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Drivers of healthy eating in a workplace in Nepal – a qualitative study

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Drivers of healthy eating in a workplace in Nepal – a qualitative study

Authors

Dipesh Tamrakar (1,2): bob.dipesh@gmail.com

Archana Shrestha (3): deararchana@gmail.com

Anjana Rai (4): anjirai@hotmail.co.uk

Biraj Man Karmacharya (1,2): birajmk@gmail.com

Vasanti Malik (5): vmalik@hsph.harvard.edu

Josiemer Mattei (5): jmattei@hsph.harvard.edu

Donna Spiegelman (3,5,6,7,8): donna.spiegelman@yale.edu

Affiliations

1. Department of Community Programs, Dhulikhel Hospital – Kathmandu University Hospital, Dhulikhel, Nepal
2. Department of Community Medicine, Kathmandu University, Dhulikhel, Nepal
3. Department of Epidemiology, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
4. PHI 360 Nepal
5. Department of Nutrition, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
6. Department of Global Health and Population, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA

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7. Department of Biostatistics, Harvard TH Chan School of Public health, Boston, Massachusetts, USA
8. Center on Methods for implementation and prevention science, Department of Biostatistics Yale School of Public Health, New Haven, CT, USA

Corresponding author

Archana Shrestha

Hospital Road, Dhulikhel, Nepal

Contact number: +977-9840764738

Email: deararchana@gmail.com

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ABSTRACT

Objective:

To explore the perceptions, provisions, enablers and barriers of healthy eating in a hospital site in central Nepal.

Design: A qualitative study including focus group discussion and in-depth interview, data were analyzed using thematic analysis method.

Settings: The study was carried out among the staff of Dhulikhel Hospital-Kathamndu University Hospital.

Participants: Focus group discussion was done among the 33 participants divided in four groups of (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours. Similarly, 9 in-depth interviews were conducted among 6 canteen operators and 3 managers.

Results:

Healthy eating was defined primarily as hygienic and fresh foods, balanced diet, and food groups like fruits and vegetables. Major factors that promote healthy eating were the availability of affordable healthy food options in the cafeteria, commitment from the cafeteria operator and managers, and health awareness among cafeteria operators and staffs. The most commonly reported barriers for healthy eating included unavailability of healthy options, limited human resources in the cafeteria, the high cost and the lack of supply of healthy food.

Conclusion: The availability of affordable healthy foods, commitment from cafeteria managers, and health awareness among cafeteria operators may promote healthy eating at hospital setting in Nepal.

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Strengths and Limitations of Study:

- This is first study to explore the facilitators and barriers for healthy eating in hospital setting in Nepal.
- The study represent the in depth views of both canteen users as well as canteen operators
- Participants were recruited from different strata of the staff representing variation in income, level of education, shift work etc in hospital.
- There is the risk of social desirability bias if focus group participants felt that they could not express personal barriers or expressing on the knowledge of healthy eating.
- There is limitations that these finding may not be generalizable to worksites other than hospital settings or other hospital which are different from our settings

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Introduction

Unhealthy eating is related to increased risk of a range of chronic diseases, including heart disease, diabetes, and cancer.[1] Diet directly increases the risk of these chronic diseases, and additionally contributes to increased risk indirectly through overweight and obesity.[2] Diets high in whole grains, fruits and vegetables and low in red meat, saturated and trans-fat are recommended to reduce chronic disease.[3 4] Eating behavior, however, results from a complex interplay of influences at the individual, social and environmental levels.

Considering that 21% of the Nepalese population are overweight, 4% have diabetes, and 26% have hypertension,[5] it is important to identify the social environments, such as the workplace,

that influence healthy eating and consequent health. Given the considerable time employees spend on their jobs, worksites offer an important venue to reach large numbers of adults to facilitate healthy eating.[6] In addition, workplaces might support long term behavioral changes through social support and changes in foods available.[7 8] The efficacy of workplace approaches in promoting healthy diet has been consistently reported in the literature.[9] Workplaces can provide employees with opportunities, resources and support that influence eating behavior.[10] The food environment at the workplace, especially food availability, preparation, and prices, can facilitate or create a barrier to healthy eating.[6 8]

The literature assessing employee's opinion about healthy eating in the workplace is limited.[11] Previous studies showed that workers are aware of the importance of changing unhealthy behaviors and they are willing to eat healthy foods if they were tasty, convenient, reasonably priced and of good quality.[12] Previously reported barriers to healthy eating include long working hours, unavailability of food, distance to facilities and poor dining facilities.[11 13 14] A study conducted in a factory in eastern Nepal reported that worker believe that the availability of healthy food options at affordable price, combined with an increased level of awareness and commitment from the worksite management will result in healthier food choices in the workplace.[15] Given the each workplaces is unique and complex environment, the present qualitative study aims to explore the perceptions and views of staff on healthy eating, provisions, enablers and barriers of healthier foods in a hospital site in central Nepal.

METHODS

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We conducted an exploratory qualitative study to investigate the perceptions, provision, enablers and barriers to employee's healthy eating in a hospital. Qualitative design was chosen for study because it aims to investigate the 'how' and 'why' of individual behavior and is able to answer complex questions about food-related perceptions and behaviors.[16]

Study Site and Settings

The study was conducted at Dhulikhel Hospital-Kathmandu University Hospital (DH-KUH), an independent, not for profit, non-government institution. The Hospital has varied backgrounds employees ranging from health personnel (doctors, nurses, and assistants), support staff (drivers, cook, laundry, gardeners and ward boys), and administrative staff. DH-KUH has four functional cafeterias that operate 16 hours a day on the hospital premises. The cafeterias serve breakfast, lunch and snack. One of the cafeterias also serves dinner. Each day, a pre-determined menu is offered for breakfast that includes kheer (rice porridge), samosas, puri (deep fried pan bread), vegetable curry, eggs, white bread, and bakery items such as cakes, donuts, white buns and puffs. Lunch items usually consists of white rice, lentil soup, vegetable curry, chicken curry, and yogurt. The snack items include noodles, fried rice, biscuits, confectionaries etc. Hot (tea, coffee) and cold (sodas) beverages are available.

Recruitment

All employees (1040) of the hospital were eligible to participate in the present study. From the list of employees, we purposely grouped them in four distinct categories: (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours to represent different cadres of staff. We decided to separate the health personnel into two groups of those working during office hours and those

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working on shifts because the availability of foods and working conditions are different between these two.A research assistant then met potential participants in each group at a pre-scheduled time to explain the purpose of the study and administered informed consent using a standard script, until a required sample size was met. A total of 64 participants were approached for 4 pre-determined focus group discussions, out of which 40 agreed to participate. Seven of those who initially agreed to participate did not show up for the session.

In addition, we purposively selected cafeteria operators, managers and hospital administration for in-depth interviews. We recruited a finance manager, a cafeteria manager, an administrative manager and 6 cafeteria operators after receiving informed consent.

Focus Group Discussions

The focus groups were conducted within the workplace setting in a private room to ensure confidentiality and honest sharing of opinion. FGDs were conducted in Nepali and audio taped after obtaining informed consent from the participants. The investigators, AS or DT, moderated all FGDs in Nepali and were assisted by a note-taker. In each session, a brief introduction to the study and about ethical considerations for maintaining confidentiality of the participants, was explained. The moderator asked open-ended questions and probed for more detailed information. We used an iterative process by discussing each FGD immediately after completion and suggesting further detailed probing in emerging themes from the previous findings. For example, a theme on healthy alternatives to white rice emerged. In the subsequent FGDs, we added separate questions on healthy alternatives to white rice.

The team developed the focus group guideline and reviewed for content and readability after pretesting with nine participants, who were employees of the hospital. The pre-tested focus

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3 group was not included in this analysis. The FGD guide consisted of semi-structured open
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5 ended questions along with probes for discussion to ensure consistency across groups and
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7 thorough understanding of the topics. The guide included topics on three main domains: (1)
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9 perceptions of healthy and unhealthy eating; (2) facilitators to healthy eating in the worksite; and
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12 (3) barriers to healthy eating in the worksite. The examples of questions in each domain is
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14 presented in table 1.
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19 Table 1. Examples of the open ended questions in each domain.
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Domain	Example questions
Perception of healthy and unhealthy eating	What do you understand by healthy foods?', 'What do you understand by unhealthy foods?'
Facilitators to healthy eating at workplace	What are factors that determine your food choices?', 'What facilitates you to choose healthy food?'
Barriers to healthy eating at workplace	'What obstructs you to choose healthy food?'

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51 **In-Depth Interviews**
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53 The investigators, DT or AS, conducted semi-structured in-depth interviews in Nepali with the
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56 cafeteria operators and administrative managers using a pretested interview guide in a private
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room of the hospital. The interviews aimed to understand the facilitators and barriers to healthy eating from the hospital administrator's perspective. The moderator interviewed the participants with open-ended questions regarding their views on healthy and unhealthy eating, facilitators and barriers to healthy eating in the worksite, operational and managerial aspects of the cafeteria, and facilitators and barriers for making changes that promote healthy eating. The questions such as 'What are healthy and unhealthy foods in your cafeteria?', 'What are changes that are necessary for making cafeteria healthier?', 'What are factors that could facilitate for making cafeteria healthier?' and 'What are the challenges for making cafeteria healthier?' were asked. In each case, the moderator probed for further descriptive information.

We used an iterative process for data collection. After each interview, we discussed each interview and identified the topics to be deeply explored by the themes emerging in earlier interviews.

Analysis

All FGDs and interviews were transcribed verbatim into Nepali by trained research assistants. The principal investigators and local principal investigator then independently reviewed the transcripts against the audio recording for potential discrepancies or incomplete data. A thematic analysis approach was used for data analysis.[17] This process involved familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. One FGD and two interview transcripts were coded inductively by two independent coders to enhance validity. The coders then compared the coding schemes and resolved the differences. The codebook was then finalized. All the transcripts were coded using RQDA; segments of the text that were related to a common theme were pieced together; emergent themes were identified; reviewed; and defined.

Results

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Characteristics of the participants

Thirty three adults participated in four focus group discussions ranging from 7 to 10 participants in each discussion session. Nine staffs of canteen and hospital administration participated in in-depth interviews. The characteristics of the participants are presented in Table 2. The mean age of participants was 33 years, range from 23 to 44 years. Sixty percent were male. About half earned less than 3 dollars per day. About 48% self-reported as alcohol drinkers and 10% as smokers. Fifty percent of them were overweight, 6% reported to have high blood pressure and 2.4% reported to have diabetes.

Table 2 Baseline Characteristics of the Participants

Characteristics	Focus Group participants (n=33)	In-depth interviews participants (n=9)	Total
Age (Mean ± SD)	32.8 ± 5.5	35.3 ± 9.9	33.33±6.43
Male, n(%)	17 (51.5)	8 (88.9)	25 (59.5)
Income, n(%)			
< 3$/day	14 (42.4)	6 (66.7)	20 (47.6)
>3$/day	19 (67.6)	3 (33.3)	22 (52.4)
Education, n(%)			

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High school and lower	13 (39.4)	3 (33.3)	16 (38.1)
More than High School	20 (70.6)	6 (66.7)	26 (61.9)
Alcohol Drinking, n(%)			
Non-Drinker	18 (54.5)	4 (44.4)	22 (52.4)
Drinker	15 (45.5)	5 (55.6)	20 (47.6)
Smoking, n(%)			
Smoker	7 (26.2)	3 (33.3)	10 (23.8)
Non-Smoker	26 (78.8)	6 (66.7)	32 (76.2)
Vegetarian, n(%)			
Yes	2 (6.1)	0 (0.0)	2 (4.7)
No	31(93.9)	9 (100.0)	40 (95.3)
BMI Categories, n(%)			
Normal (18.5- <25) kg/m^2	17 (51.5)	4 (44.4)	21(50.0)
Overweight (25+) kg/m^2	16 (49.5)	5 (55.6)	21(50.0)
Known Hypertension, n(%)			
Yes	2 (6.1)	4 (44.4)	6 (14.3)
No	31 (93.9)	5 (55.6)	36 (85.7)

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Known Diabetes, n(%)			
Yes	0(0.0)	3 (11.1)	3 (2.4)
No	33 (100.0)	8 (88.9)	41(97.6)

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Perception on Healthy and Unhealthy Eating

We queried the participants about their understanding of “healthy” and “unhealthy” eating. The participants explained the healthy and unhealthy food in terms of food groups, characteristics of food, and cooking processes.

Healthy Eating

Most of participants described healthy eating in terms of hygienically prepared food and balanced diet, defined as the mix of carbohydrates, proteins, fats, minerals, and vitamins consumed according to level of physical activeness. However, support staff group were not aware of the balance diet. Most of them considered fruits and vegetables, and the traditional Nepali diet (white rice, lentils soup and vegetable curry) as healthy food. Medical doctors were critical about considering the Nepali diet as healthy because of its high carbohydrate content, particularly with white rice and potatoes. Other items including meat, fish, whole grains, yogurts etc. were also considered as healthy by them. Most participants associated the word ‘healthy’ with ‘hygiene’ and expressed that hygienic foods in general are healthy.

A healthy food means that it should contain all necessary nutrients. On the top of that it should also be in an adequate amount according to the age and type of work they are engaged in. To add to that, we should understand healthy means hygienic, i.e. free from harmful microorganisms. (a health professional)

Healthy and balanced means rice, lentils, vegetables, fish and meat …… considering them as clean and good. (a support staff).

Unhealthy Eating

Unhealthy eating was defined as eating stale (*Basi*) and unhygienic food. All the health professional, administrative as well as support staff reported unhygienic food as unhealthy. Most of the participants reported oily food, fast food such as noodles, chips, categorized soda (Coke, Fanta, Sprite) as unhealthy. However, one of the participants from support staff group said that the drinks are healthy and can be used to treat gastritis.

"My mother used to say that coke is good for gastritis. She used to ask me to bring that black coke and say that it is good for gastritis" (a support staff)

Health professionals emphasized that the diet should have the balance of carbohydrate, protein and fat; and excess carbohydrate such as rice was unhealthy. However, the support staff did not have any concern about the amount of the food. Most participants said that frying food was unhealthy. Almost all participants expressed concerned about the overuse of chemical fertilizer and insecticides in food.

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"In my opinion, unhealthy food means that it should be considered in qualitative and quantitative both ...Qualitative food means balance diet that contain proper quantity of protein, carbohydrate etc. Even small portion of such food can provide enough nutrients.

Unhealthy means eating in high quantity for example if we eat too much rice only, then it is not healthy. (a health professional)

On asking about the food that are risk for diabetes or prevent from diabetes, the majority mentioned high sugar diet including sweets, high carbohydrate diet including white rice and potatoes, and fatty food are increasing risk for diabetes. Foods such as whole wheat flat bread (roti), fruits and vegetables, and parboiled rice were considered as preventive of obesity and diabetes. Health professionals also mentioned that a high fiber diet could prevent diabetes.

There were some misconceptions about diet and diabetes as follows:

- Washing rice multiple times decreases the quantity of carbohydrate
- Eating fruits and salads can increase risk for diabetes
- Eating irregularly can lead to diabetes
- Satiation after eating causes weight gain
- A particular type of rice (tychin rice) causes diabetes and obesity.

Consumers' perspective on facilitators to healthy eating

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Participants highlighted that hospital is in a unique position because most of the staff are health professionals and changes to improve food quality should be well received. When teachers and doctors eat healthy food, they will be a role model for other staffs and students.

Most of us are well-educated doctors and medical personnel. So, there is higher consumption of those things (healthy foods) in the cafeteria. I am not sure about other places, but in the hospital cafeteria, the consumers are concerned about their health" (a health professional)

The most commonly reported factors that would facilitate healthy eating were: (a) the addition of healthy food options, (b) the replacement of unhealthy foods with healthy options, and (c) an appealing presentation of healthy foods. The participants suggested that gradual change might lead to better acceptance. Also, the need for active involvement of canteen management and administrator in the process of change was frequently emphasized. The participants thought that change only in the cafeteria would not be enough. It would be important to advertise healthy food options and educate both cafeteria operators and consumers on healthy eating.

"Health information will increase the awareness of the people and once the people will realize the importance of the health, they will change the behavior and might also pay higher cost for the healthy food." (An administrative staff)

Providers' perspective on facilitators to healthy eating

Cafeteria operator commented that higher level authorities should be involved in making healthy changes to the hospital cafeteria, determining the menu and fixing the prices. One of the

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canteen managers highlighted a need of the committee involving the canteen operators, administrative staff, medical doctors and nutritionists to decide on the changes in menu, prices, and to monitor the continuing availability of healthy options in canteen.

"We keep talking about the changes in menu and price with the Sirs (higher authorities); such decisions (on menu and price) should be done by the system (by hospital management)".(a canteen operator)

The operators mentioned that the hospital cafeteria provides food with subsidized price and does not intend to make profit, which supports making healthy changes. The operators were concerned about the lack of knowledge about the healthy eating among the cafeteria staff, and pointed out that providing health education to them would facilitate in making changes. They mentioned that the cafeteria staff receive training on hygiene occasionally, but have never received training about healthy eating and healthy cooking.

Consumers' perspective on barriers to healthy eating

The major barriers to healthy eating that came up in the discussion were: (a) unavailability of healthy options, (b) lack of human resources to prepare healthy food, and (c) high price of healthy food and (d) food preferences. The participants noticed that there are limited human resources in the cafeterias and it would not be possible to prepare more food options. Thus, they suggested for adding healthy items which will demand fewer resources like addition of oats, fruits etc. and adding the automated machines such fruit juice makers and roti makers.

"Breakfast should have varieties, no? It should not be the same every day"

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(a support staff)

"I feel that there is inadequate human resource, that why it might be like that (less varieties). Everyone is busy there (in cafeteria)". (a health professional).

The participants also expressed that the cost of healthy food will matter. Especially, the support staff commented that they might not be consuming fruits even if they are added because of the high cost. However, health professionals expressed their willingness to pay more for access to healthy food.

From our side (support staff) consumption (of fruits) will be less. But, from higher level staff (doctors and nurses), consumption will be high. After all it is all about money. (a support staff)

The participants were concerned that it will be difficult to change food preferences as most consumers will prefer spicy and oily foods. Some unhealthy foods are greatly loved such as instant noodles, samosas, cream donuts, soda drinks etc., and changing food habit will be challenging.

You are talking about removing instant noodles? It is easy to say, but everyone prefers fast food such as instant noodles, samosas, donuts…. (an administrative staff)

Removing such food will give rise to many objections (an administrative staff)

Providers' perspective on barriers to healthy eating

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The major barrier for healthy eating reported by canteen operator were: (a) lack of adequate human resources to add food options; (b) lack of knowledge about healthy cooking practice among cafeteria staff, (c) unavailability of healthy food options in the cafeteria and (d) no food supply for healthy foods such as brown rice, brown bread, organic vegetables.

The canteen operator reported that they are not sufficiently well-staffed to provide healthy foods such as whole wheat pan bread (roti), fruits, and salad as they are labor intensive to prepare. However, the human resource manager thought that increasing the efficiency of the available staff would be more important than adding staff.

"It takes hours to prepare the whole wheat pan bread (roti), and two people are needed to do that, and one more to serve. we do not have enough staff" (a cafeteria staff)

Discussion

The purpose of the current study was to understand perceptions about healthy eating; and explore the factors that facilitate and impede healthy food choices at DH-KUH cafeterias from the consumers and providers point of view. The consumers perceived hygienic foods as healthy. Health professionals described healthy food as a balance of carbohydrate, protein, fats, mineral and vitamins according to the activity level of a person. The participants identified food groups including fruit, vegetable, meat, fish, yogurt as healthy and fast and fried food as unhealthy. From the consumers' perspectives, facilitators of healthy eating were the addition of healthy food options, replacement of unhealthy foods with healthy options, and an appealing

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presentation of healthy foods. Barriers were: unavailability of healthy options, lack of human resources to prepare healthy food, the high price of healthy food, and preferences for unhealthy food. From the providers' perspective, the major facilitators of healthy eating were: involving higher authorities in introducing change, forming a committee representing cafeteria staff, management, human resources, nutritionists and consumers. The major barriers were: lack of human resources, unavailability of healthy foods in the market, unavailability of healthy food in the cafeteria and lack of knowledge about healthy eating among cafeteria staff.

Almost all participants identified hygienic foods as healthy, more so by the support staff who had lower socio-economic status. This might be because of the Nepal government's large scale health education campaign against food-borne diseases such as diarrhea, cholera and typhoid by providing health education regularly.[18] The health professionals also associated healthy eating with the nutrient value of food and their amount. The support staff did not care about food quality and quantity. Similar findings were reported from a study among manual laborers in eastern Nepal.[15] This highlights the need for the health education about healthy eating in terms of food quality and quantity in general population. The participants agreed that food groups such fruits and vegetables were healthy, which is incongruous with another study from Nepal.[15] Despite the apparent knowledge, 99% of Nepalese do not consume at least five servings of fruits and vegetables per day.[5] Unaffordability was reported as a major barrier to eating fruits. In addition, the availability of fruits and vegetables is seasonal in Nepal. So, it is important to ensure the regular supply of fruits and vegetables in affordable price.

One of the most important promoters of healthy eating identified by participants in this study was the availability of affordable healthy food options in the cafeteria. This finding is consistent

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with other studies from Nepal.[11 15] Subsidizing the cost of food has been shown to be effective on promoting healthy dietary behaviors.[19] This strategy, however, would be challenging in the setting where cafeterias are profit oriented.[11] However, the administrative authorities in the hospital have specified that the cafeterias do not have a profit motive, making it easier to provide healthy food in subsidized rate.

It emerged in the discussions that involvement and ownership of all the stakeholders is necessary for making changes in the cafeterias. The administrative staff specially emphasized the need for the involvement of higher level authorities for making major decisions about changes. In addition, they recommended creating a committee representing all the stakeholders. "Stakeholders consultation and buy in" is a key component for successful implementation of any program.[20 21]

Commonly mentioned barriers to healthy eating were unavailability of healthy options, cost of healthy food, insufficient human resources and difficulty in changing food eating behavior. The canteen operators and the managers also highlighted challenges regarding obtaining healthy food from the market to provide the healthy options. Availability of food has been reported a barrier for consumption of healthy food in other studies.[22] High cost, scarcity and negative perception were major barriers for the consumption of healthy food options in a study from Tanzania.[23] Nestle and colleagues also reported that economic considerations may serve as barriers to healthy eating.[24]

Personal preferences for unhealthy foods were also commonly reported as a barrier to eating healthy. Other study has also reported that food characteristics including taste, appearance and

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smell strongly influence food choices.[25] Choices, availability and cost of food were also seen as being important in the worksite setting in another study.[11] The lack of affordable acceptable food options has previously been identified as a barrier.[26]

Lack of knowledge among cafeteria staff was also commonly cited as a major barrier. To respond this, the administrative authorities suggested providing training to the staff. Training of staff has been seen as essential for encouraging the provision of tasty, healthy foods.[27] Another study from eastern Nepal also reported the need for training the cafeteria staff on healthy diets and healthy meal preparation methods.[15] The consumers and cafeteria staff noted the lack of human resources to provide food options. However, the administrative authorities mentioned that increasing efficiency of the staff was more important than simply adding more staff. This indicates the need of automated machines including roti-makers, juicers to allow for the preparation of healthy food options more quickly.

The limitations of the present study include the small number of people included who may not be fully representative of the worksite. However, we conducted four focus group discussions stratified by different cadres of professionals representing both high and low socio-economic status in the workplace. We did not create strata by body mass index (BMI) although overweight/obese individual may have different perceptions about healthy eating and barriers or facilitators for eating than healthy individuals. The worksite is non-profit organization with in-house subsidized cafeterias, thus these finding may not be generalizable to privately run tertiary hospital or worksites where the cafeteria are profit oriented. Lastly, social desirability bias may have occurred if the focus group participants felt that they could not express personal barriers or expressing on the knowledge of healthy eating.

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Despite these limitations, there are several notable strengths to this study. This is the first study to explore the facilitators and barriers for healthy eating in hospital setting in Nepal. The study considered a wide range of the staff to obtain their views. We have explored the view of cafeteria users as well as cafeteria operators. Among the cafeteria users, there were four strata of support staffs, administrators and managers, and health professionals with or without shifts duty. We have identified a complex picture of views and opinions about healthy eating in the workplace and the consequent enablers and challenges for designing effective workplace healthy-eating intervention.

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Conclusions: Among the employee of the hospital, healthy food commonly defined as hygienic and balanced diet. In addition fruits and vegetables were considered healthy. Availability of affordable healthy foods in cafeteria, along with increase health awareness, commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

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Author contribution:

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DT and AS conceived the study. AS, DT, VM, JM, BMK and DS contributed to the design of the study and development and pretesting of tools. AS, and DT contributed to data collection, and transcription. AS, DT and AR participated in management and analysis of the data. DT and AS developed the manuscript. All authors read and approved the final manuscript.

Disclosure Statement: The author declared no competing interest

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Paper context:

The employee's opinion about healthy eating in the workplace is limited. The study informed that availability of affordable healthy foods in cafeteria, along with increase health awareness, commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace from consumer and providers point of views. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

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Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

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	Page/line no(s).
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1-2
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2-3

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Purpose or research question - Purpose of the study and specific objectives or questions	

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Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	5
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Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	8
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	9
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Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	18-22
Limitations - Trustworthiness and limitations of findings	

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	22
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	23

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

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Drivers of healthy eating in a workplace in Nepal – a qualitative study

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Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health, Qualitative research
Keywords:	workplace, qualitative study, diet, facilitators, barriers

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Drivers of healthy eating in a workplace in Nepal – a qualitative study

Authors

Dipesh Tamrakar (1): bob.dipesh@gmail.com

Archana Shrestha (2,3): dearsquare@gmail.com

Anjana Rai (4): anjirai@hotmail.co.uk

Biraj Man Karmacharya (2): birajmk@gmail.com

Vasanti Malik (5): vmalik@hsph.harvard.edu

Josiemer Mattei (5): jmattei@hsph.harvard.edu

Donna Spiegelman (3,5,6,7,8): donna.spiegelman@yale.edu

Affiliations

1. Department of Community Medicine, Kathmandu University, Dhulikhel, Nepal
2. Department of Public Health, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal
3. Department of Epidemiology, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
4. Family Health International 360, Nepal
5. Department of Nutrition, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
6. Department of Global Health and Population, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA

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7. Department of Biostatistics, Harvard TH Chan School of Public health, Boston, Massachusetts, USA

8. Center on Methods for implementation and prevention science, Department of Biostatistics Yale School of Public Health, New Haven, CT, USA

Corresponding author

Archana Shrestha

Hospital Road, Dhulikhel, Nepal

Contact number: +977-9840764738

Email: archana@kusms.edu.np

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ABSTRACT

Objective:

To explore the perceptions, enablers and barriers to employee's healthy eating in a hospital site in central Nepal.

Design: A qualitative study including focus group discussion and in-depth interview, data were analyzed using thematic analysis method.

Settings: The study was carried out among the employees of Dhulikhel Hospital-Kathmandu University Hospital.

Participants: Focus group discussions were conducted among the 33 participants stratified into four groups of (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours. Nine in-depth interviews were conducted among 6 canteen operators and 3 managers.

Results:

Healthy eating was defined primarily as hygienic and fresh foods, balanced diet, and food groups like fruits and vegetables. Major factors that promote healthy eating were the availability of affordable healthy food options in the cafeteria, commitment from the cafeteria operator and managers, and health awareness among cafeteria operators and staffs. The most commonly

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reported barriers for healthy eating included unavailability of healthy options, limited human resources in the cafeteria and the high price of healthy food.

Conclusion: The availability of affordable healthy foods, commitment from cafeteria managers, and health awareness among cafeteria operators may promote healthy eating among employees at a hospital setting in Nepal.

Strengths and Limitations of Study:

- This is first study to explore the facilitators and barriers for healthy eating in a hospital setting in Nepal.
- The study represents the in-depth views of both cafeteria users as well as cafeteria operators
- Participants were recruited from different strata of the employees representing varied income, education and work hours .
- There might be social desirability bias during focus group discussion while expressing their healthy eating behavior.
- The findings may not be generalizable to worksites other than hospital setting or other hospital which are different from our setting.

Introduction

Unhealthy eating is related to increased risk of chronic diseases, including heart disease, diabetes, and cancer.[1] Diet directly increases the risk of these chronic diseases, and additionally contributes to increased risk indirectly through overweight and obesity.[2] Diets high in whole

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grains, fruits and vegetables and low in red meat, saturated and trans-fat are recommended to reduce chronic disease.[3 4] Eating behavior, however, results from a complex interplay of influences at the individual, social and environmental levels.

Nepal is one of the least developed countries in the world, which is experiencing the epidemiological transition from infectious disease to chronic diseases. Ischemic heart disease, chronic obstructed pulmonary disease and stroke are the top three causes of death in 2017.[5] A fourth of the adult Nepalese population are overweight, 4% have diabetes, and 26% have hypertension.[6] An unhealthy diet might have contributed to the high prevalence of these diseases and risk factors.[7 8] In Nepal, the typical dietary pattern with refined grains, meat and alcohol was associated with a higher prevalence of overweight and obesity.[7] Deep fried foods were associated with hypertension; the cereal and vegetable pattern was inversely associated with diabetes prevalence.[9]

Considering the epidemiological transition, it is important to identify the social environments, such as the workplace, that influence healthy eating and consequent health. Given the considerable time employees spend on their jobs, worksites are an important venue to reach large numbers of adults to facilitate healthy eating.[10] In addition, workplaces might support long term behavioral changes through social support and changes in foods available.[11 12] The efficacy of workplace approaches in promoting healthy diet has been consistently reported in the literature.[13] Workplaces can provide employees with opportunities, resources and support that influence eating behavior.[14] The food environment at the workplace, especially food availability, preparation, and prices, can facilitate or create a barrier to healthy eating.[10 12]

The literature assessing employee’s opinion about healthy eating in the workplace is limited.[15] Previous studies showed that workers are aware of the importance of changing unhealthy behaviors and they are willing to eat healthy if the foods were tasty, convenient, reasonably

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priced and of good quality.[16] Previously reported barriers to healthy eating include long working hours, unavailability of healthy food, distance to facilities and poor dining facilities.[15 17 18] A study conducted in a factory in eastern Nepal reported that the availability of healthy foods at affordable price, combined with an increased level of awareness and commitment from the worksite management might result in healthier food choices in the workplace.[19] Given that the each workplaces is unique and complex environment, the present qualitative study aims to explore the perceptions and views of staff on healthy eating, enablers and barriers to healthy eating in a hospital site in central Nepal.

METHODS

We conducted an exploratory qualitative study to investigate the perceptions, enablers and barriers to employee's healthy eating in a hospital. Qualitative design was chosen for study because it aims to investigate the 'how' and 'why' of individual behavior and is able to answer complex questions about food-related perceptions and behaviors.[20]

Study Site and Settings

The study was conducted at Dhulikhel Hospital-Kathmandu University Hospital (DH-KUH), an independent, not for profit, non-government institution. It is 400 bedded tertiary hospital that annually serves about 2.2 million people within its catchment area. It is one of the largest tertiary level hospitals in central Nepal. The Hospital has varied backgrounds employees ranging from health personnel (doctors, nurses, and assistants), support staff (drivers, cook, laundry, gardeners and ward boys), and administrative staff. DH-KUH has four functional cafeterias that operate 16 hours a day on the hospital premises. The researchers from Nepal (DT, AS, BMK) are employees of the hospital and are regular customers of the cafeteria. The cafeterias serve

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breakfast, lunch and snack. One of the cafeterias also serves dinner. Each day, a pre-determined menu is offered for breakfast that includes kheer (rice porridge), samosas, puri (deep fried pan bread), vegetable curry, eggs, white bread, and bakery items such as cakes, donuts, white buns and puffs. Lunch usually consists of white rice, lentil soup, vegetable curry, chicken curry, and yogurt. The snack include noodles, fried rice, biscuits, confectionaries etc. Hot (tea, coffee) and cold (sodas) beverages are available.

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Recruitment

All employees (1040) of the hospital were eligible to participate in the present study. From the list of employees, we purposely grouped them in four distinct categories: (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours to represent different cadres of staff. We decided to separate the health personnel into two groups of those working during office hours and those working on shifts because the availability of foods and working conditions are different between these two. A research assistant then met potential participants in each group at a pre-scheduled time to explain the purpose of the study and administered informed consent using a standard script, until a required sample size was met. A total of 64 participants were approached for the four pre-determined focus group discussions, out of which 40 agreed to participate. Seven of those who initially agreed to participate did not show up.

In addition, we purposively selected a finance manager, a cafeteria manager, an administrative manager and 6 cafeteria operators for in-depth interviews.

Focus Group Discussions

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The focus groups were conducted within the workplace setting in a private room to ensure confidentiality and honest sharing of opinion. FGDs were conducted in Nepali and audio taped. The investigators, AS or DT, moderated all FGDs in Nepali and were assisted by a note-taker. In each session, the moderator briefly introduced the study and explained the ethical considerations for maintaining confidentiality of the participants. The moderator asked open-ended questions and probed for more detailed information. We used an iterative process by discussing each FGD immediately after completion and suggesting further detailed probing in emerging themes from the previous findings. For example, a theme on healthy alternatives to white rice emerged. In the subsequent FGDs, we added separate questions on healthy alternatives to white rice.

The team developed the focus group guideline and reviewed for content and readability after pretesting with nine participants, who were employees of the hospital. The pre-tested focus group was not included in this analysis. The FGD guide consisted of semi-structured open ended questions guided by socio-ecological model[21] focusing on institutional and organizational factors. Probes for the questions were included to ensure consistency across groups and thorough understanding of the topics. The guide included topics on three main domains: (1) perceptions of healthy and unhealthy eating; (2) facilitators to healthy eating in the worksite; and (3) barriers to healthy eating in the worksite. The examples of questions in each domain is presented in table 1.

Table 1. Examples of the open ended questions in each domain.

Domain	**Example questions**

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Perception of healthy and unhealthy eating	What do you understand by healthy foods?', 'What do you understand by unhealthy foods?'
Facilitators to healthy eating at workplace	What are factors that determine your food choices?', 'What facilitates you to choose healthy food?'
Barriers to healthy eating at workplace	'What obstructs you to choose healthy food?'

In-Depth Interviews

The investigators, DT or AS, conducted semi-structured in-depth interviews in Nepali with the cafeteria operators and administrative managers using a pretested interview guide in a private room of the hospital. The interviews aimed to understand the facilitators and barriers to healthy eating from the hospital administrator's perspective. The moderator interviewed the participants with open-ended questions regarding their views on healthy and unhealthy eating, facilitators and barriers to healthy eating in the worksite, operational and managerial aspects of the cafeteria, and facilitators and barriers for making changes that promote healthy eating. The questions such as 'What are healthy and unhealthy foods in your cafeteria?', 'What are changes that are necessary for making cafeteria healthier?', 'What are factors that could facilitate for making cafeteria healthier?' and 'What are the challenges for making cafeteria healthier?' were asked. In each case, the moderator probed for further descriptive information.

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We used an iterative process for data collection. After each interview, we discussed each interview and identified the topics to be deeply explored by the themes emerging in earlier interviews.

Patient and Public Involvement

No patient involved

Analysis

All FGDs and interviews were transcribed verbatim into Nepali by trained research assistants. AS and DT independently reviewed the transcripts against the audio recording for potential discrepancies or incomplete data. A thematic analysis approach was used for data analysis.[22] This process involved familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. One FGD and two interview transcripts were coded inductively by two independent coders to enhance validity. The coders then compared the coding schemes and resolved the differences. The codebook was then finalized. All the transcripts were coded using RQDA; segments of the text that were related to a common theme were pieced together; emergent themes were identified; reviewed; and defined.

Results

Characteristics of the participants

Thirty-three adults participated in four focus group discussions ranging from 7 to 10 participants in each session. Nine staffs of canteen and hospital administration participated in in-depth interviews. The characteristics of the participants are presented in Table 2. The mean age of participants was 33 years, range from 23 to 44 years. Sixty percent were male. About half earned less than 3 dollars per day. About 48% self-reported as alcohol drinkers and 10% as

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smokers. Fifty percent of them were overweight, 6% reported to have high blood pressure and 2% reported to have diabetes.

Table 2 Baseline Characteristics of the Participants

Characteristics	Focus Group participants (n=33)	In-depth interviews participants (n=9)	Total
Age (Mean ± SD)	32.8 ± 5.5	35.3 ± 9.9	33.33±6.43
Male, n(%)	17 (51.5)	8 (88.9)	25 (59.5)
Income, n(%)			
< 3$/day	14 (42.4)	6 (66.7)	20 (47.6)
>3$/day	19 (67.6)	3 (33.3)	22 (52.4)
Education, n(%)			
High school and lower	13 (39.4)	3 (33.3)	16 (38.1)
More than High School	20 (70.6)	6 (66.7)	26 (61.9)
Alcohol Drinking, n(%)			
Non-Drinker	18 (54.5)	4 (44.4)	22 (52.4)
Drinker	15 (45.5)	5 (55.6)	20 (47.6)

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Smoking, n(%)			
Smoker	7 (26.2)	3 (33.3)	10 (23.8)
Non-Smoker	26 (78.8)	6 (66.7)	32 (76.2)
Vegetarian, n(%)			
Yes	2 (6.1)	0 (0.0)	2 (4.7)
No	31(93.9)	9 (100.0)	40 (95.3)
BMI Categories, n(%)			
Normal (18.5- <25) kg/m^2	17 (51.5)	4 (44.4)	21(50.0)
Overweight (25+) kg/m^2	16 (49.5)	5 (55.6)	21(50.0)
Known Hypertension, n(%)			
Yes	2 (6.1)	4 (44.4)	6 (14.3)
No	31 (93.9)	5 (55.6)	36 (85.7)
Known Diabetes, n(%)			
Yes	0(0.0)	3 (11.1)	3 (2.4)
No	33 (100.0)	8 (88.9)	41(97.6)

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Perception on Healthy and Unhealthy Eating

The participants explained the healthy and unhealthy food in terms of food groups, characteristics of food, and cooking processes.

Healthy Eating

Most of participants described healthy eating as hygienically prepared food and balanced diet, defined as the mix of carbohydrates, proteins, fats, minerals, and vitamins consumed according to level of physical activity. However, support staff group were not aware of the balance diet. Most of them considered fruits and vegetables, and the traditional Nepali diet (white rice, lentils soup and vegetable curry) as healthy food. Physicians were critical about considering the traditional Nepali diet as healthy because of its high carbohydrate content, particularly with white rice and potatoes. Other items including meat, fish, whole grains, yogurts etc. were also considered as healthy. Most participants associated the word 'healthy' with 'hygiene' and expressed that hygienic foods in general are healthy.

A healthy food means that it should contain all necessary nutrients. On the top of that, it should also be in an adequate amount according to the age and type of work they are engaged in. To add to that, we should understand healthy means hygienic, i.e. free from harmful microorganisms. (a health professional)

Healthy and balanced means rice, lentils, vegetables, fish and meat …… considering them as clean and good. (a support staff).

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Unhealthy Eating

Unhealthy eating was defined as eating stale (*Basi*) and unhygienic food. Most of the participants reported oily food, fast food such as noodles, chips, categorized soda (Coke, Fanta, Sprite) as unhealthy. However, one of the participants from support staff group said that the sodas are healthy and can be used to treat gastritis.

"My mother used to say that Coke is good for gastritis. She used to ask me to bring that black Coke" (a support staff)

Health professionals emphasized that excess carbohydrate such as rice was unhealthy. However, the support staff did not have any concern about the amount of the food. Most participants said that frying food was unhealthy. Almost all participants expressed concerned about the overuse of chemical fertilizer and insecticides in food.

"Food should be considered in both qualitative and quantitative way ...Healthy food means balance diet that contains adequate amount of protein, carbohydrate etc. Unhealthy means eating a lot. (a health professional)

On asking about the food that are risk for diabetes or prevent from diabetes, the majority mentioned high sugar diet including sweets, high carbohydrate diet including white rice and potatoes, and fatty food increase the risk for diabetes. Foods such as whole wheat flat bread (roti), fruits and vegetables, and parboiled rice were considered as preventive of obesity and diabetes. Health professionals also mentioned that a high fiber diet could prevent diabetes.

There were some misconceptions about diet and diabetes as follows:

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- Washing rice multiple times decreases the quantity of carbohydrate
- Eating fruits and salads can increase risk for diabetes
- Eating irregularly can lead to diabetes
- Satiation after eating causes weight gain
- A particular type of rice (tychin rice) causes diabetes and obesity.

Consumers' perspective on facilitators to healthy eating

Participants highlighted that hospital is in a unique position because many employees are health professionals who are expected to well receive the changes to improve food quality.

Most of us are well-educated doctors and medical personnel…I am not sure about other places, but in the hospital cafeteria, the consumers are concerned about their health" (a health professional)

The most commonly reported factors that would facilitate healthy eating were: (a) the addition of healthy food options, (b) the replacement of unhealthy foods with healthy options, and (c) an appealing presentation of healthy foods. The participants suggested that gradual change might lead to better acceptance. Also, the need for active involvement of canteen management and administrator in the process of change was frequently emphasized. The participants said that it would be important to advertise healthy food options and educate both cafeteria operators and consumers on healthy eating.

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“Health information will raise the awareness and once the people realize the importance of health, they are likely to pay higher price for the healthier foods.” (An administrative staff)

Providers’ perspective on facilitators to healthy eating

Cafeteria operator commented that higher level authorities should be involved in making healthy changes to the hospital cafeteria, determining the menu and the prices. One of the canteen managers highlighted a need of the committee involving the canteen operators, administrative staff, medical doctors and nutritionists to decide on the changes in menu, prices, and to monitor the continuing availability of healthy options in canteen.

“We keep talking about the changes in menu and price with the Sirs (higher authorities)… such decisions (on menu and price) should be taken by the system (by hospital management)”.(a canteen operator)

The operators mentioned that the cafeteria provides food with subsidized price and does not intend to make profit. The operators were concerned about the lack of knowledge about the healthy eating among the cafeteria staff, and pointed out that providing health education to them would facilitate in making changes. They mentioned that the cafeteria staff receive training on hygiene occasionally, but have never received training about healthy eating and cooking.

Consumers’ perspective on barriers to healthy eating

The major barriers to healthy eating that came up in the discussion were: (a) unavailability of healthy options, (b) lack of human resources to prepare healthy food, (c) high price of healthy food and (d) food preferences. The participants noticed that there are limited human resources

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in the cafeterias and it would not be possible to prepare more food options. Thus, they suggested for adding healthy items which will demand fewer human resources like addition of oats, fruits etc. and adding the automated machines such as fruit juice makers and roti makers.

"Breakfast should have varieties, no? It should not be the same every day"

(a support staff)

"I feel that there is inadequate human resource, that why it might be like that (less varieties). Everyone is busy there (in cafeteria)". (a health professional).

The participants also expressed that the price of healthy food will matter. Especially, the support staff commented that they might not be consuming fruits even if they are added because of the high price. However, health professionals expressed their willingness to pay more for healthy food.

We (support staff) consume less (fruits). But, higher level staff (doctors and nurses), consume more (fruits). After all, it is all about money. (a support staff)

The participants were concerned that it will be difficult to change food preferences as most consumers prefer spicy and oily foods. Some unhealthy foods are greatly loved such as instant noodles, samosas, cream donuts, soda drinks etc., and changing food habit will be challenging.

You are talking about removing instant noodles? It is easy to say, but everyone prefers fast food such as instant noodles, samosas, donuts…. (an administrative staff)

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Removing such food will lead to objections (an administrative staff)

Providers' perspective on barriers to healthy eating

The major barrier for healthy eating reported by canteen operator were: (a) lack of adequate human resources to add food options; (b) lack of knowledge about healthy cooking practice among cafeteria staff, (c) unavailability of healthy food options in the cafeteria and (d) no food supply for healthy foods such as brown rice, brown bread, organic vegetables.

The canteen operator reported that they are not sufficiently staffed to provide healthy foods such as whole wheat pan bread (roti), fruits, and salad as they are labor-intensive to prepare. However, the human resource manager thought that increasing the efficiency of the available staff would be more important than adding staff.

"It takes hours to prepare the whole wheat pan bread (roti), and two people are needed prepare (roti), and one more to serve it. We do not have enough staff" (a cafeteria staff)

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Discussion

The purpose of the current study was to understand perceptions about healthy eating; and explore the factors that facilitate and impede healthy food choices at DH-KUH cafeterias from the consumers and providers point of view. The consumers perceived hygienic foods as healthy. Health professionals described healthy food as a balance of carbohydrate, protein, fats,

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mineral and vitamins according to the activity level of a person. The participants identified food groups including fruit, vegetable, meat, fish, yogurt as healthy and fast and fried food as unhealthy. From the consumers' perspectives, facilitators of healthy eating were the addition of healthy food options, replacement of unhealthy foods with healthy options, and an appealing presentation of healthy foods. Barriers were: unavailability of healthy options, lack of human resources to prepare healthy food, the high price of healthy food, and preferences for unhealthy food. From the providers' perspective, the major facilitators of healthy eating were: involving higher authorities in introducing change, forming a committee representing cafeteria staff, management, human resources, nutritionists and consumers. The major barriers were: lack of human resources, unavailability of healthy foods in the market, unavailability of healthy food in the cafeteria and lack of knowledge about healthy eating among cafeteria staff.

Almost all participants identified hygienic foods as healthy, more so by the support staff who had lower socio-economic status. This might be because of the Nepal government's large scale health education campaign against food-borne diseases such as diarrhea, cholera and typhoid.[23] The health professionals also associated healthy eating with the nutrient value of food and their amount. The support staff did not care about food quality and quantity. Similar findings were reported from a study among manual laborers in eastern Nepal.[19] This highlights the need for the health education about healthy eating in terms of food quality and quantity in general population. The participants agreed that food groups such as fruits and vegetables were healthy, which is incongruous with another study from Nepal.[19] Despite the apparent knowledge, 99% of Nepalese do not consume at least five servings of fruits and vegetables per day.[6] Unaffordability was reported as a major barrier to eating fruits. In addition, the availability of fruits and vegetables is seasonal in Nepal. So, it is important to ensure the regular supply of fruits and vegetables in affordable price.

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One of the most important promoters of healthy eating identified by participants in this study was the availability of affordable healthy food options in the cafeteria. This finding is consistent with other studies from Nepal.[15 19] Subsidizing the price of food has been shown to be effective on promoting healthy dietary behaviors.[24] This strategy, however, would be challenging in the setting where cafeterias are profit oriented.[15] However, the administrative authorities in the hospital have specified that the cafeterias do not have a profit motive, making it easier to provide healthy food in subsidized rate.

It emerged in the discussions that involvement and ownership of all the stakeholders is necessary for making changes in the cafeterias. The administrative staff specially emphasized the need for the involvement of higher level authorities for making major decisions about changes. In addition, they recommended creating a committee representing all the stakeholders. “Stakeholders consultation and buy in” is a key component for successful implementation of any program.[25 26]

Commonly mentioned barriers to healthy eating were unavailability of healthy options, price of healthy food, insufficient human resources and difficulty in changing food eating behavior. The canteen operators and the managers also highlighted challenges regarding obtaining healthy food from the market to provide the healthy options. Availability of food has been reported a barrier for consumption of healthy food in other studies.[27] High price, scarcity and negative perception were major barriers for the consumption of healthy food options in a study from Tanzania.[28] Nestle and colleagues also reported that economic considerations may serve as barriers to healthy eating.[29]

Personal preferences for unhealthy foods were also commonly reported as a barrier to eating healthy. Other study has also reported that food characteristics including taste, appearance and

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smell strongly influence food choices.[30] Choices, availability and price of food were also seen as being important in the worksite setting in another study.[15] The lack of affordable acceptable food options has previously been identified as a barrier.[31]

Lack of knowledge among cafeteria staff was also commonly cited as a major barrier. To respond this, the administrative authorities suggested providing training to the staff. Training of staff has been seen as essential for encouraging the provision of tasty, healthy foods.[32] Another study from eastern Nepal also reported the need for training the cafeteria staff on healthy diets and healthy meal preparation methods.[19] The consumers and cafeteria staff noted the lack of human resources to provide food options. However, the administrative authorities mentioned that increasing efficiency of the staff was more important than simply adding more staff. This indicates the need of automated machines including roti-makers, juicers to allow for the preparation of healthy food options more quickly.

The limitations of the present study include the small number of people included who may not be fully representative of the worksite. However, we conducted four focus group discussions stratified by different cadres of professionals representing both high and low socio-economic status in the workplace. We did not create strata by body mass index (BMI) although overweight/obese individual may have different perceptions about healthy eating and barriers or facilitators for eating than healthy individuals. The worksite is non-profit organization with in-house subsidized cafeterias, thus these finding may not be generalizable to privately run tertiary hospital or worksites where the cafeteria are profit oriented. Social desirability bias may have occurred if the focus group participants felt that they could not express personal barriers or

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expressing on the knowledge of healthy eating. Lastly, the study did not explore the social determinants that influence healthy eating among employees.

Despite these limitations, there are several notable strengths to this study. This is the first study to explore the facilitators and barriers for healthy eating in hospital setting in Nepal. The study considered a wide range of the staff to obtain their views. We have explored the view of cafeteria users as well as cafeteria operators. Among the cafeteria users, there were four strata of support staffs, administrators and managers, and health professionals with or without shifts duty. We have identified a complex picture of views and opinions about healthy eating in the workplace and the consequent enablers and challenges for designing effective workplace healthy-eating intervention.

The results of this study are valuable in designing appropriate cafeteria-based interventions to sustained healthy eating behaviors in worksites in Nepal. Availability of healthy food options at an affordable price, involvement of stakeholders at all levels of decision making, and increasing awareness on healthy eating would be crucial part of a worksite based environmental interventions to improve diet of employees. The interventions focusing on healthful, less expensive food preparation, or selection of more convenient yet inexpensive healthful food, may help overcome the most common barriers in this population.

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Conclusions: Among the employee of the hospital, healthy food commonly defined as hygienic and balanced diet. In addition fruits and vegetables were considered healthy. Availability of affordable healthy foods in cafeteria, along with increase health awareness, commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

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Author contribution:

DT and AS conceived the study. AS, DT, VM, JM, BMK and DS contributed to the design of the study and development and pretesting of tools. AS, and DT contributed to data collection, and transcription. AS, DT and AR participated in management and analysis of the data. DT and AS developed the manuscript. All authors read and approved the final manuscript.

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Paper context:

The employee's opinion about healthy eating in the workplace is limited. The study informed that availability of affordable healthy foods in cafeteria, along with increase health awareness, commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace from consumer and providers point of views. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

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Data Availability Statement: No additional data available

References:

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Standards for Reporting Qualitative Research (SRQR)*

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Title and abstract

Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1-2
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2-3

Introduction

Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
Purpose or research question - Purpose of the study and specific objectives or questions	

Methods

Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	5
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Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	6-7
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	23
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Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	7
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	8
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	9
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Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	9-18
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	18-22
Limitations - Trustworthiness and limitations of findings	

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	22
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	23

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

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BMJ Open

Drivers of healthy eating in a workplace in Nepal – a qualitative study

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Secondary Subject Heading:	Global health, Qualitative research
Keywords:	workplace, qualitative study, diet, facilitators, barriers

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Drivers of healthy eating in a workplace in Nepal – a qualitative study

Authors

Dipesh Tamrakar (1): bob.dipesh@gmail.com

Archana Shrestha (2,3): deararchana@gmail.com

Anjana Rai (4): anjirai@hotmail.co.uk

Biraj Man Karmacharya (2): birajmk@gmail.com

Vasanti Malik (5): vmalik@hsph.harvard.edu

Josiemer Mattei (5): jmattei@hsph.harvard.edu

Donna Spiegelman (3,5,6,7,8): donna.spiegelman@yale.edu

Affiliations

1. Department of Community Medicine, Kathmandu University, Dhulikhel, Nepal
2. Department of Public Health, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal
3. Department of Epidemiology, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
4. Family Health International 360, Nepal
5. Department of Nutrition, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA
6. Department of Global Health and Population, Harvard TH Chan School of Public Health, Boston, Massachusetts, USA

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7. Department of Biostatistics, Harvard TH Chan School of Public health, Boston, Massachusetts, USA
8. Center on Methods for implementation and prevention science, Department of Biostatistics Yale School of Public Health, New Haven, CT, USA

Corresponding author

Archana Shrestha

Hospital Road, Dhulikhel, Nepal

Contact number: +977-9840764738

Email: archana@kusms.edu.np

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ABSTRACT

Objective:

To explore the perceptions, enablers and barriers to employee's healthy eating in a hospital site in central Nepal.

Design: A qualitative study including focus group discussion and in-depth interview, data were analyzed using thematic analysis method.

Settings: The study was carried out among the employees of Dhulikhel Hospital-Kathmandu University Hospital.

Participants: Focus group discussions were conducted among the 33 participants stratified into four groups of (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours. Nine in-depth interviews were conducted among 6 canteen operators and 3 managers.

Results:

Healthy eating was defined primarily as hygienic and fresh foods, balanced diet, and food groups like fruits and vegetables. Major factors that promote healthy eating were the availability of affordable healthy food options in the cafeteria, commitment from the cafeteria operator and managers, education level of employee, and promotion of healthy eating among cafeteria operators and staffs. The most commonly reported barriers for healthy eating included

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unavailability of healthy options, lack of food supply from local market, food preferences, limited human resources in the cafeteria, and the high price of healthy food.

Conclusion: The availability of affordable healthy foods, supply of healthy foods from market, commitment from cafeteria managers, and health awareness among cafeteria operators may promote healthy eating among employees at a hospital setting in Nepal.

Strengths and Limitations of Study:

- This is first study to explore the facilitators and barriers for healthy eating in a hospital setting in Nepal.
- The study represents the in-depth views of both cafeteria operators as well as cafeteria users from different strata representing varied income, education and work hours.
- There might be social desirability bias during focus group discussion while expressing their healthy eating behavior.
- The findings may not be generalizable to worksites other than hospital setting or other hospital which are different from our setting.
- The study has not explore the broader environmental, contextual, social, and commercial determinants of the healthy eating as the study was primarily conducted to understand healthy eating and its determinants in worksite setting to develop worksite specific interventions to promote healthy foods.

Introduction

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Unhealthy eating is related to increased risk of chronic diseases, including heart disease, diabetes, and cancer.[1] Diet directly increases the risk of these chronic diseases, and additionally contributes to increased risk indirectly through overweight and obesity.[2] Diets high in whole grains, fruits and vegetables and low in red meat, saturated and trans-fat are recommended to reduce chronic disease.[3 4]

Eating behavior is results from a complex interplay of influences at the individual, social and environmental levels. Previous studies have emphasized that understanding enablers and barriers to healthy eating in the complex multiple environment is important such as presentation and composition of meals, price of foods, and access to healthy options, and other socio-cultural factors such as time management, family support, and social food environment. [5-7]However, most of these findings are reported from high income countries.

Nepal is one of the least developed countries in the world, which is experiencing the epidemiological transition from infectious disease to chronic diseases. Ischemic heart disease, chronic obstructed pulmonary disease and stroke are the top three causes of death in 2017.[8] A fourth of the adult Nepalese population are overweight, 4% have diabetes, and 26% have hypertension.[9] An unhealthy diet might have contributed to the high prevalence of these diseases and risk factors.[10 11] In Nepal, the typical dietary pattern with refined grains, meat and alcohol was associated with a higher prevalence of overweight and obesity.[10] Deep fried foods were associated with hypertension; the cereal and vegetable pattern was inversely associated with diabetes prevalence.[12]

Considering the epidemiological transition, it is important to identify the social environments, such as the workplace, that influence healthy eating and consequent health. Given the considerable time employees spend on their jobs, worksites are an important venue to reach large numbers of adults to facilitate healthy eating.[13] In addition, workplaces might support long

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term behavioral changes through social support and changes in foods available.[14 15] The efficacy of workplace approaches in promoting healthy diet has been consistently reported in the literature.[16] Workplaces can provide employees with opportunities, resources and support that influence eating behavior.[17] The food environment at the workplace, especially food availability, preparation, and prices, can facilitate or create a barrier to healthy eating.[13 15]

The literature assessing employee's opinion about healthy eating in the workplace is limited.[18] Previous studies showed that workers are aware of the importance of changing unhealthy behaviors and they are willing to eat healthy if the foods were tasty, convenient, reasonably priced and of good quality.[19] Previously reported barriers to healthy eating include long working hours, unavailability of healthy food, distance to facilities and poor dining facilities.[6 18 20] A study conducted in a factory in eastern Nepal reported that the availability of healthy foods at affordable price, combined with an increased level of awareness and commitment from the worksite management might result in healthier food choices in the workplace.[21] Given that the each workplace is unique and complex environment, the present qualitative study aims to explore the perceptions and views of staff on healthy eating, enablers and barriers to healthy eating in a hospital site in central Nepal.

METHODS

We conducted an exploratory qualitative study to investigate the perceptions, enablers and barriers to employee's healthy eating in a hospital. Qualitative design was chosen for study because it aims to investigate the 'how' and 'why' of individual behavior and is able to answer complex questions about food-related perceptions and behaviors.[22]

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Study Site and Settings

The study was conducted at Dhulikhel Hospital-Kathmandu University Hospital (DH-KUH), an independent, not for profit, non-government institution. It is 400 bedded tertiary hospital that annually serves about 2.2 million people within its catchment area. It is one of the largest tertiary level hospitals in central Nepal. The Hospital has varied backgrounds employees ranging from health personnel (doctors, nurses, and assistants), support staff (drivers, cook, laundry, gardeners and ward boys), and administrative staff. DH-KUH has four functional cafeterias that operate 16 hours a day on the hospital premises. The researchers from Nepal (DT, AS, BMK) are employees of the hospital and are regular customers of the cafeteria. The cafeterias serve breakfast, lunch and snack. One of the cafeterias also serves dinner. Each day, a pre-determined menu is offered for breakfast that includes kheer (rice porridge), samosas, puri (deep fried pan bread), vegetable curry, eggs, white bread, and bakery items such as cakes, donuts, white buns and puffs. Lunch usually consists of white rice, lentil soup, vegetable curry, chicken curry, and yogurt. The snacks include noodles, fried rice, biscuits, confectionaries etc. Hot (tea, coffee) and cold (sodas) beverages are available.

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Recruitment

All employees (1040) of the hospital were eligible to participate in the present study. From the list of employees, we purposely grouped them in four distinct categories: (a) support staff, (b) administrators and managers, (c) health personnel who work 8-12 hours shifts, and (d) health personnel who work during office hours to represent different cadres of staff. We decided to separate the health personnel into two groups of those working during office hours and those working on shifts because the availability of foods and working conditions are different between these two. A research assistant then met potential participants in each group at a pre-scheduled

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time to explain the purpose of the study and administered informed consent using a standard script, until a required sample size was met. A total of 64 participants were approached for the four pre-determined focus group discussions, out of which 40 agreed to participate. Seven of those who initially agreed to participate did not show up.

In addition, we purposively selected a finance manager, a cafeteria manager, an administrative manager and 6 cafeteria operators for in-depth interviews.

Focus Group Discussions

The focus groups were conducted within the workplace setting in a private room to ensure confidentiality and honest sharing of opinion. FGDs were conducted in Nepali and audio taped. The investigators, AS or DT, moderated all FGDs in Nepali and were assisted by a note-taker. In each session, the moderator briefly introduced the study and explained the ethical considerations for maintaining confidentiality of the participants. The moderator asked open-ended questions and probed for more detailed information. We used an iterative process by discussing each FGD immediately after completion and suggesting further detailed probing in emerging themes from the previous findings. For example, a theme on healthy alternatives to white rice emerged. In the subsequent FGDs, we added separate questions on healthy alternatives to white rice.

The team developed the focus group guideline and reviewed for content and readability after pretesting with nine participants, who were employees of the hospital. The pre-tested focus group was not included in this analysis. The FGD guide consisted of semi-structured open ended questions guided by socio-ecological model[23] focusing on institutional and organizational factors. Probes for the questions were included to ensure consistency across groups and thorough understanding of the topics. The guide included topics on three main domains: (1)

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perceptions of healthy and unhealthy eating; (2) facilitators to healthy eating in the worksite; and (3) barriers to healthy eating in the worksite. The examples of questions in each domain is presented in table 1.

Table 1. Examples of the open ended questions in each domain.

Domain	**Example questions**
Perception of healthy and unhealthy eating	What do you understand by healthy foods?', 'What do you understand by unhealthy foods?'
Facilitators to healthy eating at workplace	What are factors that determine your food choices?', 'What facilitates you to choose healthy food?'
Barriers to healthy eating at workplace	'What obstructs you to choose healthy food?'

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In-Depth Interviews

The investigators, DT or AS, conducted semi-structured in-depth interviews in Nepali with the cafeteria operators and administrative managers using a pretested interview guide in a private room of the hospital. The interviews aimed to understand the facilitators and barriers to healthy eating from the hospital administrator's perspective. The moderator interviewed the participants with open-ended questions regarding their views on healthy and unhealthy eating, facilitators and barriers to healthy eating in the worksite, operational and managerial aspects of the cafeteria, and facilitators and barriers for making changes that promote healthy eating. The

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questions such as 'What are healthy and unhealthy foods in your cafeteria?', 'What are changes that are necessary for making cafeteria healthier?', 'What are factors that could facilitate for making cafeteria healthier?' and 'What are the challenges for making cafeteria healthier?' were asked. In each case, the moderator probed for further descriptive information.

We used an iterative process for data collection. After each interview, we discussed each interview and identified the topics to be deeply explored by the themes emerging in earlier interviews.

Patient and Public Involvement

No patients were involved in the design, planning and conception of this study. **Analysis**

All FGDs and interviews were transcribed verbatim into Nepali by trained research assistants. AS and DT independently reviewed the transcripts against the audio recording for potential discrepancies or incomplete data. A thematic analysis approach was used for data analysis.[24] This process involved familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. One FGD and two interview transcripts were coded inductively by two independent coders to enhance validity. The coders then compared the coding schemes and resolved the differences. The codebook was then finalized. All the transcripts were coded using RQDA; segments of the text that were related to a common theme were pieced together; emergent themes were identified; reviewed; and defined.

Results

Characteristics of the participants

Thirty-three adults participated in four focus group discussions ranging from 7 to 10 participants in each session. Nine staffs of canteen and hospital administration participated in in-depth

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interviews. The characteristics of the participants are presented in Table 2. The mean age of participants was 33 years, range from 23 to 44 years. Sixty percent were male. About half earned less than 3 dollars per day. About 48% self-reported as alcohol drinkers and 10% as smokers. Fifty percent of them were overweight, 6% reported to have high blood pressure and 2% reported to have diabetes.

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Table 2 Baseline Characteristics of the Participants

Characteristics	Focus Group participants (n=33)	In-depth interviews participants (n=9)	Total
Age (Mean ± SD)	32.8 ± 5.5	35.3 ± 9.9	33.33±6.43
Male, n(%)	17 (51.5)	8 (88.9)	25 (59.5)
Income, n(%)			
< 3$/day	14 (42.4)	6 (66.7)	20 (47.6)
>3$/day	19 (67.6)	3 (33.3)	22 (52.4)
Education, n(%)			
High school and lower	13 (39.4)	3 (33.3)	16 (38.1)
More than High School	20 (70.6)	6 (66.7)	26 (61.9)

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Alcohol Drinking, n(%)			
Non-Drinker	18 (54.5)	4 (44.4)	22 (52.4)
Drinker	15 (45.5)	5 (55.6)	20 (47.6)
Smoking, n(%)			
Smoker	7 (26.2)	3 (33.3)	10 (23.8)
Non-Smoker	26 (78.8)	6 (66.7)	32 (76.2)
Vegetarian, n(%)			
Yes	2 (6.1)	0 (0.0)	2 (4.7)
No	31(93.9)	9 (100.0)	40 (95.3)
BMI Categories, n(%)			
Normal (18.5- <25) kg/m^2	17 (51.5)	4 (44.4)	21(50.0)
Overweight (25+) kg/m^2	16 (49.5)	5 (55.6)	21(50.0)
Known Hypertension, n(%)			
Yes	2 (6.1)	4 (44.4)	6 (14.3)
No	31 (93.9)	5 (55.6)	36 (85.7)
Known Diabetes, n(%)			
Yes	0(0.0)	3 (11.1)	3 (2.4)

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No	33 (100.0)	8 (88.9)	41(97.6)

Perception on Healthy and Unhealthy Eating

The participants explained the healthy and unhealthy food in terms of food groups, characteristics of food, and cooking processes.

Healthy Eating

Most of participants described healthy eating as hygienically prepared food and balanced diet, defined as the mix of carbohydrates, proteins, fats, minerals, and vitamins consumed according to level of physical activity. However, support staff group were not aware of the balance diet. Most of them considered fruits and vegetables, and the traditional Nepali diet (white rice, lentils soup and vegetable curry) as healthy food. Physicians were critical about considering the traditional Nepali diet as healthy because of its high carbohydrate content, particularly with white rice and potatoes. Other items including meat, fish, whole grains, yogurts etc. were also considered as healthy. Most participants associated the word 'healthy' with 'hygiene' and expressed that hygienic foods in general are healthy.

A healthy food means that it should contain all necessary nutrients. On the top of that, it should also be in an adequate amount according to the age and type of work they are engaged in. To

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add to that, we should understand healthy means hygienic, i.e. free from harmful microorganisms. (a health professional)

Healthy and balanced means rice, lentils, vegetables, fish and meat …… considering them as clean and good. (a support staff).

Unhealthy Eating

Unhealthy eating was defined as eating stale (*Basi*) and unhygienic food. Most of the participants reported oily food, fast food such as noodles, chips, categorized soda (Coke, Fanta, Sprite) as unhealthy. However, one of the participants from support staff group said that the sodas are healthy and can be used to treat gastritis.

"My mother used to say that Coke is good for gastritis. She used to ask me to bring that black Coke" (a support staff)

Health professionals emphasized that excess carbohydrate such as rice was unhealthy. However, the support staff did not have any concern about the amount of the food. Most participants said that frying food was unhealthy. Almost all participants expressed concerned about the overuse of chemical fertilizer and insecticides in food.

"Food should be considered in both qualitative and quantitative way ...Healthy food means balance diet that contains adequate amount of protein, carbohydrate etc. Unhealthy means eating a lot. (a health professional)

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On asking about the food that are risk for diabetes or prevent from diabetes, the majority mentioned high sugar diet including sweets, high carbohydrate diet including white rice and potatoes, and fatty food increase the risk for diabetes. Foods such as whole wheat flat bread (roti), fruits and vegetables, and parboiled rice were considered as preventive of obesity and diabetes. Health professionals also mentioned that a high fiber diet could prevent diabetes.

There were some misconceptions about diet and diabetes as follows:

- Washing rice multiple times decreases the quantity of carbohydrate
- Eating fruits and salads can increase risk for diabetes
- Eating irregularly can lead to diabetes
- Satiation after eating causes weight gain
- A particular type of rice (tychin rice) causes diabetes and obesity.

Table 3: Themes and sub themes identified through focus group discussions and in depth interviews

Facilitators to healthy eating	**Barriers to healthy eating**
Consumers perspective - Individual: education level of employee, - Environment: availability of healthy options, stakeholder involvement, Promotion of healthy food and healthy eating	Consumers perspective - Individual: food preferences, high price of the healthy food - Environment: unavailability of healthy options, lack of human resources to prepare healthy food

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Providers perspective - Individual: - Environment: Stakeholder involvement, income of cafeteria, health education about healthy eating to cafeteria staff	Providers perspective - Individual: lack of knowledge and skill for health eating and healthy cooking - Environment: lack of adequate human resources, lack of food supply from local markets

Consumer's perspective on facilitators to healthy eating

Table 3 represent structured list of perceived facilitators and barriers to healthy eating in cafeteria by employee.

The most commonly reported factors that would facilitate healthy eating were: (a) availability of healthy food options, (b) promotion of healthy food and healthy eating, (c) stakeholders involvement, and (d) education of the employee

Availability of healthy food options: The participants said that unhealthy foods should be replaced by healthy foods in a gradual way.

"if we put pan bread (option),those who want rice they will eat rice otherwise eat panbread…… if we put pan bread in hot case then people will eat panbread" (a health personnel)

Promotion of healthy food and healthy eating: The participants emphasized that the presentation of the healthy food should be appealing; and promotion of healthy food options by educating both providers and consumers might improve healthy eating

"*In that case if we aware, as awareness is important, or keep a poster that will increase awareness in our canteen, the attractive one, then we will see when we visit canteen as well as*

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while leaving and will be familiar with poster. Subsequently we will avoid (unhealthy food)" (an administrative staff)

"Health information will raise the awareness and once the people realize the importance of health, they are likely to pay higher price for the healthier foods." (An administrative staff)

Involvement of influential stakeholders: They also, frequently emphasized that there should be active involvement of canteen management and administrator in the process of change

" Rather than asking for canteen staff, change (in cafeteria) should be implemented by more influential people (administration)." (a support staff)

Education level of employee: Participants highlighted that hospital is in a unique position because many employees are health professionals who are well aware of the health and expected to well receive the changes to improve food quality.

"Most of us are well-educated doctors and medical personnel…I am not sure about other places, but in the hospital cafeteria, the consumers are concerned about their health" (a health professional)

Providers' perspective on facilitators to healthy eating

Facilitator to healthy eating according to providers included stakeholder involvement; income of cafeteria; health education on healthy eating to cafeteria staff.

Stakeholder involvement: Cafeteria operator commented that higher level authorities should be involved in making healthy changes to the hospital cafeteria, determining the menu and the prices. One of the cafeteria managers highlighted a need of the committee involving the cafeteria operators, administrative staff, medical doctors and nutritionists to decide on the changes in menu, prices, and to monitor the continuing availability of healthy options in cafeteria.

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"We keep talking about the changes in menu and price with the Sirs (higher authorities)… such decisions (on menu and price) should be taken by the system (by hospital management)".(a cafeteria staff)

Income of cafeteria: The manger mentioned that the cafeteria provides food with subsidized price and does not intend to make profit. All the participants appreciated that the cost of the food at the cafeteria is cheaper compared to market price.

"if I have to say, finance (department) will price the food at a breakeven point. We do not have profit motive………, all the benefit will be for the staff, student or patients, isn't it?" (a finance manager)

Health education on healthy eating to cafeteria staff : The operators were concerned about the lack of knowledge about the healthy eating among the cafeteria staff, and pointed out that providing health education to them would facilitate in making changes.

"if we get training on healthy eating then we will know more about the effect of food items that we use for cooking " (a cafeteria staff)

Consumers' perspective on barriers to healthy eating

The major barriers to healthy eating that came up in the discussion were: (a) unavailability of healthy options, (b) lack of human resources to prepare healthy food, (c) high price of healthy food and (d) food preferences.

Unavailability of healthy options: The participants emphasized that there are less options of healthy food in the cafeteria

"We will start consuming healthy food, but you should provide the (healthy) food (in cafeteria)" (a health professional)

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Inadequate human resources: The participants noticed that there are limited human resources in the cafeterias and it would not be possible to prepare more food options. Thus, they suggested for adding healthy items which will demand fewer human resources like addition of oats, fruits etc. and adding the automated machines such as fruit juice makers and roti makers.

"I feel that there is inadequate human resource, that why it might be like that (less varieties). Everyone is busy there (in cafeteria)". (a health professional).

High price of healthy foods: The participants also expressed that the price of healthy food will matter. Especially, the support staff commented that they might not be consuming fruits even if they are added because of the high price. However, health professionals expressed their willingness to pay more for healthy food.

We (support staff) consume less (fruits). But, higher level staff (doctors and nurses), consume more (fruits). After all, it is all about money. (a support staff)

Food preferences: The participants were concerned that it will be difficult to change food preferences as most consumers prefer spicy and oily foods. Some unhealthy foods are greatly loved such as instant noodles, samosas, cream donuts, soda drinks etc., and changing food habit will be difficult.

You are talking about removing instant noodles? It is easy to say, but everyone prefers fast food such as instant noodles, samosas, donuts…. (an administrative staff)

Removing such food will lead to objections (an administrative staff)

Providers' perspective on barriers to healthy eating

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The major barrier to healthy eating reported by canteen operator included (a) lack of adequate human resources; (b) lack of knowledge and skills on healthy eating and healthy cooking practice; (c) unavailability of healthy food at local market.

Inadequate human resources: The canteen operator reported that they are not sufficiently staffed to provide healthy foods such as whole wheat pan bread (roti), fruits, and salad as they are labor-intensive to prepare. However, the human resource manager thought that increasing the efficiency of the available staff would be more important than adding staff.

"It takes hours to prepare the whole wheat pan bread (roti), and two people are needed prepare (roti), and one more to serve it. We do not have enough staff" (a cafeteria staff)

Less knowledge and skills on healthy eating and cooking: The participants mentioned that the cafeteria staffs do not have adequate knowledge on healthy eating. They had received training on hygiene occasionally, but have never received training on healthy cooking.

"cafeteria staff cannot identify which are healthy food or unhealthy food. Even being general people I cannot separate it." *(a cafeteria manager)*

Unavailability of healthy foods at local market: cafeteria staffs and managers emphasized that healthy foods such as brown rice, brown bread, organic vegetables are not available at the local market and regular food supplier cannot supply the foods.

"in that in my opinion availability is one of the factors(barrier). How easily will brown rice be available?" *(a cafeteria manager)*

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Discussion

The purpose of the current study was to understand perceptions about healthy eating; and explore the factors that facilitate and impede healthy food choices at DH-KUH cafeterias from the consumers and providers point of view. The consumers perceived hygienic foods as healthy. Health professionals described healthy food as a balance of carbohydrate, protein, fats, mineral and vitamins according to the activity level of a person. The participants identified food groups including fruit, vegetable, meat, fish, yogurt as healthy and fast and fried food as unhealthy. From the consumers' perspectives, facilitators of healthy eating were the availability of healthy food options, promotion of healthy food and healthy eating, stakeholder involvement, and education of employee. Barriers were unavailability of healthy options, lack of human resources to prepare healthy food, the high price of healthy food, and preferences for unhealthy food. From the providers' perspective, the major facilitators to healthy eating were involving higher authorities and forming a committee representing cafeteria staff, management, human resources, nutritionists and consumers, health education about healthy eating, and income of canteen. The major barriers were lack of adequate human resources, lack of healthy foods supply at local market, and lack of knowledge and skill about healthy eating and cooking among cafeteria staff.

Almost all participants identified hygienic foods as healthy, more so by the support staff who had lower socio-economic status. This might be because of the Nepal government's large scale health education campaign against food-borne diseases such as diarrhea, cholera and typhoid.[25] The health professionals also associated healthy eating with the nutrient value of food and their amount. The support staff did not care about food quality and quantity. Similar findings

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were reported from a study among manual laborers in eastern Nepal.[21] This highlights the need for the health education about healthy eating in terms of food quality and quantity in general population. The participants agreed that food groups such as fruits and vegetables were healthy, which is incongruous with another study from Nepal.[21] Despite the apparent knowledge, 99% of Nepalese do not consume at least five servings of fruits and vegetables per day.[9] Unaffordability was reported as a major barrier to eating fruits. In addition, the availability of fruits and vegetables is seasonal in Nepal. So, it is important to ensure the regular supply of fruits and vegetables in affordable price.

One of the most important factors of healthy eating identified by participants in this study was the availability of affordable healthy food options in the cafeteria. This finding is consistent with other studies from Nepal in which employee reported that availability of healthy food options to be major motivator for healthy eating.[21] In another qualitative study, it found that lack of affordable, appetizing, healthier food and drink choices at worksite as major barrier to healthy eating.[18] The review of research on eating behavior among nurse reported that lack of availability of healthy options in onsite cafeteria and vending machine barriers to healthy eating[6].

It emerged in the discussions that involvement and ownership of all the stakeholders are necessary for making changes in the cafeterias. The administrative staff specially emphasized the need for the involvement of higher level authorities for making major decisions about changes. In addition, they recommended creating a committee representing all the stakeholders. “Stakeholders consultation and buy in” is a key component for successful implementation of any program.[26 27]

In our study, the canteen operators and the managers highlighted the unavailability of healthy food in the market that interfered with the regular supply in the hospital cafeteria. Other studies which shows that the availability of healthy food at local market act as obstacle to consuming

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healthy food.[28 29] Availability of healthy food in the stores has potential to influences the purchasing patterns and dietary intake. Both cafeteria users and managers emphasized the potential effect broader environmental level factors such as price, availability, access, and influence of higher administration on healthy eating. These factors could potentially be address through a strong administrative commitment and organizational policies to offer healthy food in lower price. Policy changes have increasingly been recognized as essential components of worksite health promotion. [30]Changes solely in the workplace environment may not be enough to make changes in healthy behavior.[31] Other social context such as social support and social norms substantially affect the perception and behavior of employees. Social norms have been studied as a way to promote nutrition.[32]

One of the major barriers to healthy eating was high price of healthy food. The study from Tanzania reported major barriers for consumption of healthy food were high price, scarcity and negative perception.[33] Cox et al also identified that the lack of affordable acceptable food options has as a barrier to healthy eating.[34] Thus, while designing the intervention the high cost of healthy option should be addressed. The research has shown that subsidies in healthier food significantly increase the purchase and consumption of promoted food.[35] This strategy, however, would be challenging in the setting where cafeterias are profit oriented.[18] However, Sforzo et al found that despite removing barriers to healthy eating such as cost and inconvenience, other factors (such as time and motivation) could still prevent in healthy eating at work.[36] In our setting, the food price in the cafeteria was determined by the worksite administration and profit making was not their major motive. Therefore, although price is a major determinant of healthy eating in other setting, in this worksite it is positive point.

Personal preferences for unhealthy foods were also commonly reported as a barrier to eating healthy. Other study has also reported that food characteristics including taste, appearance and smell strongly influence food choices.[37] There is multiple links between taste perception, taste

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preference, food preference, and food selection and consumption and thus influenced each other.[38]

Lack of knowledge among cafeteria staff was also commonly cited as a major barrier. To respond this, the administrative authorities suggested providing training to the staff. Training of staff has been seen as essential for encouraging the provision of tasty, healthy foods.[39] Another study from eastern Nepal also reported the need for training the cafeteria staff on healthy diets and healthy meal preparation methods.[21] The consumers and cafeteria staff noted the lack of human resources to provide food options. However, the administrative authorities mentioned that increasing efficiency of the staff was more important than simply adding more staff. This indicates the need of automated machines including roti-makers, juicers to allow for the preparation of healthy food options more quickly.

A major limitation of this study is exploration of facilitators and barriers in a single worksite. Therefore, we have not explored the broader environmental, contextual, social and commercial determinants of healthy eating beyond the worksite setting. This was intentional as the study was primarily conducted to understand healthy eating and its determinants in worksite setting to develop worksite specific interventions to promote healthy foods. Further, we included a small number of people included who may not be fully representative of the worksite. However, we conducted four focus group discussions stratified by different cadres of professionals representing both high and low socio-economic statuses in the workplace. We did not create strata by body mass index (BMI) although overweight/obese individual may have different perceptions about healthy eating and barriers or facilitators for eating than healthy individuals. The worksite is non-profit organization with in-house subsidized cafeterias, thus these finding may not be generalizable to privately run tertiary hospital or worksites where the cafeteria are profit oriented. Social desirability bias may have occurred if the focus group participants felt that they could not express personal barriers or expressing on the knowledge of healthy eating

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Despite these limitations, there are several notable strengths to this study. This is the first study to explore the facilitators and barriers for healthy eating in hospital setting in Nepal. The study considered a wide range of the staff to obtain their views. We have explored the view of cafeteria users as well as cafeteria operators. Among the cafeteria users, there were four strata of support staffs, administrators and managers, and health professionals with or without shifts duty. We have identified a complex picture of views and opinions about healthy eating in the workplace and the consequent enablers and challenges for designing effective workplace healthy-eating intervention.

The results of this study are valuable in designing appropriate cafeteria-based interventions to sustained healthy eating behaviors in worksites in Nepal. Availability of healthy food options at an affordable price, involvement of stakeholders at all levels of decision making, and increasing awareness on healthy eating would be crucial part of a worksite based environmental interventions to improve diet of employees. The interventions focusing on healthful, less expensive food preparation, or selection of more convenient yet inexpensive healthful food, may help overcome the most common barriers in this population.

Conclusions: Among the employee of the hospital, healthy food commonly defined as hygienic and balanced diet. In addition fruits and vegetables were considered healthy. Availability of affordable healthy foods in cafeteria, along with increase health awareness, commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

Acknowledgement:

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Author contribution:

DT and AS conceived the study. AS, DT, VM, JM, BMK and DS contributed to the design of the study and development and pretesting of tools. AS, and DT contributed to data collection, and transcription. AS, DT and AR participated in management and analysis of the data. DT and AS developed the manuscript. All authors read and approved the final manuscript.

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Paper context:

The employee's opinion about healthy eating in the workplace is limited. The study informed that availability of affordable healthy foods in cafeteria, along with increase health awareness,

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commitment from cafeteria managers, and supply of the healthy food from market can result in healthy food choice in workplace from consumer and providers point of views. These factors needs to address in order to design cafeteria- based intervention to promote healthy eating in Nepal.

Data Availability Statement: No additional data available

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Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

Title and abstract

	Page/line no(s).
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1-2
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2-3

Introduction

Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
Purpose or research question - Purpose of the study and specific objectives or questions	

Methods

Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	5
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	6
Context - Setting/site and salient contextual factors; rationale**	6
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	6-7
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	23
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	8

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Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	8
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	7
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	8
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	9
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	9-18
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	18-22
Limitations - Trustworthiness and limitations of findings	

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	22
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	23

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014 DOI: 10.1097/ACM.0000000000000388

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Drivers of Healthy Eating in a Workplace in Nepal: A Qualitative Study

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Secondary Subject Heading:	Global health, Qualitative research
Keywords:	workplace, qualitative study, diet, facilitators, barriers

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Drivers of Healthy Eating in a Workplace in Nepal: A Qualitative Study

Authors

Dipesh Tamrakar (1): bob.dipesh@gmail.com

Archana Shrestha (2,3): deararchana@gmail.com

Anjana Rai (4): anjirai@hotmail.co.uk

Biraj Man Karmacharya (2): birajmk@gmail.com

Vasanti Malik (5): vmalik@hsph.harvard.edu

Josiemer Mattei (5): jmattei@hsph.harvard.edu

Donna Spiegelman (3,5,6,7,8): donna.spiegelman@yale.edu

Affiliations

1. Department of Community Medicine, Kathmandu University, Dhulikhel, Nepal
2. Department of Public Health, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal
3. Department of Epidemiology, Harvard University T.H. Chan School of Public Health, Boston, Massachusetts, USA
4. Family Health International 360, Nepal
5. Department of Nutrition, Harvard University T.H. Chan School of Public Health, Boston, Massachusetts, USA
6. Department of Global Health and Population, Harvard University T.H. Chan School of Public Health, Boston, Massachusetts, USA
7. Department of Biostatistics, Harvard University T.H. Chan School of Public Health, Boston, Massachusetts, USA
8. Center on Methods for Implementation and Prevention Science, Department of Biostatistics Yale University School of Public Health, New Haven CT, USA

Corresponding author

Archana Shrestha

Hospital Road, Dhulikhel, Nepal

Contact number: +977-9840764738

Email: archana@kusms.edu.np

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ABSTRACT

Objective: To explore the perceptions, enablers and barriers to employees' healthy eating in a hospital site.

Design: A qualitative study including focus group discussion and in-depth interview, data were analyzed using thematic analysis method.

Setting: The study was carried out among employees of Dhulikhel Hospital-Kathmandu University Hospital, located about 30 km east of Nepal's capital Kathmandu.

Participants: Focus group discussions were conducted among the 33 participants, who were divided into four groups: (a) support staff (drivers, cook, laundry, gardeners and ward boys); (b) hospital administrators and managers; (c) health personnel (doctors, nurses, and assistants), who work 8-12 hours shifts; and (d) health personnel who work during office hours. Nine in-depth interviews were conducted among 6 canteen operators and 3 managers.

Results: The major factors for promoting healthy eating were identified as the availability of affordable healthy food options in the cafeterias, a commitment to such promotion by the cafeteria manager, operators, staff and hospital administration and the level of education of the employees. The most commonly reported barriers for healthy eating were the unavailability of healthy options, including the lack of food supply from local market, the higher cost of healthy foods, individual food preferences and limited human resources in the cafeteria.

Conclusion: The availability of affordable healthy foods, supply of healthy foods from the market, commitment from cafeteria managers, hospital administrators and health awareness among cafeteria operators may promote healthy eating among employees in a Nepali hospital setting.

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Strengths and Limitations of the Study:

- This is first study to explore the facilitators and barriers for healthy eating in a Nepali hospital setting.
- The study represents the in-depth views of both cafeteria operators as well as cafeteria users from different strata of Nepali society, representing varied levels of income, professional status, education, and work hours.
- There may have been social desirability bias during focus group discussions that affected how participants expressed their thoughts on healthy eating behaviors.
- The findings may not be generalizable to worksites other than a hospital setting.
- This study was primarily conducted to understand healthy eating and its determinants in a specific worksite setting and to develop interventions to promote healthy foods. It has not explored the broader environmental, contextual, social, and commercial determinants of healthy eating.

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Introduction

Unhealthy eating is related to increased risk of chronic diseases, including heart disease, diabetes, and cancer.[1] Diet directly increases the risk of these chronic diseases, and also contributes to increased risk indirectly through overweight and obesity caused by poor diet.[2] Diets high in whole grains, fruits and vegetables and low in red meat, saturated and trans-fat are recommended to reduce chronic disease.[3 4]

Eating behavior results from a complex interplay of influences at the individual, social and environmental levels. Previous studies have emphasized the importance of understanding enablers and barriers to healthy eating, including the presentation and composition of meals, access to healthy options, food price and other socio-cultural factors such as time management, family support, and the social food environment. [5-7] However, most of these findings are reported from high income countries, not developing countries like Nepal.

Nepal is one of the least developed countries in the world. Nonetheless, due to rapid changes from an agricultural to a more urbanized work and lifestyle, including the advent of more processed foods, the country is experiencing an epidemiological transition from infectious to chronic diseases. In fact, ischemic heart disease, chronic obstructive pulmonary disease and stroke were the top three causes of death in 2017.[8] One fourth of the adult Nepali populations are overweight, 4% have diabetes, and 26% have hypertension.[9] An unhealthy diet might have contributed to the high prevalence of these diseases and risk factors.[10 11] In Nepal, the typical dietary pattern of refined grains, meat and alcohol is associated with a higher prevalence of overweight and obesity.[10] Deep-fried foods are associated with hypertension; the cereal and vegetable pattern is inversely associated with diabetes prevalence.[12]

In light of this significant epidemiological transition, it is important to identify the social environments, including at the workplace, that influence healthy eating and consequent health

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outcomes. Given the considerable time employees spend on their jobs, worksites are an important venue and opportunity to reach large numbers of adults to facilitate healthy eating.[13] In addition, workplaces might support long-term behavioral changes through social support and changes in available foods.[14 15] The efficacy of workplace approaches in promoting a healthy diet has been consistently reported in the literature.[16] Workplaces can provide employees with the opportunities, resources and support that influence eating behavior.[17] The workplace food environment, especially food availability, preparation, and price, can facilitate or create a barrier to healthy eating.[13 15]

The literature assessing employees' opinions on healthy eating in the workplace is limited.[18] Previous studies showed that workers are aware of the importance of changing unhealthy behaviors and that they are willing to eat healthy foods provided they are tasty, convenient, reasonably-priced and of good quality.[19] Previously reported barriers to healthy eating include long working hours, the unavailability of healthy food and the distance to and poor quality of dining facilities.[6 18 20]

A study conducted in a factory in eastern Nepal reported that the availability of healthy foods at affordable prices, combined with an increased level of awareness and commitment from worksite management can result in healthier food choices in the workplace.[21] Given that each workplace is a unique and complex environment, the present qualitative study aims to explore the perceptions and views of staff on healthy eating as well as the enablers and barriers to healthy eating at a hospital worksite in central Nepal.

Methods

We conducted an exploratory qualitative study to investigate the perceptions, enablers and barriers to employees' healthy eating in a hospital. A qualitative design was chosen for the study

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because it aims to investigate the 'how' and 'why' of individual behavior and is best suited to answering complex questions about food-related perceptions and behaviors.[22]

Study Site and Settings

This study was conducted at Dhulikhel Hospital-Kathmandu University Hospital (DH-KUH), an independent, not for profit, non-government, tertiary care institution that has 1,040 employees, 400 beds and annually serves about 2.2 million people from within its catchment area, making it one of the largest tertiary level hospitals in central Nepal. The 1,040 employees are of quite varied backgrounds, ranging from professional health personnel (doctors, nurses, and assistants) and professional administrative staff to support staff (drivers, cook, laundry, gardeners and ward boys. DH-KUH has four cafeterias on the hospital premises that operate 16 hours a day. All four cafeterias are supervised by one manager and operated on a subsidized on or near a break-even basis by DH-KUH**.** All four cafeterias serve breakfast, lunch and snacks and one also serves dinner.

The researchers from Nepal (DT,AS,BMK) are themselves all employees of DH-KUH and regular customers of the cafeteria. Each day, a pre-determined menu is offered for breakfast that includes kheer (milk and rice porridge), samosas, (deep-fried vegetable dumplings made with wheat flour) puri (deep-fried wheat bread), vegetable curry, eggs, white bread, and bakery items such as cakes, donuts, white buns and unsweetened, savory puff pastries. Lunch usually consists of white rice, lentil soup, vegetable curry, chicken curry, and yogurt. Snacks include noodles, fried rice, biscuits, confectionaries etc. Hot (tea, coffee) and cold beverages (sodas and soft drinks) are also available.

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Recruitment

All employees of the hospital were eligible to participate in the present study. To represent the different staff cadre, we purposely grouped them into four distinct categories: (a) support staff; (b) administrators and managers; (c) health personnel who work 8-hour shifts throughout the day and night; and (d) health personnel who work during regular, daytime office hours. The decision to separate the health personnel into two groups, i.e. those who work regular office hours and those working on 8-hour shifts throughout the day was taken because the availability of foods and working conditions differ for these two groups. A research assistant met potential participants in each group at a pre-scheduled time to explain the purpose of the study and administered an informed consent procedure to each participant, using a standard script until our required sample size was met. A total of 64 participants were approached for the four pre-determined focus group discussions and 40 agreed to participate. Seven of those who initially agreed to participate did not show up. In addition, we selected a finance manager, a cafeteria manager, an administrative manager and 6 cafeteria operators for in-depth interviews.

Focus Group Discussions

Focus groups discussions (FGDs) were conducted and audio taped in the Nepali language within the workplace setting, but in a private room to ensure confidentiality and honest sharing of opinions. Investigators AS or DT, moderated all FGDs, assisted by a note-taker. In each session, the moderator briefly introduced the study and explained the ethical considerations and procedures for maintaining confidentiality of the participants. The moderator asked open-ended questions and probed for more detailed information. We used an iterative process by discussing each FGD immediately after completion and suggesting further detailed probing in emerging themes from the previous findings. For example, a theme on healthy alternatives to white rice

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emerged. In the subsequent FGDs, we added separate questions on healthy alternatives to white rice.

The team developed the focus group guidelines and reviewed for content and readability after pretesting with nine participants, all of whom were employees of the hospital. However, this pre-tested focus group was not included in this analysis. The FGD guide consisted of semi-structured open-ended questions guided by a socio-ecological model[23] focusing on institutional and organizational factors. Probes for the questions were included to ensure consistency across groups and thorough understanding of the topics. The guide included topics on three main domains: (1) perceptions of healthy and unhealthy eating; (2) facilitators to healthy eating in the worksite; and (3) barriers to healthy eating in the worksite. Examples of questions in each domain are presented in table 1 below.

Table 1. Examples of the open-ended questions in each domain.

Domain	**Example questions**
Perception of healthy and unhealthy eating	What do you understand by healthy foods?' 'What do you understand by unhealthy foods?'
Facilitators to healthy eating at workplace	What factors determine your food choices?' 'What facilitates your choosing healthy food?'
Barriers to healthy eating at workplace	'What prevents you from choosing healthy food?'

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In-Depth Interviews

Investigators DT or AS conducted semi-structured in-depth interviews in Nepali with the cafeteria operators and administrative managers using a pretested interview guide in a private room of the hospital. The interviews aimed to understand the facilitators of and barriers to healthy eating from the cafeteria operators and managers' perspective. The moderator interviewed the participants employing open-ended questions to elicit their views on healthy and unhealthy eating, facilitators and barriers to healthy eating in the worksite, operational and managerial aspects of the cafeteria, and their views on the factors that facilitate and impede making changes that would promote healthier eating. The questions such as 'What are healthy and unhealthy foods in your cafeteria?', 'What changes are necessary for making cafeteria healthier?', 'What are factors that could facilitate making the cafeteria's food offerings healthier?' and 'What are the challenges for making cafeteria healthier?' were asked. In each case, the moderator probed to draw out further descriptive information.

An iterative process was used for data collection. After each interview, we discussed each interview and identified the topics to be deeply explored by the themes emerging in earlier interviews.

Analysis

All FGDs and interviews were transcribed verbatim into Nepali by trained research assistants. To ensure quality control, AS and DT independently reviewed the transcripts against the audio recording for potential discrepancies or incomplete data. A thematic analysis approach was used for data analysis.[24] This process involved the investigators' familiarizing themselves with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. One FGD and two interview transcripts were coded inductively by two independent coders to enhance the validity of the data. The coders then

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compared the coding schemes and resolved any differences. The codebook was then finalized. All the transcripts were coded using RQDA; segments of the text that related to a common theme were pieced together; emergent themes were identified; reviewed; and defined.

Patient and Public Involvement

No patient and public were involved in the design, planning and conception of the study

Results

Characteristics of the participants

Thirty-three adults participated in four focus group discussions that ranged from 7 to 10 participants per session. Nine canteen and hospital administration staffers participated in in-depth interviews. The characteristics of the participants are presented in Table 2. The mean age of participants was 33 years, range from 23 to 44 years. Sixty percent were male. About half earned less than US 3 dollars per day. About 48% self-reported as alcohol drinkers and 10% as smokers. Fifty percent of them were overweight, 6% reported having high blood pressure and 2% reported having diabetes.

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Table 2 Baseline Characteristics of the Participants

Characteristics	Focus Group participants (n=33)	In-depth interviews participants (n=9)	Total
Age (Mean ± SD)	32.8 ± 5.5	35.3 ± 9.9	33.33±6.43
Male, n(%)	17 (51.5)	8 (88.9)	25 (59.5)
Income, n(%)			
< 3$/day	14 (42.4)	6 (66.7)	20 (47.6)
>3$/day	19 (67.6)	3 (33.3)	22 (52.4)
Education, n(%)			
High school and lower	13 (39.4)	3 (33.3)	16 (38.1)
More than High School	20 (70.6)	6 (66.7)	26 (61.9)
Alcohol Drinking, n(%)			
Non-Drinker	18 (54.5)	4 (44.4)	22 (52.4)
Drinker	15 (45.5)	5 (55.6)	20 (47.6)
Smoking, n(%)			
Smoker	7 (26.2)	3 (33.3)	10 (23.8)

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Non-Smoker	26 (78.8)	6 (66.7)	32 (76.2)
Vegetarian, n(%)			
Yes	2 (6.1)	0 (0.0)	2 (4.7)
No	31(93.9)	9 (100.0)	40 (95.3)
BMI Categories, n(%)			
Normal (18.5- <25) kg/m^2	17 (51.5)	4 (44.4)	21(50.0)
Overweight (25+) kg/m^2	16 (49.5)	5 (55.6)	21(50.0)
Known Hypertension, n(%)			
Yes	2 (6.1)	4 (44.4)	6 (14.3)
No	31 (93.9)	5 (55.6)	36 (85.7)
Known Diabetes, n(%)			
Yes	0(0.0)	3 (11.1)	3 (2.4)
No	33 (100.0)	8 (88.9)	41(97.6)

Perceptions of Healthy and Unhealthy Eating

The participants explained the healthy and unhealthy food in terms of food groups, characteristics of food, and cooking processes.

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Healthy Eating

Most of participants described healthy eating as hygienically prepared food and a balanced diet, defined as a mix of carbohydrates, proteins, fats, minerals, and vitamins consumed according to one's level of physical activity. The support staff group however, who were less well educated than the other groups, were generally unaware of what a balanced diet means. Most of participants considered fruits and vegetables, and the traditional Nepali diet of white rice, lentil soup and vegetable curry to be healthy foods. Physicians, on the other hand, criticized this traditional Nepali diet as unhealthy due to its high carbohydrate content, particularly when accompanied by -- as it often is -- white rice and potatoes. Other items including meat, fish, whole grains, yogurts etc. were also considered healthy by most participants. Most participants also equated the words ‘healthy’ and ‘hygienic’ and expressed the view that hygienically prepared foods in general are by definition healthy foods.

Thus for example a typical response by a health professional was:

Healthy food means that it contains all the necessary nutrients. On the top of that, it should also be in an appropriate amount according to the age and type of work of the consumer. Moreover, we understand that 'healthy' means 'hygienic', i.e. free from harmful microorganisms.

Whereas a typical response from support staff participants was:

Healthy and balanced means rice, lentils, vegetables, fish and meat . . . provided they clean and good (i.e. hygienically prepared).

Unhealthy Eating

Unhealthy eating was defined by most participants as the consumption of stale (*Basi*) and unhygienic food. Most participants reported that oily foods or fast foods such as packaged

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instant noodles, chips, and soda (Coke, Pepsi, Fanta or Sprite) were unhealthy. However, one support staff participant stated that the sodas were useful for treating gastritis:

> *My mother used to say that Coke is good for gastritis. She would ask me to bring 'that black drink' (Coca Cola).*

Health professionals reported that excess consumption of carbohydrates such as rice was unhealthy.

> *Food should be considered in both qualitative and quantitative way . . . Healthy food means a balanced diet that contains adequate amounts of protein, carbohydrates, etc. Overeating [anything] is unhealthy.* (A health professional).

Support staff, on the other hand, expressed no concern about the amount of rice consumed. Most participants said that fried food was unhealthy. Almost all participants however, expressed concerns about the overuse of chemical fertilizer and insecticides in food.

When questioned about foods that are risky for diabetics or those prevent diabetes, the majority of participants cited as risky those foods containing high amounts of sugar and diets high in carbohydrates like white rice and potatoes, and fatty foods. Conversely, foods such as whole wheat flat bread (roti), fruits and vegetables, and parboiled rice were considered to be preventive of obesity and diabetes. Health professionals also mentioned that high fiber diets could help prevent diabetes.

Several misconceptions about diet and diabetes were expressed, e.g.:

- Washing white rice multiple times before cooking decreases the quantity of carbohydrates.
- Eating fruits and salads can increase the risk for diabetes.
- Eating irregularly can lead to diabetes.

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- Satiation after eating causes weight gain.
- Eating Taichung rice (a short-grain rice variety largely used to make beaten rice) causes diabetes and obesity if served as boiled rice.

Consumers' perspective on facilitators to healthy eating

The most commonly reported factors that facilitate healthy eating were: (a) the availability of or the lack of healthy food options; (b) the promotion of healthy foods and healthy eating; (c) the stakeholders' (i.e. the hospital administration) involvement; and (d) the level of education of the employee/participant.

Table 3 represents a structured list of the respondents' perceptions of the facilitators and barriers to healthy cafeteria eating.

Table 3: Themes and sub-themes identified through focus group discussions and in-depth interviews

Facilitators of healthy eating	**Barriers to healthy eating**
Consumers' perspectives: - Individual: education level of employee, - Environmental: availability of healthy options; stakeholder's involvement in promotion of healthy food and healthy eating	Consumers' perspectives - Individual: food preferences, higher cost of healthy foods - Environmental: unavailability of healthy options, lack of human resources to prepare healthy foods
Providers' perspectives: - Individual: - Environmental: stakeholder's involvement, income of cafeteria, health education about healthy eating to cafeteria staff	Providers' perspectives - Individual: lack of knowledge and skill for health eating and healthy cooking - Environment: lack of adequate human resources, lack of food supply from local markets

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Availability of healthy food options: Most participants reported that unhealthy foods should be gradually replaced by healthier foods.

> *if we give [an option for whole wheat roti, those who want rice will still eat rice.* (A health professional)

Promotion of healthy food and healthy eating: Most participants said that healthy food should be presented in an appealing way and that healthy food options should be promoted by educating both providers and consumers.

> *There should be attractive posters visible in our canteen when we enter and leave to increase awareness so that we will avoid unhealthy food.*(An administrative staffer)

The Involvement of influential stakeholders: Most participants also emphasized that there should be active involvement of canteen management and hospital administrators in the process of change

> *Rather than asking the canteen staff to change the cafeteria menu, changes should be implemented by more influential people in the administration.*(A support staffer)

Education level of employee: Some participants expressed the idea that hospital is uniquely positioned to promote healthier eating since many employees are health professionals who are well aware of the health benefits and expected to be receptive of changes that improve food quality.

> *Most of us are well-educated doctors and medical professionals…I am not sure about other places, but in the hospital cafeteria, the consumers are concerned about their health* (A health professional)

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Providers' perspectives on facilitators to healthy eating

The cafeteria manager pointed out that DH-KUH subsidizes the cost of the food served in the four cafeterias, which attempt to operate on a break even basis. All participants noted their appreciation of the fact that the cost of food at the cafeterias is less than the regular market price.

The cafeteria operators expressed concern that the lack of knowledge among cafeteria staff about what constitutes a healthy diet and expressed the view that providing health education to the staff would facilitate the making of changes to their menu offerings.

> *If we get training on healthy eating, we will know more about the health effects of the food items we serve.* (A cafeteria staffer)

One cafeteria operator said that "higher level authorities" (i.e. as hospital administrators and health professionals) should be involved in making any changes to the hospital cafeterias' offerings, including determining the menu and the prices, as healthier foods could cost more. Another cafeteria manager suggested forming a committee made up of cafeteria operators, administrative staff, medical doctors and nutritionists to decide on menu changes and revised pricing, and to monitor the availability of healthier options.

> *We keep talking about the changes in menu and price with "the Sirs" (i.e. the higher authorities) . . . such decisions (on menu and price) should be taken by the system*

Consumers' perspective on barriers to healthy eating

The major barriers to healthy eating cited by consumers in the FGDs were: (a) the unavailability of healthy options; (b) the lack of human resources needed to prepare healthy foods; (c) the higher cost of healthy foods; and (d) individual preferences for non-healthy foods.

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Unavailability of healthy options: Many participants mentioned the lack of healthy food options in the cafeterias:

We are ready to start consuming healthier food, but the cafeteria should provide it. (A health professional)

Inadequate human resources: Many participants expressed the view that the cafeterias might lack the necessary human resources to prepare more healthy food options and suggested adding items like oats, fruits that require little additional labor or automated machines such as electric fruit juice or roti makers.

I think that there are inadequate human resources and that is why there are not better options. Everyone is always busy in there (the cafeteria). (A health professional).

Higher cost of healthier foods: Most participants in all groups mentioned the higher price of healthy food as a concern. The support staff group especially commented that consumers might not be eat fruits even if they are added to the menu because of their high price. In contrast, most health professionals indicated their willingness to pay more for healthier food.

We (support staff) consume less (fruit). But, higher level staff (doctors and nurses), consume more (fruits). After all, it is all about money. (A support staffer)

Food preferences: Most participants expressed the concern that changing food preferences would be difficult because most Nepali consumers prefer spicy and oily foods. In addition many also love such 'junk food" items as instant noodles, samosas, cream donuts and soft drinks.

You are talking about removing instant noodles? It is easy to say, but everyone prefers fast food such as instant noodles, samosas, donuts. Removing such food will lead to objections. (An administrative staffer)

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Providers' perspective on barriers to healthy eating

The major barriers to healthy eating reported by the canteen operators were: (a) lack of adequate human resources; (b) lack of knowledge about healthier foods and the skills to prepare them; and (c) the unavailability of healthier food in the local market.

Inadequate human resources: Canteen operators reported that they have insufficient staff to prepare such healthy foods such as whole wheat flat bread (roti), fruits, and salads, which they say are more labor-intensive. The human resource manager however thought that measures to increase the efficiency of the available kitchen staff would suffice to allow such changes.

> *Two people are needed and it takes hours to prepare whole wheat roti; and one more to serve it. We do not have enough staff* (A cafeteria staffer)

Inadequate knowledge and skills of healthy eating and food preparation: Most participants expressed the view that the cafeteria staffs lack adequate knowledge of healthy eating. They had occasionally received training on hygiene, but never on healthy foods or cooking.

> *Cafeteria staffs don't know which foods are healthy or unhealthy. Most people, even I don't know which is which.* (A cafeteria manager)

Unavailability of healthy foods in the local market: Cafeteria operators and the manager reported that healthy foods such as brown rice, brown bread and organic vegetables are unavailable in the local market and their regular food suppliers cannot supply such foods.

> *Unavailability is one of the barriers. Where can we get brown rice?* (A cafeteria manager)

Discussion

Most consumers equated hygienic foods and healthy foods. Health professionals however, also described a healthy diet as a balance of carbohydrates, proteins, fats, minerals and vitamins

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consumed according to the physical activity level of the person. The participants identified foods such as fruits, vegetables, meat, fish, and dairy items like yogurt as healthy and fast and fried foods as unhealthy. From the consumers' perspectives, the facilitators of healthy eating were the availability of healthy food options, the promotion of healthy food and healthy eating, stakeholder involvement, and the education level of the support staff. The barriers identified were the unavailability of healthy options, inadequate human resources to prepare healthy foods, the higher price of healthy foods and individual habitual preferences for unhealthy foods.

From the providers' perspective, the major facilitators to healthier eating were identified as the involvement and support of higher authorities in making changes. Providers also suggested the formation of a committee with representatives from the cafeteria staff and management, the human resources department, nutritionists and consumers, to promote healthier eating and to effect changes in the cafeterias' food offerings. The major barriers identified by providers were: inadequate human resources, lack of healthy foods supply in the local market, and lack of knowledge and skills among the cafeteria staff about healthy eating and food preparation.

Almost all participants equated hygienic foods as healthy foods, especially the support staffs that are of lower socio-economic status. This equating hygienic and healthy could be a result of the Nepal government's long standing and large scale health education campaigns against food-borne diseases such as diarrhea, cholera and typhoid.[25] Support staff for the most part did not express concerns about food quality or quantity. Similar findings were reported from a study among manual laborers in eastern Nepal.[21] This highlights the need for more education among the general population that focuses healthy eating in terms of food quality and healthy quantities.

Most participants identified fruits and vegetables as healthy, which is incongruous with another study from Nepal.[21] Despite the apparent knowledge, 99% of Nepalese consume less than five

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servings of fruits and vegetables per day.[9] Unaffordability was reported as a major barrier to fruit consumption. In addition, the availability of fruits and vegetables is seasonal in Nepal, so, it can be difficult to ensure the regular supply of fruits and vegetables at an affordable price.

One of the major factors of healthy eating identified by participants in this study was the unavailability of affordable healthy food options in the cafeteria. This finding is consistent with other studies from Nepal in which employees reported the presence of healthy food options to be major motivator for healthy eating.[21] Another qualitative study found that a lack of affordable, appetizing, healthier food and drink choices at a worksite was major barrier to healthy eating.[18] Yet another review of research on eating behaviors among nurses reported the unavailability of healthy options in an onsite cafeteria and in vending machines as a barrier to healthy eating[6].

Another factor that emerged in the discussions was that the involvement and 'ownership' of all the stakeholders is necessary for making changes in the foods offered in the cafeterias. The administrative staff especially emphasized the need for the involvement of higher level authorities for making major decisions about changes. In addition, they recommended creating a committee representing all the stakeholders. Consultation with stakeholders and their "buy in" was repeatedly cited as a key component for successful implementation of any program.[26 27]

The canteen operators and manager also highlighted the unavailability of healthy foods in the local market as interfering with the regular supply to the hospital cafeterias. Other studies also show that the availability of healthy food at local market acts as an obstacle to consuming healthy food.[28 29] Obviously, availability of healthy food in the stores has the potential to influence purchasing patterns and dietary intake. Both cafeteria users and managers emphasized the potential effect broader environmental level factors such as price, availability, access, and the influence of the higher administration on healthy eating. These factors could potentially be addressed through a strong administrative commitment and policies to offer

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healthy foods at affordable prices. Policy changes have increasingly been recognized as essential components of worksite health promotion. [30] Changes solely in the workplace environment may not be enough to make changes in healthy behavior.[31] Other social context factors such as social support and social norms also substantially affect the perceptions and behavior of employees. Social norms have been studied as a way to promote nutrition.[32]

One of the major barriers to healthy eating is higher price of healthy foods. A study from Tanzania reported major barriers for consumption of healthy food as high price, scarcity and negative perceptions.[33] Cox et al. also identified the lack of affordable and acceptable food options as a barrier to healthy eating.[34] Thus, while designing any intervention, the higher cost of healthy options should be addressed. The research has shown that subsidies for healthier foods significantly increase their purchase and consumption.[35] Such a strategy, however, would be challenging in settings where cafeterias are profit-oriented.[18] However, Sforzo et al. found that despite removing barriers to healthy eating such as cost and inconvenience, other factors (such as time and motivation) could still prevent healthy eating at work.[36] In our setting however, the price of the cafeteria food was determined by the worksite administration and profit-making was not a major motive. Therefore, although price is a major determinant of healthy eating in other settings, in this worksite it could be a positive point in any effort to bring about changes.

Personal preferences for unhealthy foods were also commonly reported as a barrier to healthy eating. Another study has also reported that food characteristics including taste, appearance and smell strongly influence food choices.[37] Taste perception, taste preference, food preference, and food selection and consumption all influence each other.[38]

Lack of knowledge among cafeteria staff was also commonly cited as a major barrier to healthier eating. To respond this, the administrative authorities suggested staff training, which has elsewhere been seen as essential.[39] Another study from eastern Nepal also reported the

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need for cafeteria staff training on healthy diets and healthy meal preparation methods.[21] Both consumers and cafeteria staff noted the lack of human resources to provide food options. However, the administrative authorities expressed the view that increasing staff efficiency and productivity might be more important than simply adding more staff and suggesting automating certain functions, such as roti-making and juicers.

A major limitation of this study is its exploration of facilitators and barriers in only a single worksite. Nor have we have explored the broader environmental, contextual, social and commercial determinants of healthy eating beyond this worksite setting. This was intentional as the study was primarily conducted to understand healthy eating and its determinants in a specific worksite setting to develop worksite specific interventions to promote healthy foods there. Further, we included a small number of people who may not be fully representative of the worksite. However, we conducted four stratified focus group discussions of different cadres of employees representing both high and low socio-economic status in the workplace. We did not create strata by body mass index (BMI) although we recognize that overweight/obese individuals may have different perceptions of healthy eating and barriers or facilitators for eating than healthier individuals. Also, the surveyed worksite is a non-profit organization with in-house subsidized cafeterias; thus these findings may not be generalizable to a privately-run tertiary hospital, or to worksites where the cafeteria is profit oriented. Social desirability bias may also have occurred if the focus group participants felt that they could not freely express their personal barriers or their knowledge of healthy eating.

Despite these limitations, we believe there are several notable strengths to this study. It is the first study to explore the facilitators and barriers to healthy eating in a hospital setting in Nepal. The study considered a wide range of staff to obtain their views. We have explored the views of cafeteria users as well as cafeteria operators. Among the cafeteria users, there were four strata of support staff, administrators and managers, and health professionals with and without shift

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duty. We have identified a complex picture of views and opinions about healthy eating in the workplace and the consequent enablers and challenges for designing an effective workplace intervention to promote healthy-eating.

The results of this study are valuable in designing appropriate cafeteria-based interventions to sustained healthy eating behaviors in worksites in Nepal. The availability of healthy food options at an affordable price, involvement of stakeholders at all levels of decision making, and increasing awareness of healthy eating would be crucial parts of any worksite based environmental intervention to improve employees' diets. Interventions focusing on healthful, less expensive food preparation, or selection of more convenient yet still inexpensive and healthful foods, may help overcome the most common barriers identified in this population.

Conclusions: Among the employees of the hospital, healthy food was commonly defined as a hygienic and balanced diet. In addition fruits and vegetables were considered healthy. The availability of affordable healthy foods in the cafeteria, along with increased health awareness, commitment from cafeteria managers, and a regular supply of the healthy foods from market can result in healthy food choice in the workplace. These factors need to be addressed in order to design cafeteria- based intervention to promote healthy eating in Nepal.

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Author contribution:

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DT and AS conceived the study. AS, DT, VM, JM, BMK and DS contributed to the design of the study and development and pretesting of tools. AS, and DT contributed to data collection, and transcription. AS, DT and AR participated in management and analysis of the data. DT and AS developed the manuscript. All authors read and approved the final manuscript.

Disclosure Statement: The author declared no competing interest

Ethics and Consent: We obtained ethical clearance from the Institutional Review Board of the Harvard School of Public Health and the Institutional review Committee of the Kathmandu University School of Medical Sciences. We took the written informed consent from the each participant before participation in the study.

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Standards for Reporting Qualitative Research (SRQR)*

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Title and abstract

	Page/line no(s).
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1-2
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	3

Introduction

Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	5-6
Purpose or research question - Purpose of the study and specific objectives or questions	

Methods

Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	6-7
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	7
Context - Setting/site and salient contextual factors; rationale**	7
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	8
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	26
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	8-10

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Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	8-10
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	8
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	10-11
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	10-11
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	11-20
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	20-25
Limitations - Trustworthiness and limitations of findings	

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	26
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	26

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014 DOI: 10.1097/ACM.0000000000000388

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