

Calorie and nutrient gap analysis of jail menu and nutritional status of the prisoners of District Jail, Faisalabad, Pakistan

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Abstract

Assessment of prisoners' diet showed that it is deficient in calories as well as in Recommended Daily Allowance values. Caloric value was about 64.9% deficient considering one serving (plate per time) taken. A quantitative-qualitative mixed approach was adopted. Convenient purposive sampling was employed to recruit 112 participants. For quantitative assessment a descriptive cross-sectional study design and semi-structured data collection tool was used, and for qualitative evaluation, caloric and RDA value of different nutrients were calculated and in-depth interviews were conducted. Analysis showed that the diet provided was deficient in caloric and RDA values, thus the prison authority should design a proper strategy to ensure proper nutritional status of prisoners.

Keywords: Inmates, Prisoners, Servings, Associated factors, Mal-nutrition.

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Introduction

One of the fundamental rights of prisoners, in accordance with the Universal Declaration of Human Rights (UDHR) Article 25,¹ is the availability and access to healthy and satisfactory food choices to fulfil their nutritional needs.¹

People are more susceptible to COVID-19, when they have weakened immune systems, and good nutrition and specific micronutrients play a role in supporting the immune system. A varied and balanced diet with an abundance of fruits and vegetables and the essential nutrients like vitamin D, vitamin A, B vitamins (folate, vitamin B6 and vitamin B12), vitamin C and minerals, such as Fe, Cu, Se and Zn, are all known to contribute to the normal functioning of the immune system. Avoidance of deficiencies and identification of suboptimal intake of

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these micronutrients in targeted groups of patients and in distinct and highly sensitive populations could help to strengthen the resilience of people against the COVID-19 pandemic.² In low-income countries, including Ethiopia, undernutrition is common in prisons. More than half of the detainees are seriously undernourished.³ Mounting background evidence has shown that incarceration can affect the health and well-being of individuals and increase the risk of non-communicable diseases. Diet quality is known to be one of the main determinants of risk of non-communicable diseases, and dietary changes are the first approach used in primary care to reduce the prevalence of non-communicable diseases.⁴ A meta-ethnographic synthesis of 27 papers integrated first-hand experiences of food in prison from 10 different countries. It showed the potential of food to enhance the prison environment and support improvement in prisoners' health and well-being, which is limited when the nutritional content is inadequate and/or where food is served and eaten, impacting negatively on human dignity. Prison policy which provides opportunities for cooking and sharing food that better reflects familial and cultural identity has the potential to improve relationships, increase self-esteem, and build and maintain life skills needed for reintegration.⁴ This study addresses a vital topic of nutrition among prisoners in jail. Internationally, nutrition among prisoners has been addressed much often but unfortunately in Pakistan it remained unaddressed. It is the basic right of prisoners as human being to get healthy and nutritious food. Therefore, the maintenance of nutritional adequacy becomes very important specially where there is restriction and rationing of food as seen in prisons. Studies showed relation of unsociable and unlawful nature of behaviour with the nutritional deficiency. Prisons are rehabilitation centres, to give a person a chance to be a better citizen, hence it is crucial to maintain the physical as well as mental health of the incarcerated individuals so that when they complete their required time in prison, they can prove to be beneficial to the society. This study tries to address the importance of adequate nutrition for prisoners.

Methods and Results

A quantitative-qualitative mixed approach was adopted

Table-1: Nutritional Status of Inmates of district jail Faisalabad

		Frequency	Percentage
Calf Circumference	<34cm	68	60.7
	>34cm	44	39.2
Mid Arm Circumference	<24cm	10	8.9
	>24cm	102	91.0
BMI	<18.5	7	6.3
	>18.5	105	93.7
	Weight loss	26	23.2
Weight loss during the last 3 months (subjective)	No weight loses	59	52.7

Mean Age= 40.67 years with \pm 16.9 SD

Mean Weight=73.71 kg with \pm 16.97 SD

Mean Height=1.67 m with \pm 0.08 SD

Mean Calf Muscle Circumference=32.9cm with \pm 3.68 SD

Mean Mid Arm Circumference=27.9cm with \pm 3.62 SD

Mean BMI 26.08 with \pm 5.6 SD

Table-2: Recommended RDA and Calories per week and RDA and Calories offered per week by jail menu.

	Recommended RDA per week	RDA offered Per week	Deficiency	Excess	Percentage Deficiency	Percentage Excess
Carbohydrates (g)	910	677.0	230.8		25.36	
Proteins(g)	364	338.9	25.1		6.89	
Fats(g)	490	325.3	164.7		33.61	
Vit A(ug)	6300	4063.3	2236.7		35.50	
Vit C(mg/d)	525	405.42	119.58		22.77	
Iron(mg)	77	77.3		0.3		0.38
Dietary Fibre(g)	175	129.2	45.8		26.17	
Total Calories (Kcal)	16800	5893	10907*		64.9	

*=These calories values are calculated by keeping in mind if person is eating one serving

Jail's Mess Menu

Day	Breakfast	Lunch	Dinner
Monday	Chapati and Tea	Murgh Chana with Roti	Sabzi with Roti
Tuesday	Chapati and Tea	Daal Chana	Chicken Qorma with Roti
Wednesday	Chapati and Tea	Daal Mash	Chicken Qorma with Roti
Thursday	Chapati and Tea	Murgh Daal	Sabzi with Roti
Friday	Chapati and Tea	Sufaid Channay	Chicken Qorma with Roti
Saturday	Chapati and Tea	Aloo	Chicken Qorma with Roti
Sunday	Chapati and Tea	Daal Masoor	Sufaid Lobia with Roti

SD: Standard deviation, LVT: Left ventricle thickness, RVT: Right ventricle thickness.

for the study. Convenient purposive sampling was employed to recruit 112 participants. For quantitative assessment, a descriptive cross-sectional study design and semi-structured data collection tool was used, and for qualitative evaluation, caloric and RDA value of different nutrients were calculated and in-depth interviews were conducted. This study was conducted in District Jail, Faisalabad, from January 9, 2020 to April 9, 2020 (three months). In quantitative assessment a semi structured data collection tool was designed for recording the physical examination and anthropometric measurements

for nutritional status of the prisoners. For qualitative assessment in-depth interview guidelines were developed and interviews were conducted from randomly selected prisoners. Calf muscle circumference, mid-arm circumference and BMI were the parameters used for quantitative depiction as done in a study conducted in Karachi prison.⁵ Nutritional deficiency depicted through the calf muscle circumference with cut off value 34cm, having optimum sensitivity and specificity of depicting malnutrition, and on this criterion 68 (60.7%) of the prisoners had protein calorie malnutrition (<34cm). The overall mean calf muscle circumference was 60.7% below the optimum value of the males. Moreover, with another parameter of mid-arm circumference, it was observed that 10 (8.9%) inmates had the mid-arm circumference below the standard reference value of 24cm for males (Table:1). Although BMI (third parameter)

is not reflecting a major malnutrition here, 7 (6.3%) inmates showed BMI below the cut off value⁶, i.e.18.5 (Table:1). Regarding the subjective view of inmates regarding weight loss, 85 inmates responded, out of which 26 (23.21%) were of the view that they had lost weight in the last three months (Table:1). The overall calorie contents seem to be alarmingly deficient, i.e. about 64.9%. The most deficient nutrient was fats that was 33.6%, followed by carbohydrate 25.36%. Proteins were only 6.89% deficient. Among the micronutrients, the most deficient nutrient was vitamin A (35.5%) followed by vitamin C (22.7%). Dietary fibres

were also deficient by 26.1% of the RDA (Table: 2). In-depth interviews conducted under four thematic areas: quantity of serving, quality of cooking, equity in serving, and their perceptions about weight loss and health effects. The majority of the interviewed subjects were not satisfied with the quantity of serving. Majority of the respondents had complaints about the indiscipline and unequal distribution of servings. Many of the prisoners pointed out about the poor quality of processing, cleanliness, and cooking and mentioned presence of impurities like small stones in the food served. Regarding perception of weight loss and health effects majority of the respondents felt adverse health effects and weight loss due to inadequate and poor quality of food available to them. Quantitative data was processed and analysed through SPSS (V. 26). This study has a limitation, i.e. the duration of imprisonment was not taken into consideration.

Conclusion

Significant number of prisoners were nutritionally deficient both in macro- and micro- nutrients or are at

risk, as both of them are cornerstones of the diet. Macro-nutrients are the nutritive components of food that the body needs for energy and to maintain the body's structure and systems, while micro-nutrients, though needed in minute quantity, have extremely important role in the human body for its proper functioning. Regular intake of micro-elements, due to their antioxidant and metabolic function, could reduce the prevalence of anaemia, diabetes mellitus, blindness, cognitive and mental retardation, premature mortality, and stunted growth, mainly in the crucial phases of development, pregnancy, and senility. Additionally, it strengthens the immune system by protecting the human body from viral infections. Trace elements are important for a number of vital functions in the human body, so the study of their concentration in the blood is a topic that has long been widely addressed. Among the most important functions we list:

- Activation of many enzymatic processes
- Regulation of fibroblast excitability
- Nerve impulse conduction
- Participation in the process of blood coagulation and cell growth
- Membrane transport mechanism control
- Reduction of neuromuscular excitation
- Participation in protein syntheses
- Preservation of red blood colour
- Functioning of the immune system

Recommendations: : It is the basic right of prisoners as human beings to get healthy and nutritious food.

- The mess menu should be made after considering the

calorie demand essential for human body. There should be proper surveillance system to check the mess, food quantity, and food quality.

- Take an action on nutritional intervention especially for food diversity and improve the health status of the inmates.
- Establish strong cooperation with health teams to intervene on prevention and control of disease and different factors, i.e. stress, difficulty in eating, etc. which leads to under nutrition.

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Authors' Contribution:

MBA: Study design, data analysis and collection.

FS: Writing, drafting and data collection.

RMH: Data collection, drafting and proof reading.

Questionnaire 1 (Annexure 1)

Mini Nutritional Assessment

MNA®



Last name:				First name:			
Sex:		Age:		Weight, kg:		Height, cm:	
						Date:	

Body Mass Index (BMI) = weight in kg / (height in m)²

0 = BMI less than 19

1 = BMI 19 to less than 21

2 = BMI 21 to less than 23

3 = BMI 23 or greater

Mid-arm circumference (MAC) in cm

= MAC less than 21

= MAC 21 to 22

= MAC greater than 22

Calf circumference (CC) in

cm

0 = CC less than 31

1 = CC 31 or greater

Lives independently (not in nursing home or hospital)

1 = yes 0 = no

Takes more than 3 prescription drugs per day

0 = yes 1 = no

Has suffered psychological stress or acute disease in the past 3 months?

0 = yes 2 = no

Mobility

0 = bed or chair bound

1 = able to get out of bed / chair but does not go out

2 = goes out

Neuropsychological problems

0 = severe dementia or depression

1 = mild dementia

2 = no psychological problems

Pressure sores or skin ulcers

0 = yes 1 = no

How many full meals does the patient eat daily?

0 = 1 meal
 1 = 2 meals
 2 = 3 meals

Selected consumption markers for protein intake

- At least one serving of dairy products
 (milk, cheese, yoghurt) per day yes No
 - Two or more servings of legumes
 yes No
 - or eggs per week
 - Meat, fish or poultry every day yes no .
 0.
 0 = if 0 or 1 yes
 0.
 5 = if 2 yes
 1.
 0 = if 3 yes
-

Consumes two or more servings of fruit or vegetables per day?

0 = no 1 = yes

Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?

0 = severe decrease in food intake
 1 = moderate decrease in food intake
 2 = no decrease in food intake

How much fluid (water, juice, coffee, tea, milk...) is consumed per day?

0.0 = less than 3 cups
 0.5 = 3 to 5 cups
 1.0 = more than 5 cups

Questionnaire 2 (Annexure 2) Malnutrition Screening Tool (MST)

STEP 1: Screen with the MST

1 Have you recently lost weight without trying?

No 0

Unsure 2

If yes, how much weight have you lost?

2-13 lb	1
14-23 lb	2
24-33 lb	3
34 lb or more	4
Unsure	2

Weight loss score:

2 Have you been eating poorly because of a decreased appetite?

No 0

Yes 1

Appetite score:

Add weight loss and appetite scores

MST SCORE:

Annexure 3

Anthropometry

Height: _____

Weight: _____

BMI: _____

Mid upper arm circumference: _____

Calf Circumference _____

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