવા સમા એ બાજરીનો બીજો પ્રકાર છે જે ઉચ્ચ ફાઇબર સામગ્રી સાથે પોષક રીતે ગાઢ છે. જો તમે વજન ઘટાડવાનું વિચારી રહ્યા છો, તો તેને તમારા આહારમાં સામેલ કરવાથી તમારા એકંદર સુખાકારી માટે ભટકાઈ શકે છે. સમામાં કેલ્શિયમ અને ફોસ્ફરસ ભરપૂર માત્રામાં હોય છે, જે નાના બાળકો અને સગર્ભા સ્ત્રીઓ માટે હાડકાના નિર્માણમાં મદદ કરે છે. આ બાજરીનો ઉપયોગ ડાયાબિટીસના દર્દીઓ માટે યોખાના વિકલ્પ તરીકે થઈ શકે છે.

વરી એ બ્લડ સુગરના સ્તરને સંતુલિત કરવા માટે સારી છે અને તેનો ગ્લાયસેમિક ઇન્ડેક્સ ઓછો છે. અનાજમાં અજીર્ણ ફાઇબરની તુલનાત્મક રીતે ઊંચી ટકાવારી હોય છે કારણ કે બીજ હલમાં બંધ હોય છે.

રાજગરો માં પ્રોટીનની માત્રા વધુ હોય છે અને વાળ ખરવા અને સફેદ થવા સામે લડવામાં મદદ કરે છે. આમળાં કોલેસ્ટ્રોલનું સ્તર અને કાર્ડિયોવેસ્ક્યુલર રોગોનું જોખમ પણ ઘટાડે છે. તે કેલ્શિયમ, એન્ટીઓક્સિડન્ટો અને અન્ય ખનિજોમાં વધારે છે. તે માત્ર ઉપવાસ પૂરતું મર્યાદિત ન હોવું જોઈએ, પરંતુ રોજિદા આહારમાં પણ તેનો સમાવેશ કરવો જોઈએ.



કાંગ ની કટલેટ

ઘટકો:

કાંગ - 100 ગ્રામ, બટાકા - 20 ગ્રામ,
ગાજર - 20 ગ્રામ, મીઠું - 2 ગ્રામ,
મરી - 5 ગ્રામ, ચાટ મસાલો - 5
ગ્રામ, બેડ કમ્બસ - 20 ગ્રામ, લીલા
મરચાં - 5 ગ્રામ, પાણી - જરૂર મુજબ
અને તેલ - તળવા માટે

તૈયારી પદ્ધતિ:

- બધી ઝીણી સમારેલી શાકભાજી અને કાંગ ના દાણાને રાંધીને બાજુ પર રાખવામાં આવે છે.
- એક પેનમાં એક ટેબલ સ્પૂન તેલ, આદુ લસણની પેસ્ટ, કાપેલાં લીલા મરચાં નાખીને લાઈટ બ્રાઉન કલર ના થાય ત્યાં સુધી તળો.
- રાંધેલ કાંગ, ચાટ મસાલો, મરી અને રાંધેલા શાકભાજી ઉમેરો અને તેને સારી રીતે મિક્સ કરો.
- તેમને કટલેટના આકારમાં બનાવો, કટલેટને બેડના ટુકડાથી કોટ કરો.
- આણ બ્રાઉન રંગના દેખાય ત્યાં સુધી તેને એક પેનમાં શેલો અથવા ડીપ ફાય કરો.
- ટોમેટો સોસ અથવા ચટણી સાથે સર્વ કરો.



કોદરી ઉપમા

ઘટકો:

કોદરીના દાણા - 1 કપ, ઝીણી સમારેલી
ડુંગળી, લીલા મરચાં, ગાજર, બટેટા આદુ,
સરસવના દાણા, કાળા ચણાની દાળ, કરી
પત્તા, પાણી અને તેલ - જરૂર મુજબ.

તૈયારી પદ્ધતિ:

- કોદરીને બે કે ત્રણ વાર ધોઈ લો.
- ડુંગળી, લીલા મરચાં અને શાકભાજીને બારીક કાપો. આદુને છીણી લો.
- પ્રેશર કુકરમાં તેલ ગરમ કરો, તેમાં સરસવ ઉમેરો, અડદ દાળ, ચણાદાળ, કઢી પત્તા અને લીલા મરચાં ઉમેરો.
- જ્યારે દાળ ગોલ્ડન બ્રાઉન થાય ત્યારે તેમાં ડુંગળી, આદુ, ફળદર નાખીને ડુંગળી ગોલ્ડન બ્રાઉન થાય ત્યાં સુધી સાંતળો.
- ગાજર, કઠોળ અને બટાકા ઉમેરો 2 થી 3 મિનિટ માટે સાંતળો. પછી કોદરી ઉમેરો, 1 મિનિટ સાંતળો, જ્યાં સુધી બધું ભેગું ન થઈ જાય.
- પછી પાણી અને મીઠું ઉમેરો. જ્યારે પાણી ઉકળવા લાગે ત્યારે ઢાંકણ બંધ કરી દો અને મધ્યમ તાપે 3 સીટી સુધી રાંધો.
- જ્યારે દબાણ ઓછું થઈ જાય, ત્યારે ઢાંકણ ખોલો અને ક્રીઈપ્સ પ્રકારની ચટણી અથવા સાંભાર સાથે ગરમા-ગરમ સર્વ કરો.



રાગીના લાડુ

ઘટકો:

રાગીના લોટ - 1 કપ, ખાંડ - 1/2

કપ પાવડર, ઘી - 3 ચમચી, દૂધ - 1/4

કપ, એલચી પાવડર - 1 ટીસ્પૂન, નારિયેળ અને ફાયકુટસ - જરૂર મુજબ બારીક સમારેલા

તૈયારી પદ્ધતિ:

- શેકેલી સુગંધ દેખાય ત્યાં સુધી રાગીના લોટને ગરમ કરો.
- ફાયકુટસને ઘીમાં શેકી, દૂધ ગરમ કરો અને ગોળ ઓગાળી લો.
- બધા શેકેલા ઘટકોને એકસાથે ઉમેરો અને સારી રીતે મિક્સ કરો.
- મેન્યુઅલી ગોળ લીંબુના કદના બોલમાં આકાર આપો અને સર્વ કરો.



જુવાર ઢોસા

ઘટકો:

જુવારના દાણા - 3 કપ, અડદની દાળ -

1 કપ, મીઠું અને તેલ (શેલો ફાય માટે)

તૈયારી પદ્ધતિ:

- પલાળેલા જુવારના દાણા અને અડદની દાળને એકસાથે ઝીણી પીસી લો. સ્વાદ માટે મીઠું ઉમેરો અને તેને આથો આવવા દો.
- પહેલાથી ગરમ કરેલા તવા પર એક ટી સ્પૂન તેલ લગાવો અને તેના પર બેટર રેડો, સ્કૂપ વડે પાતળા ગોળ આકારમાં ફેલાવો. કિસ્મી ડોસા મળે ત્યાં સુધી શેકો.
- ચટણી સાથે ગરમા-ગરમ સર્વ કરો.



રાગી કેક

ઘટકો:

રાગીનો લોટ - 100 ગ્રામ, એસેન્સ - 3 મિલી, ફેટ - 100 ગ્રામ, બેકિંગ પાવડર - 3 ગ્રામ,

ઘેસા - 2 કોકો પાવડર - 5 ગ્રામ, ખાંડ - 100 ગ્રામ, મીઠું - 2 ગ્રામ અને દૂધ - 20 મિલી

તૈયારી પદ્ધતિ:

• ઓવનને 180 ડિગ્રી સેલ્સિયસ પહેલા ગરમ કરો, એકસમાન મિશ્રણ માટે તમામ સૂકા ઘટકોને યાળી લો.

• ખાંડનો પાવડર અને ઈંડાની સફેદી સારી રીતે કટી લેવી અને તેમાં દૂધ, એસેન્સ, ઈંડાની જરદી ઉમેરીને બરાબર મિક્સ કરી લેવાનું છે.

• રાગીનો લોટ, મીઠું, કોકો પાવડર અને બેકિંગ પાવડર ઉમેરીને ઝીણું ખીંડું બનાવો.

• બેટરને બેકિંગ બાઉલમાં મૂકો અને ઓવનમાં 25-30 મિનિટ માટે 180°C પર મૂકો. કેકને બહાર કાઢો અને તે ઠંડું થાય ત્યાં સુધી 10 મિનિટ રાહ જુઓ.

• ઓછામાં ઓછા 15 મિનિટ પછી કેકને મોલ્ડમાંથી દૂર કર, ટુકડા કરી સર્વ કરો.



ટેન્ગી મેંગો કાંગ

ઘટકો:

કાંગ - 1 કપ, પાણી - 2 કપ, કાચી કેરી, છીણેલી - 1 અથવા સ્વાદ અનુસાર, સીંગદાણા - 2 ચમચી, મસાલા : મરચાં, સરસવના દાણા, અડદ દાળ, હળદર, હિંગ, તેલ, મીઠું સ્વાદ અનુસાર

તૈયારી પદ્ધતિ:

• કાંગને પાણીમાં પકાવો અને બાકીના ઘટકોને મિક્સ કરતા પહેલા તેને ઠંડું થવા દો.

• સીંગદાણાને તેલમાં તળો, બાજુ પર રાખો.

• મસાલા તૈયાર કરો.

• છીણેલી કેરી ઉમેરો અને એક મિનિટ સાંતળો.

• રાંધેલ કાંગ ઉમેરો અને મિક્સ કરો

• ટેન્ગી મેંગો કાંગ તૈયાર છે, ગરમાગરમ સર્વ કરો.



સામા ની માહેરી

ઘટકો:

સામા - 50 ગ્રામ, ચોખા - 100 ગ્રામ,
છાશ - 550 મિલી, મીઠું - સ્વાદ
પ્રમાણે, ઘી - 20 મિલી, કરી પત્તા -
થોડા, સરસવના દાણા - 2 ગ્રામ
અને સમારેલા લીલા મરચા 10
ગ્રામ.

તૈયારી પદ્ધતિ:

- સામા અને ચોખાને 30 મિનિટ સુધી, પલાળી રાખો અને ઉકાળો.
- સારી રીતે થાય ત્યાં સુધી છાશમાં ગાળીને પકાવો.
- એક જાડા તળિયાની કડાઈમાં ઘી ગરમ કરો, તેમાં સરસવ લીલા મરચા અને કઢી પત્તા ઉમેરો.
- રાંધેલા ભાતને ઢાંકીને થોડા સમય માટે ઢાંકી દો.
- સારી રીતે મિક્સ કરો અને મસાલા ઉમેરો.
- ગરમાગરમ સર્વ કરો.



બાજરી અને ડુંગળીના મુઠીયા

ઘટકો:

બાજરી - 1 કપ, ડુંગળી સમારેલી,
હળદર, મરચું પાવડર, ધાણાજીરું,
જીરું, આદુ-લીલા મરચાંની પેસ્ટ,
ખાવાનો સોડા, મીઠું અને તેલ -
જરૂર મુજબ.

તૈયારી પદ્ધતિ:

- બધી સામગ્રી ભેગી કરો અને સારી રીતે મિક્સ કરો અને અર્ધ નરમ કણક બાંધો.
- થોડું તેલ લગાવો અને સિલિન્ડ્રિકલ આકાર આપો અને કટકા કરો.
- એક નોનસ્ટીક પેનમાં બાકીનું તેલ ગરમ કરો અને તેમાં સરસવના દાણા ઉમેરો.
- ટુકડાઓને તેલમાં શેલો ફાય કરો અને જીરું વડે સીઝન કરો.
- કોથમીરથી સજાવીને ગરમાગરમ સર્વ કરો.



સામાની કટલેટ

ઘટકો:

સામાના દાણા - 100 ગ્રામ, બટાકા - 20 ગ્રામ, ગાજર - 20 ગ્રામ, મીઠું - 5 ગ્રામ, મરી - 5 ગ્રામ, ચાટ મસાલો - 5 ગ્રામ, બ્રેડ ક્રમ્બ્સ - 20 ગ્રામ, ચણાની દાળ - 30 ગ્રામ, લીલા મરચાં - 5 ગ્રામ, પાણી જરૂર મુજબ અને તેલ તળવા માટે તૈયારી પદ્ધતિ:

- સામાને ઉકળતા પાણીમાં પકાવો અને તેને કાંટા વડે કુલાવો અને તેને બાજુ પર રાખો.
- ચણાની દાળના લોટને દહીં સાથે મિક્સ કરો, શાકભાજીને ઉકાળો અને બારીક સમારેલી ડુંગળી, લીલા મરચાં, લસણ, આદુને સાંતળો અને ડુંગળી તેલમાં સાંતળો.
- રાંધેલા શાકભાજીમાં મીઠું, મરી પાઉંડર, હળદર પાઉંડર ઉમેરો અને સામા, બારીક સમારેલી કોથમીર ઉમેરો અને સારી રીતે મિક્સ કરો. વધુ થોડી સેકંડ માટે રાંધવા.
- તેને ઠંડુ થવા દો. મિશ્રણને સરખા ભાગે વર્કચો અને કટલેટનો આકાર આપો અને કટલેટને ગોલ્ડન બ્રાઉન થાય ત્યાં સુધી બંને બાજુથી શેલો હૂંચ કરો અથવા તેલમાં ડીપ ફ્રાય કરો.
- ચટણી સાથે સર્વ કરો.



જુવાર અન્નમ

ઘટકો:

છુંદેલા જુવારના દાણા - 1 કપ તૈયારી પદ્ધતિ:

- જ્યાં સુધી જુવાર સુંવાળી અને સ્વાદિષ્ટ ન બને ત્યાં સુધી છુંદેલા જુવારના દાણાને ઉકળતા પાણીમાં રાંધો.
- તેને પ્રેશર કુકરમાં 5-10 મિનિટ માટે પેણ તૈયાર કરી શકાય છે.



બાજરીનો હલવો

ઘટકો:

બાજરીનો લોટ- 1 કપ, ગોળ- 1 કપ, માખણ - 1 કપ અને દૂધ - 1 કપ

તૈયારી પદ્ધતિ:

- એક તપેલીમાં બાજરીના લોટને સુગંધ અને રંગ બદલાય ત્યાં સુધી શેકી લો.
- મિશ્રણમાં દૂધ ઉમેરો અને રાંધો.
- ગોળ, ઘી ઉમેરો અને ઘટ્ટ સુસંગતતા સુધી ગરમ અને ત્યાં સુધી સારી રીતે મિક્સ કરો.
- તૈયાર બેટરને મોલ્ડમાં રેડો અને સેટ થવા દો.



કોદરી પાયસમ

ઘટકો:

કોદરી- 150 ગ્રામ, ખાંડ - 250 ગ્રામ, દૂધ - 250 મિલી, કેસર - 4-5 દોરા, ડ્રાયફ્રુટ્સ (કાજુ, બદામ અને પિસ્તા) - 50 ગ્રામ અને ઘી - 30 મિલી.

તૈયારી પદ્ધતિ:

- કોદરી, કેસર અને દૂધને એકસાથે ધીમા તાપે કોદરી મેશ ન થાય ત્યાં સુધી રાંધો.
- પાયસમ રાંધવા માટે ખાંડ ઉમેરો અને હળવા હાથે હલાવો.
- એક કડાઈમાં ઘી ગરમ કરો અને તેમાં બધા ડ્રાયફ્રુટ્સ ઉમેરો અને સોનેરી રંગ થાય ત્યાં સુધી શેકો અને રાંધેલા પાયસમમાં ઉમેરો.
- તેને ગરમ કે ઠંડુ સર્વ કરી શકાય છે.

संदर्भ

- Millets recipes: a healthy choice , ICAR- Indian Institute Of Millet Research
- Millet: Future Of Food & Farming, Millet Network of India- Deccan Development Society- FIAN, INDIA.
- The Story Of Millets: Karnataka State Development of Agriculture In Association With ICAR Hyderabad.

Annexure 4 (few participant respond)

Assessment of nutrition status millets among the woman population of Surat (urban) impact and evaluation on knowledge gain by nutrition health education (NHE)

SUBJECT: - PARTICIPATE'S REVIEW

Organization

Faculty of family and community science department of food and nutrition from M.S University Vadodara

Participates response

Participating in the research made us aware about the dietary benefits of millet and what type of diet should be taken during diabetes, hypertension, weight loss and anemia and other micronutrient deficiencies. So we were very happy to learn about diet by participating in the research.

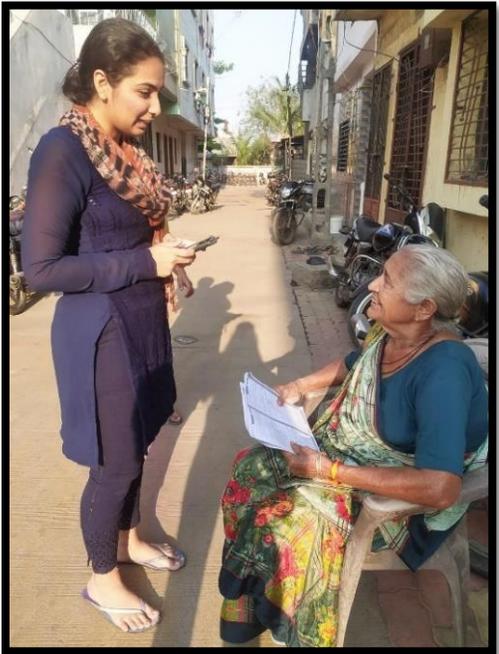
Name	Mobile number	Signature
1. Nisha ben	6353244428	Aishoj
2. Nirali ben	7046618740	D. Suva
3. Chandrika ben	6358175248	S.C.V.
4. Rajnandani ben	9054896009	R.
5. Nayan ben	7698190062	B.
6. Hemangi ben	6353252809	Eshwar
7. Sonal ben	9714396225	21011
8. Janvi ben	9327280814	C.S.D
9. Hetal ben	9099265370	Hetal
10. Jyoti ben	7016381617	P.J.S.



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By Sonal Suva

Annexure 5





Annexure 6



Institutional Ethics
Committee for Human
Research
(IECHR)

FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

Ethical Compliance Certificate 2022 – 2023

This is to certify that Ms. Sonal Suva's study titled, "**Assessment of Nutritional Status, Knowledge and Consumption Pattern of Millets Among the Women Population of Urban Surat: Impact Evaluation on Knowledge Gain by Nutrition Health Education (NHE)**" from Department of Foods and Nutrition has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Science, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number IECHR/FCS/MSc/2022/30.

Prof Mini Sheth
Member Secretary
IECHR

Prof Shagufa Kapadia
Chairperson
IECHR

Chair Person
IECHR
Faculty of Family & Community Sciences
The Maharaja Sayajirao University of Baroda

Annexure 7

Document Information

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Submitter email	komal.chauhan-fn@msubaroda.ac.in
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