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A qualitative study on the perception of obesity in Nepal

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1
2
3 35 **Abstract**

4
5 36 **Objective**

6
7 37 To explore the perception of obesity and overweight among Nepalese adults living in a
8
9 38 suburban community from both community's and health providers' perspectives.

10
11 39 **Design**

12
13 40 A qualitative study comprising focus group discussion and in-depth interview.

14
15
16 41 **Setting**

17
18 42 Community and health care facilities in Dhulikhel, Nepal.

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20
21 43 **Participants**

22
23 44 Four focus group discussions were conducted with general people (n= 22) and four in-depth
24
25 45 interviews were conducted with health providers.

26
27
28 46 **Results**

29
30 47 Obesity was a rising problem in this suburban community. People had inadequate knowledge
31
32 48 regarding the consequences of obesity, and they perceived overweight as normal, healthy,
33
34 49 and attractive. The adults above 40 years of age did not perceive themselves to be
35
36 50 overweight/obese. Despite the participant's awareness of the importance of diet control and
37
38 51 exercise to prevent obesity, these were not translated into practice. The providers at the
39
40 52 peripheral health institutions lacked training and instruments to identify central obesity.

41
42
43
44 53 **Conclusions**

45
46 54 This study provided insight into the perception of obesity in the community through both
47
48 55 community and health providers' perspective. Misconception and inadequate knowledge on
49
50 56 obesity among people in this community indicate the need of health education and
51
52 57 interventional program to increase health awareness and preventive practices.

53
54
55
56 58 **Keywords:** obesity, overweight, perception, qualitative study, Nepal, public health,
57
58 59 cardiovascular disease

60 **Strengths and limitations of this study**

- 61 • To our knowledge, this is the first study in Nepal to explore the perception of obesity
62 among adults in a suburban community in Nepal.
- 63 • The study includes the in-depth view of both community people and health care providers
64 working at different levels.
- 65 • The study findings may not be generalizable to other population because of small sample
66 size and limitation to only the Dhulikhel Heart Study participants residing in suburban
67 area.

80 **Background**

81 Obesity is one of the top five causes for cardiovascular mortality and morbidity in the world¹
82 causing increased risk of coronary artery disease, diabetes mellitus, hypertension, and kidney
83 failure.² The rate of obesity has increased in many developing nations, including Nepal.³⁻⁵
84 About 24.3% of Nepalese adults are obese or overweight.⁶

85 Several demographic, socio-economic and cultural factors contributing to obesity have been
86 described elsewhere.⁷⁻⁹ Like other developing countries, Nepal is undergoing epidemiologic
87 and demographic transition, experiencing significant lifestyle changes.⁷⁻¹⁰ Urbanization,
88 leading to increased number of fast food restaurants, the growing culture of 'eating out', and
89 availability of lower price food with high calories have contributed to obesity. The 2019
90 STEP survey reported low physical activity and low vegetables and fruits consumption in
91 Nepal.⁶

92 Studies have found relationship between obesity and body weight/size perception. Unlike in
93 developed countries, heavier body is preferred in developing countries like South Africa and
94 Tanzania.^{8 11} In Nepal, traditionally, 'big belly' is considered as a sign of prosperity.⁷ This
95 perceived norm might be facilitating weight gain mainly among high-income individuals and
96 families. However, with the global epidemiologic transition and technological advancement,
97 this perception may be changing. It is also important to understand how the individual
98 perceives their own body size. The individuals who do not see themselves as overweight/
99 obese are prone to gain weight because of their low risk perception and unwillingness to lose
100 weight.^{8 11 12} On the other hand, females generally have wrong perception of their body
101 weight as to being too high, and thus are dissatisfied with their bodies compared to males.¹³
102 To our understanding, there are no qualitative studies conducted to date to understand obesity
103 perception among people in Nepal. Thus, this study aimed to explore the perception of
104 obesity among Nepalese adults living in Dhulikhel.

105 **METHODS**

106 **Study design and setting**

107 This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS),
108 which is a longitudinal cohort study conducted between November 2013 to February 2015 to
109 assess the prevalence of cardiovascular diseases and its risk factors among adults of 18 years
110 and older living in Dhulikhel, a sub-urban town in Nepal.¹⁴

111 **Participants**

112 We conducted a Focus group Discussion (FGD) with the DHS participants. We used
113 purposeful, maximum variation sampling to include participants from different ages and
114 gender. We stratified participants into four groups as per gender (male and female) and age
115 (<40years and \geq 40years). The separation of gender was necessary because women in
116 Nepalese culture are usually shy and do not discuss explicitly in presence of men. We
117 contacted 48 eligible participants via phone or home visit. Of which, 22 participated in the
118 discussion. Six participants who initially agreed to participate did not show up in the
119 discussion. The reason for non-participation were busy schedule on the given time and date
120 and medical illness.

121 For IDIs, we purposefully selected four health providers (HPs) from different healthcare
122 levels to explore barriers to obesity management. We selected one doctor and a nutritionist
123 from the tertiary hospital, an in-charge from a primary health care center, and an in-charge
124 from the urban health care center. All agreed to participate in the study.

125 **Data collection**

126 We collected data from October 2016 to December 2016. We developed initial guidelines in
127 Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline
128 was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and

1
2
3 129 modified accordingly. The findings from the pre-tested FGD and IDI were not included in
4
5 130 this analysis. The questions included ‘What do you understand by obesity?’, ‘How do you
6
7
8 131 view overweight and obesity?’, ‘How do you describe your body size’, and ‘What factors
9
10 132 affect obesity management?’. FGD participants were offered a light snack for their time and
11
12 133 participation.

15 134 All FGDs were moderated by the researcher and assisted by a note taker. The moderator was
16
17 135 not from the study community, hence did not know the participants prior to the study. The
18
19
20 136 moderator started each session by briefly explaining the aim of the study and receiving
21
22 137 informed consent. The moderator started with open-ended questions and probed further for
23
24 138 in-depth information. We conducted FGDs in a private space in a community building. The
25
26
27 139 group size varied from 3 to 7. We measured participants’ height and weight before
28
29 140 discussion. The investigator conducted and in-depth interviews with health providers in the
30
31 141 private room at their respective health care centers. Informed consent was received prior to
32
33
34 142 each interview.

37 143 **Data analysis**

38
39
40 144 IDIs and FGDs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded
41
42 145 data. We used structural and thematic coding to analyze the data. We started with an “a
43
44 146 priori” list of codes drawn from the literature review and then included additional themes that
45
46 147 came up during the inductive analysis process. A second coder (SA) used the same start list
47
48
49 148 and inductively coded for emerging themes. Coders discussed similarities and differences in
50
51 149 the way codes were applied and agreed on the emerging ones. After the discussion, the
52
53 150 codebook was updated. SS further analyzed the transcripts and grouped text units as per the
54
55
56 151 codes using the Atlas ti.7. Selected quotes were reported.

58 152 **Patient and public involvement**

153 No patients or the public were involved in the conception of this study, analysis, and
 154 manuscript writing.

155 RESULTS

156 Characteristics of participants

157 The characteristics of the participants are presented in tables 1 and 2.

158 **Table 1: Socio-demographic characteristics of FGD participants**

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Religion	
Hindu	22(100.0)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employee	3 (13.6)
Self-employed*	9 (40.9)
Home makers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m ²	9 (40.9%)
≥25-29kg/m ²	6 (27.3%)
≥30kg/m ²	7 (31.8%)

159 *Self-employed include business and agriculture

160 **Table 2: Job title and represented institution of health providers**

Job title	Institution	N
Medical Officer	Tertiary hospital	1
Nutritionist	Tertiary hospital	1
Auxillary Health Worker	Primary Health Care Center (PHCC)	1
Auxiliary Health Worker	Urban Health Care Center (UHCC)	1

161

162 We categorized themes derived from FGDs and IDIs into five categories: (1) Burden of
 163 obesity; (2) Knowledge on obesity; (3) Attitude towards obesity; (4) Body size perception;
 164 and (5) Barriers to obesity management. The example of coding, categorizing, and
 165 formulating themes is given in table 3.

166 **Table 3: Example of coding, categorizing, and formulating themes**

Codes	Definition of codes	Subcategory	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to patient's lack of time.	Exercise habit	Challenges in behavior modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather condition.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and adequate space to exercise.			
Food taste	Any reference to difficulty in modifying dietary habit due to food taste.	Food habit		

1 2 3 4 5 6 7 8	Desire to eat	Any reference to difficulty in modifying dietary habit due to patient's desire to eat what they see.
9 10 11 12 13	Junk food	Any reference to difficulty in modifying dietary habit due to easy availability and accessibility of junk food.
14 15 16 17	Lack of access to healthy food	Any reference to difficulty in modifying dietary habit due to inaccessibility of healthy food.

167

168 **Burden of obesity**

169 Both FGD participants and HPs identified obesity as a growing problem in the community. A
 170 medical officer stated that among 20-25 patients he examines in a day, 7-8 of them are either
 171 overweight or obese. He further commented that obesity might have been increasing in
 172 teenagers, but these teenagers are not under their radar as they do not usually visit doctors.
 173 Obesity was found to be higher among females and individual aged 40 years and over in the
 174 community. Participants also pointed out that obesity is high among few ethnic groups like,
 175 Newar and Tamang, married persons, office workers, housewives, businessmen, drivers, rich
 176 people, and people living in urban areas.

177 *“In Newari culture, there is a lot of feasts and festivals, so they eat a lot. In*
 178 *case of Tamang, they drink (alcohol) a lot. They eat much while drinking.*
 179 *Both are high in calorie, so this might result in weight gain.” (Nutritionist)*

180

181 **Awareness on obesity**182 Causes of obesity

183 All FGD participants believed that obesity could result from unhealthy diet (e.g., oily and
 184 fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity and old age as
 185 causes to overweight. Participants aged 40 and over reported they gained weight without any
 186 specific reasons although they try to maintain their diet.

1
2
3 187 *“In my case, I eat chapatti in the evening and rice in the morning. Still my*
4 188 *belly does not get decreased. In the past, despite my massive eating, I did*
5 189 *not gain weight. Now, even drinking water, leads to weight gain.”*(Male,
6 190 *above 40)*

7
8
9 191 *“For some, it looks like genetics. Their grandparents are fat and so are the*
10 192 *grandchildren.”* (Female, above 40)

11
12 193 Female participants further added the reasons for being obese, such as use of family planning
13
14 194 devices, increase in amount of food during childbirth, and habit of eating leftovers to prevent
15
16 195 food waste.

17
18
19
20 196 *“(I) was told to eat more during my child birth. Everyone used to say that I*
21 197 *need more than before. So, the amount of my food increased. I used to eat*
22 198 *less before (giggles)”* (Female, above 40yrs.)

23
24 199 *“It’s like, someone leaves the food, and instead of throwing, I feel like*
25 200 *should eat it. Why to throw (food)? So, I gained weight.”* (Female, above
26 201 *40yrs.)*

28 202 Complicaitons of obesity

29
30
31 203 Musculoskeletal problems, such as difficulty sitting and walking, back pain, and pressure on
32
33 204 heel due to overweight were the predominant complications reported by participants. Many
34
35 205 reported high blood pressures, while few mentioned diabetes, high cholesterol, and heart
36
37 206 disease as complications. Participants’ knowledge of complications were not only based on
38
39 207 their experience but also what they had seen in their family and community.

40
41
42 208 *“As per my experience, it is better to lose weight than to gain it. [...] Once*
43 209 *I had an experience of being overweight. It was difficult. It’s like I had*
44 210 *Asthma [disease]. I could not walk.”* (Male, under 40yrs.)

45
46
47 211 Some participants also expressed their concern regarding appearance resulting from
48
49 212 overweight. A male participant under 40 years stated, he was ashamed of walking with his
50
51 213 friends when he was overweight. Another participant said,

52
53
54 214 *“Our body shape looks bad. [...] (We) look older in younger age because*
55 215 *of obesity.* (Male, under 40yrs.)

56
57
58 216 HPs commented that people do not take obesity seriously as they do not have adequate
59
60 217 knowledge about its complications. As one said:

218 *“Until and unless the disease does not get complicated, it barely comes*
 219 *to their mind that they should go for check-up. Otherwise, they don’t even*
 220 *give a try to reduce weight although they are asked to do so.”* (Medical
 221 Officer)

223 People who feared the health consequences of obesity usually ask the HPs for suggestions
 224 to reduce weight. However, one health provider emphasized that the reason of being
 225 concerned is the appearance rather than disease.

226
 227 *“I see these days that people are concerned with obesity not because of*
 228 *disease but because of how they look physically. There are very few*
 229 *who concerns about disease.”* (Medical Officer)

231 **Attitude towards obesity and overweight**

232 FGD participants reported that overweight was considered good in the society, both health-
 233 wise and appearance-wise. Few participants under 40 years also expressed their willingness
 234 to increase weight. One female participant described how odd it was to have a relatively
 235 thinner member in the family:

236 *“...we are five daughters-in-law in the family...it looks odd when there is*
 237 *one thin person in the room...it does not match in the family.”* (Female,
 238 under 40yrs.)

239 For women, gaining weight after marriage was viewed as good in the society.

240 *“If I lose my weight and visit there [maternal home], they [neighbors]*
 241 *would say that my husband did not provide me enough to eat [giggles]. If I*
 242 *go with my increased weight, they will say that my husband loves me.”*
 243 (Female, under 40yrs.)

244 However, too much weight gain (obesity) was perceived as bad in the community. People’s
 245 perception/attitude towards obesity has been changing in the community, which is attributed
 246 to information provided through media (TV, radio) and increasing disease prevalence due to
 247 obesity in the community.

248 *“...My mother-in-law used to say that if she saw any handsome and healthy*
 249 *person then she thought that the person belongs to high economic class.*
 250 *[...] She says it is good. However, nowadays, her view has changed. Now*

251 *she says that it is not good to gain weight, and excess weight results in*
252 *disease. (Female, under 40yrs.)*

253 Most participants expressed positive attitude towards thinness and expressed their willingness
254 to lose weight. Those who had already faced problems or are currently facing problems due
255 to obesity/overweight, both disease-and appearance-wise, did not want to increase their
256 weight though their family and community commented on them.

257 *“If we, the overweight people, lose weight, we get comments (from others)*
258 *like- what happened, what disease you suffered from, are you stressed, and*
259 *all. But we have to take care of our own body though people comment.”*
260 *(Female, above 40yrs.)*

261 HPs also mentioned about the low self-esteem and psychological stress they found among
262 obese people, especially in teenagers, because of the comments that people pass onto them.

263 *“It’s like okay if someone [obese individuals] can take it easily when they*
264 *are called fat [“Mote”]. Otherwise, what I also have seen among teenagers*
265 *of age 16-17 years is that they do not participate in dance [competitions].*
266 *They do not participate in game competitions because they think people*
267 *will stare at them and flatter them. Such cases come often. (Nutritionist)*
268

269 HPs commented that though excessive weight (obesity) and thinness are considered bad in
270 the community, overweight is still considered good. This concept is hard to change among
271 people, even in educated people when it comes to children. The provider described saying,

272 *“(I have seen) a woman with a lean child. She cried after seeing another*
273 *chubby baby by her side grieving what had happened to her own*
274 *children. That was a difficult time for me [to counsel her].” (Nutritionist)*
275

276 **Body size perception**

277 Before carrying out the discussion, we measured height and weight of each participant. We
278 observed that all participants aged 40 and over were found to be either obese or overweight.
279 Nevertheless, when asked what they feel about the body size, majority of them perceived that
280 their weight was normal.

281 *“It would be good if I could decrease my belly size. Otherwise, I feel like I*
282 *am normal.” (Male, under 40yrs.)*

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3 283 Majority of the participants under 40 years had normal weight when measured. Two
4
5 284 participants, one male and one female, considered themselves as overweight though they
6
7
8 285 were found to be in normal weight.
9

10 286 Most participants measured their body weight through clothes' size, looking into mirrors, and
11
12
13 287 from others' comment on their body, while only few male participants reported measuring
14
15 288 their weight in a scale, when possible. However, HPs commented that the number of people
16
17 289 who are aware of/interested in measuring their weight is increasing in the community. As one
18
19
20 290 said,

21
22
23 291 *"If we remember those people who measured their weight, the count will be double*
24 292 *than our patients."* (Auxiliary Health Worker)

25 293

26 294 **Barriers to weight management**

27 295 Challenges in behavior modification

28
29
30 296 All FGD participants mentioned that diet modification and exercise are keys to prevent and
31
32
33 297 control obesity. However, only few of them exercise to maintain/reduce their weight. The
34
35
36 298 major reported barriers were busy schedule and laziness followed by cold weather and lack of
37
38
39 299 space or physical facilities. Participants above 40 years reported comorbidities like
40
41
42 300 musculoskeletal pain limits their physical activities.

43
44 301 *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me*
45 302 *to walk, my leg aches".* (Female, above 40yrs.)

46
47 303 *"I don't have friends to walk together with. Here is no place for Yoga. [...].*
48 304 *I also need to manage time at home"* (Female, under 40yrs.)

49
50
51 305 Two female participants under 40 years reported that they feel normal, and thus do not feel a
52
53
54 306 need to exercise.

55
56 307 *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I*
57 308 *feel- why should I exercise?"* (Female, under 40yrs.)
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59
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3 309 Participants had diverse opinion on the adequate level of physical activity. Few believed that
4
5 310 household chores like cooking and washing clothes are adequate for exercise, while others
6
7
8 311 thought exercise is only adequate when they sweat. The required duration of exercise ranges
9
10 312 from 10 minutes to 3 hours a day.

11
12
13 313 The frequently reported barrier for diet control was difficulty in changing food habit due to
14
15 314 food taste and desire to eat. Participants also mentioned unavailability of healthy food due to
16
17 315 use of excessive pesticides in vegetables and fruits. In addition, people's attraction towards
18
19 316 junk food because of its easy availability, accessibility, and time saving nature has limited the
20
21 317 use of healthy food. One participant complained that people eat junk food to show
22
23 318 themselves belonging of higher social status in the community.

24
25
26
27 319 *“If our children walk taking the juice bottles and drinking juices, then that*
28 320 *reflects a higher status. But, if they walk eating homemade popcorn, then*
29 321 *that reflects the lower status. (Male, under 40yrs.)*

30
31
32 322
33 323 Lack of HP's knowledge and anthropometric measurement device

34 324
35 325 HPs usually identify a person with overweight and obesity by measuring their weight and
36
37 326 height, by observation, and by patient's own complain. When asked specifically about
38
39 327 measuring central obesity, the health providers at the tertiary level stated that they measure
40
41 328 waist circumference only for those who are diabetic or have metabolic syndrome. However,
42
43 329 the health providers at the peripheral level were not aware of measuring central obesity. One
44
45 330
46 331 put it this way-

47 332
48 333
49 334 *“We have not done that (measured central obesity). We do not have*
50 335 *instrument. We also do not have such information. If we were given*
51 336 *instrument and the District Health Office directed us to do so or if we*
52 337 *were given any training...we do everything based on our own knowledge.*
53 338 *We do not have anything extra.” (Auxiliary Health Worker)*
54
55 339

56 340 Lack of counseling

57 341
58 342 HPs at the peripheral level provide counseling to patients for 7 mins to half an hour
59
60 343

1
2
3 344 depending upon patient's condition and provider's available time. The Nutritionist spends
4 345
5 346 around half an hour to 45 minutes in counseling. However, the medical officer at the tertiary
6
7
8 347 level could provide a maximum of 5 minutes for counseling because of their time constraint
9
10 348 and high patient flow in a day. The officer mentioned that it would be helpful if they had a
11
12 349 helping hand.

13
14 350
15 351 *"Yes, I think it's a time factor [for not counseling patients]. And another, I*
16 352 *think it is helpful if we get a helping hand. One will take a note when one*
17 353 *measures [weight], it expedites the process."* (Medical Officer)
18 354
19
20
21

22 355 **Discussion**

23 356 In this study, obesity was perceived as a growing problem in the community. A cross-
24 357 sectional study (2016) among a cohort of 18 years and older in the same study community
25
26 358 reported the prevalence of overweight and obesity as 28.4% and 8.1%, respectively.⁹

27
28
29 359 Whereas, the 2019 WHO STEPS survey among 15-45 years Nepalese adults reported the
30
31 360 prevalence of overweight and obesity as 20% and 4.3%, respectively.⁶

32
33 361 Obesity was mainly a problem in those who are 40 years and older, married, office workers,
34
35 362 businessman, retired individuals, and housewives. A study among civil servants in Nepal
36
37 363 reported that married participants were 7.5 times more likely to be overweight/obese than
38
39 364 non-married, and the job title was related with being overweight/obese.¹⁵

40
41 365 Participants mainly linked the causes of obesity to personal factors, such as fatty diet and
42
43 366 physical inactivity, which is similar to other studies.^{8 15-18} Few of our participants reported
44
45 367 heredity as a cause of obesity. This is in contrast to the previous study done among civil
46
47 368 servants in Nepal, where almost equal number of participants viewed "fatty foods" or "a
48
49 369 genetic disorder" as a cause to obesity.¹⁵ In addition to above personal factors, women in our
50
51 370 study stressed on social and medical factors (such as use of contraceptives) as reasons to
52
53 371 gaining weight. In Nepalese society, higher consumption of food during childbirth is related

1
2
3 372 with higher milk production, improved milk quality, and the well-being of both mother and
4
5 373 child.

6
7
8 374 Health and appearance are the key motive to lose weight.^{19 20} Our participants who were
9
10 375 concerned about the consequences of obesity and their appearance were more willing to lose
11
12 376 or maintain their current weight. However, it is important to consider if people are only
13
14 377 concerned with their appearance because the weight loss for a transient period to appear fit
15
16 378 and attractive, such as in social events, will not be sustainable, and the attempt to lose
17
18 379 massive weight in short duration can be hazardous.

19
20
21
22 380 In our study, almost all participants who were 40 years and older underestimated their body
23
24 381 weight, though they all met the criteria of overweight and obese. The finding is similar to the
25
26 382 studies conducted in Tanzania,¹¹ Cameroon²¹ and in the United states.¹⁶ Studies have also
27
28 383 reported gender variation in the weight estimation,^{8 22} men above 40 years are more likely to
29
30 384 underestimate their weight than females of that age groups.²¹ Interestingly, two overweight
31
32 385 male participants who were 40 years and older in our study viewed themselves as
33
34 386 underweight. Individuals who do not perceive themselves as overweight and obese are likely
35
36 387 to gain more weight due to their low risk perception and unwillingness to lose weight.^{8 11 12}

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41 388 Big belly is culturally accepted as a sign of prosperity in Nepal.^{7 15} Overweight is considered
42
43 389 good, healthy, and attractive, which is consistent with other studies.^{8 16} Most strikingly, this
44
45 390 was frequently reported by women under 40 years of age. Researches have shown that
46
47 391 women may be more accepting of obesity than men, thus have less negative attitude towards
48
49 392 obese individuals.²³ However, further studies on the role of gender in weight related
50
51 393 acceptance is needed.

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55 394 Although overweight is acceptable, participants have negative attitude towards obese person,
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57 395 which is congruent with other studies.^{8 16 24 25} Obese person is viewed as someone who is

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3 396 lazy, heavy, unattractive, and have illness associated with obesity. Studies have shown
4
5 397 consequences of others' negative attitudes among obese persons.^{8 15 16 24 25} A study in
6
7 398 Cameoon reported that the overweight Caucasian and African American women were viewed
8
9 399 differently and were discriminated despite their hard work.¹⁶ Such internalized stigma among
10
11 400 obese individuals is particularly from the belief that obesity is a result of individual's failure
12
13 401 to maintain healthy lifestyle.²⁴ Considering the fact that participants in our study also pointed
14
15 402 out the internal factors, like diet and exercise, as prominent reasons to obesity, it is important
16
17 403 to aware people regarding different socio-cultural and medical causes associated with obesity
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19 404 to reduce obesity related stigma and negative attitude.²⁴ Further study to explore the impact
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21 405 of negative attitude on overweight or obese individuals would be beneficial to develop
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23 406 interventional programs.

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25
26 407 Adequate exercise and healthy diet are keys to manage obesity and other chronic diseases.²⁶
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28 408 Even though participants in our study were aware that healthy lifestyle will benefit them, they
29
30 409 did not implement it. This difference in knowledge and practice has been described in many
31
32 410 studies.^{8 27-29}

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34 411 As in other low and middle-income countries,^{18 24 30} obesity is primarily assessed based on
35
36 412 BMI in Nepal. However, BMI cannot differentiate between weight because of excessive
37
38 413 muscle percentage and proportions of body fat.²⁴ Studies have shown that people with normal
39
40 414 BMI are at risk of cardiovascular diseases because of Central obesity.^{18 24 30} The prevalence
41
42 415 of central obesity has been increasing in South Asians. A study in Nepal (2006) reported
43
44 416 higher prevalence of central obesity than general obesity among study population in
45
46 417 Dharan.³¹ Similarly, a study in China reported that the prevalence of central obesity among
47
48 418 adults with BMI <25kg/m² increased by almost two-fold from 11.9% in 1993 to 21.1% in
49
50 419 2009. If the study did not consider measuring WC for obesity, they would have missed 65%

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3 420 of the cases.³⁰ This highlights the importance of measuring WC to accurately predict obesity
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5 421 in the clinical settings.
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8 422 This study is one among few qualitative studies of its kind in Nepal that aimed to understand
9
10 423 the perception of obesity among adult in a sub-urban community from both community and
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12 424 health provider's perspective. The use of open-ended questions provided insights into
13
14 425 participants' views and experiences. However, several limitations exist. This study is
15
16 426 confined confined to sub-urban area; therefore, the perception of urban and rural areas is
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18 427 underrepresented. However, qualitative study is intended to understand phenomenon, and not
19
20 428 to analyze the relationship between variables.^{28 29} Although few number of health providers
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22 429 were interviewed in this study, we have considered to include them from the different health
23
24 430 care levels. Given these limitations, however, the study provides profound information on
25
26 431 community's perception regarding obesity in Nepal.
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33 **Conclusions**

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35 433 This qualitative study explored the knowledge, attitude, and perception of obesity among
36
37 434 Nepalese adults in a sub-urban community. Given the participants' misconception and
38
39 435 inadequate knowledge regarding obesity, and the underestimation of their body size, it is
40
41 436 suggested to design and disseminate culturally appropriate health information to manage
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43 437 obesity in the community. Our finding shows that the providers at the peripheral health
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45 438 institutions lack training and instrument to measure central obesity. Since the prevalence of
46
47 439 central obesity is rising in South Asians, including Nepalese population, it is important to
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49 440 consider central obesity while training health workers at the peripheral level.
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3 **443 List of abbreviations**
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5 444 BMI: Body Mass Index
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8 445 FGD: Focus Group Discussion
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11 446 HP: Health Provider
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14 447 IDI: In-depth Interview
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17 448 STEPS: STEPwise approach to surveillance
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20 449 WHO: World Health Organization
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23
24 **450 Declarations**
25

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27

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29
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31
32 454 thank all participants for providing their invaluable contribution in the study.
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35

36 **455 Author contributions**
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38 456 SS, the principal investigator, conceived the study, transcribed and analysed data, and
39
40 457 developed the manuscript. BMK contributed to research design. SA contributed to collecting
41
42 458 and analysing the data. SS contributed to revising manuscript. All authors read and approved
43
44 459 the final manuscript for publication.
45
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3 462 **Competing interests**
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5 463 None declared
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8 464 **Patient consent for publication**
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10 465 Not required.
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13 466 **Ethics approval**
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15 467 Ethical approval was obtained from the Kathmandu University School of Medical Sciences
16

17 468 Institutional Review Committee (IRB# 36/16). Informed consent was received from all
18

19 469 participants before participation in the study.
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23 470 **Provenance and peer review**
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25 471 Not commissioned, externally peer reviewed.
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30 472 **Data availability statement**
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32 473 No data are available.
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Standards for Reporting Qualitative Research (SRQR)^a

No.	Topic	Item	Page/ line no(s).
	Title and abstract		
S1	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
S2	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
	Introduction		
S3	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4	Purpose or research question	Purpose of the study and specific objectives or questions	4
	Methods		
S5	Qualitative approach and research paradigm ^b	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7	Context ^b	Setting/site and salient contextual factors; rationale ^a	5
S8	Sampling strategy ^b	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale ^a	5
S9	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	20
S10	Data collection methods ^b	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale ^a	5-6
S11	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	5-6

S12	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13	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/deidentification of excerpts	6
S14	Data analysis ^b	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale ^a	6,8-9
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Results/Findings			
S16	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	7-15
S17	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion			
S18	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	15-18
S19	Limitations	Trustworthiness and limitations of findings	18
Other			
S20	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

^aThe 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.

^bThe 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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5 1 **Perception of obesity and overweight among adults living in suburban**
6 2 **Nepal: A qualitative study**

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3 36 **Abstract**

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5 37 **Objective**

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7 38 To explore the perception of obesity and overweight among Nepalese adults living in a
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9 39 suburban community.

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11 40 **Design**

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13 41 A qualitative study comprising focus group discussion and in-depth interview.

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16 42 **Setting**

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18 43 Community and health care facilities in Dhulikhel, Nepal.

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21 44 **Participants**

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23 45 Four focus group discussions were conducted with community members (n= 22) and four in-
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25 46 depth interviews were conducted with healthcare providers.

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28 47 **Results**

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30 48 Obesity was a rising problem in this suburban community. Participants had inadequate
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32 49 knowledge regarding the consequences of obesity, and they perceived overweight as normal,
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34 50 healthy, and attractive. The participants above 40 years of age did not perceive themselves to
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36 51 be overweight or obese. Despite participants' awareness of the importance of diet control
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38 52 and exercise to prevent obesity, these were not translated into practice.

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42 53 **Conclusions**

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44 54 This study provided insight into perceptions of obesity in a suburban Dhulikhel community
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46 55 through both community members' and healthcare providers' perspective. Misconceptions
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48 56 and inadequate knowledge of obesity among people in this community indicate the need for
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50 57 health education and interventional programme to increase health awareness and preventive
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52 58 practices.

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56 59 **Keywords:** obesity, overweight, perception, qualitative study, Nepal, public health,
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58 60 cardiovascular disease

61 **Strengths and limitations of this study**

- 62 • To our knowledge, this is the first qualitative study in Nepal to explore the perception of
63 obesity among adults in a suburban community in Nepal.
- 64 • The study includes in-depth views of both community members and health care providers
65 working at different levels.
- 66 • The study is limited to the Dhulikhel Heart Study participants residing in a suburban area;
67 therefore, the findings of the study may not be transferable to rural or urban areas.

81 **Background**

82 Obesity is one of the top five causes of cardiovascular mortality and morbidity globally¹
83 causing an increased risk of coronary artery disease, diabetes mellitus, hypertension, and
84 kidney failure.² The rate of obesity has increased in many developing nations, including in
85 Nepal.³⁻⁵ About 24.3% of Nepalese adults are obese or overweight.⁶

86 Several demographic, socio-economic, and cultural factors contributing to obesity have been
87 described elsewhere.⁷⁻⁹ Like other developing countries, Nepal is undergoing epidemiologic
88 and demographic transition, experiencing significant lifestyle changes.⁷⁻¹⁰ Urbanization,
89 leading to an increased number of fast-food restaurants, the growing culture of 'eating out',
90 and the availability of lower-priced, higher caloric food have contributed to obesity. The
91 2019 WHO STEP survey reported low physical activity and low vegetable and fruit
92 consumption in Nepal.⁶

93 Studies have found a relationship between obesity and body weight/size perception. Unlike in
94 developed countries, a heavier body is preferred in many developing countries, such as South
95 Africa and Tanzania.^{8 11} In Nepal, traditionally, having a 'big belly' is considered a sign of
96 prosperity.⁷ This perceived norm might be facilitating weight gain, particularly among high-
97 income individuals and families. However, with epidemiologic transitions and technological
98 advancements occurring globally, this perception may be changing. It is also important to
99 understand how the individual perceives their body size. The individuals who do not see
100 themselves as overweight/ obese are prone to gain weight because of their low-risk
101 perception and unwillingness to lose weight.^{8 11 12} On the other hand, females generally
102 misperceive body weight, deeming it higher than it is, and thus are dissatisfied with their
103 bodies compared to males.¹³

104 In 2015, the Dhulikhel Heart Study, a population-based cohort study on cardiovascular
105 disease and its risk factors, was conducted among adults living in Dhulikhel, a suburban town

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3 106 in Nepal.¹⁴ The study found a high prevalence of cardiovascular disease and its risk factors,
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5 107 such as obesity. Given the high prevalence of obesity and poor cardiovascular health literacy,
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7 108 the development of effective health education and interventional programmes to manage
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9 109 obesity in this community is vital. Though studies regarding obesity perception have been
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11 110 conducted in many low- and middle-income countries (LMICs)^{8 15-17}, information on body
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13 111 size self-perception and willingness to lose weight among Nepalese adults is limited. In 2009,
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15 112 Simkhada et.al¹⁸ conducted a cross-sectional study to assess knowledge, attitude, and
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17 113 prevalence of overweight and obesity among civil servants in Nepal. Few qualitative studies
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19 114 that have been conducted in this context focus primarily on diet and exercise.^{19 20} To our
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21 115 understanding, there are no qualitative studies conducted to date exploring body size
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23 116 perception and willingness to lose weight among adults in Nepal. Also, no studies exist to
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25 117 understand obesity from the healthcare provider's perspective in Nepal. Our study aims to
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27 118 fulfill the above-mentioned gaps in knowledge by exploring the perception of obesity and
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29 119 overweight among Nepalese adults, including both community members and healthcare
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31 120 providers (HCP).
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121 **METHODS**

122 **Study design and setting**

123 This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS),
124 which is a longitudinal cohort study conducted between November 2013 and February 2015
125 to assess the prevalence of cardiovascular diseases and its risk factors among adults of 18
126 years and older living in Dhulikhel, a sub-urban town in Nepal.¹⁴

127 **Participants**

128 We conducted four focus group discussions (FGD) with 22 DHS participants. We used FGDs
129 for community members as this method is proven to adequately gather information on the

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3 130 perception of obesity among adults in LMICs.^{8 15} Participants were selected using purposeful
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5 131 sampling methods. A list of DHS participants was obtained and stratified into four groups by
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7 132 gender (male and female) and age (<40years and \geq 40years). The separation of gender was
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9 133 necessary because women in Nepalese culture are usually shy and do not discuss explicitly in
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11 134 presence of men. The researcher contacted 12 eligible participants from each group via phone
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13 135 call to request participation in the study. Participants who provided verbal consent were
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15 136 invited for discussions. Of the total 48 eligible participants who agreed to participate, 22 took
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17 137 part in the group discussions. Six participants who initially agreed to participate did not
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19 138 attend the discussion. The reasons for non-participation were busy schedules on the given
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21 139 time and date and medical illness.

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27 140 For the in-depth interview (IDI), we purposefully selected four health providers (HPs) from
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29 141 different healthcare levels to explore barriers to obesity management. We selected one doctor
30
31 142 and a nutritionist from the tertiary hospital, an in-charge from a primary health care center,
32
33 143 and an in-charge from an urban health care center. All HCPs who were invited agreed to
34
35 144 participate in the study and were interviewed.

36 145 **Data collection**

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42 146 We collected data from October 2016 to December 2016. We developed initial guidelines in
43
44 147 Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline
45
46 148 was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and
47
48 149 modified accordingly. The findings from the pre-tested FGD and IDI were not included in
49
50 150 this analysis.

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54 151 All FGDs were moderated by the researcher and assisted by a note-taker. The moderator was
55
56 152 not from the study community and, hence had no prior knowledge about the participants
57
58 153 before the study. The moderator started each session by briefly explaining the aim of the
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3 154 study and receiving informed consent. Participants' height and weight were also measured
4
5 155 before the discussion commenced. The moderator started the discussion with open-ended
6
7 156 questions and probed further for in-depth information. The FGD guideline included 10-item
8
9 157 questions under four topics— body size perception; knowledge on obesity; attitude towards
10
11 158 obesity; and barriers to weight management. For the perception of body size, we asked
12
13 159 participants' views on their body size, and then probed why they think their body is normal or
14
15 160 overweight or obese and how they measure their body size. To explore participants'
16
17 161 knowledge of obesity, we asked questions on the perceived cause and complications of
18
19 162 obesity and further probed if certain groups in the community are perceived as more obese
20
21 163 than others. On attitude towards obesity, we asked the following questions, 'How do you
22
23 164 view overweight and obesity?', and 'What influences society's views on obesity?' Regarding
24
25 165 the willingness to lose weight or maintain optimally, we asked about the perceived barriers to
26
27 166 weight management. We conducted FGDs in a private space at a community building. The
28
29 167 group size varied from 3 to 7. FGD participants were offered a light snack for their time and
30
31 168 participation.

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37
38 169 The investigator (SA) conducted IDIs with HCPs in the private room at their respective
39
40 170 health care centers. Informed consent was received before each interview. The IDIs were
41
42 171 conducted to understand the burden of obesity in the community, providers' perspectives on
43
44 172 the community's knowledge and attitude on obesity, and providers' related barriers to obesity
45
46 173 management. The questions included 'What percentage of patients attending to your
47
48 174 institution are overweight or obese?', 'In general, how well do you think patients understand
49
50 175 overweight and obesity?', 'How do community members view/perceive obesity?', 'Are there
51
52 176 any common misconceptions in the community about obesity?', and 'What factors affect
53
54 177 obesity management?' The moderator further probed on the above questions to explore
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56 178 further information.
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179 **Data analysis**

180 FGDs and IDIs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded
181 data. Data were analysed using the hybrid thematic analysis approach.²¹ We started with an
182 “a priori” list of codes drawn from the literature review and research questions and included
183 additional codes that emerged during the inductive analysis process.²² One FGD and two
184 interview transcripts were coded separately by two independent coders (SS and SA) to
185 enhance the data validity. Coders discussed similarities and differences in the way codes were
186 applied and agreed on the emerging codes. The interconnected codes were then grouped into
187 sub-groups and sub-groups were further grouped into broad themes. After the discussion, the
188 final codebook was updated. SS further analysed the transcripts and grouped text units as per
189 the codes using the Atlas ti.7. Selected quotes were reported.

190 **Ethics statement**

191 All participants who gave verbal consent to participate in the study also signed an informed
192 consent form. Participation in the study was voluntary. All collected data were kept safe and
193 strictly confidential.

194 **Patient and public involvement**

195 The study design and objectives were informed by previous findings from the DHS study,
196 which indicated the high prevalence of obesity and poor cardiovascular health literacy among
197 the community members. Although we did not specifically do separate community
198 engagement for this study, we did include the discussions in the planning of the DHS in
199 several community activities at schools, wards, meetings with female community health
200 volunteers, and other local community clubs.

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2
3 201 **RESULTS**

4
5 202 **Characteristics of participants**

6
7 203 The characteristics of the FGD participants are presented in table 1.

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9
10 204 **Table 1: Socio-demographic characteristics of FGD participants**

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employed	3 (13.6)
Self-employed*	9 (40.9)
Homemakers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m ²	9 (40.9%)
≥25-29kg/m ²	6 (27.3%)
≥30kg/m ²	7 (31.8%)

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50 205 *Self-employed includes business and agriculture

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52 206 We categorized themes derived from FGDs and IDIs into five categories: (1) Burden of
53
54 207 obesity; (2) Knowledge of obesity; (3) Attitude towards obesity; (4) Body size perception;
55
56 208 and, (5) Barriers to obesity management. The example of coding, categorizing, and
57
58
59 209 formulating themes is given in table 2.
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Table 2: Example of coding, categorizing, and formulating themes

Codes	Definition of codes	Sub-category	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to the patient's lack of time.	Exercise habit	Challenges in behavior modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to the patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to the patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather conditions.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and/or adequate space to exercise.			
Food taste	Any reference to the difficulty in modifying dietary habits due to food taste.	Food habit		
Desire to eat	Any reference to the difficulty in modifying dietary habits due to the patient's desire to eat what they see.			
Junk food	Any reference to the difficulty in modifying dietary habits due to easy availability and accessibility of junk food.			
Lack of access to healthy food	Any reference to the difficulty in modifying dietary habits due to the inaccessibility of healthy food.			

211

212 **Burden of obesity**

213 Both FGD participants and HCPs identified obesity as a growing problem in the community.

214 A medical officer stated that among the 20-25 patients he examines in a day, 7-8 of them are

215 either overweight or obese. He further commented that while obesity might be increasing

216 among teenagers, these teenagers are not under their radar as they seldom visit doctors.

217 Obesity was found to be higher among females and individuals aged 40 years and over in the

218 community. Participants also pointed out that obesity is high among particular ethnic groups,

219 such as Newar and Tamang, and among other sub-groups such as married persons, office

220 workers, housewives, businessmen, drivers, rich people, and people living in urban areas.

221 *“In Newari culture, there are a lot of feasts and festivals, so they eat a lot.*

222 *In the case of Tamang, they drink (alcohol) a lot. They eat much while*

223 *drinking. Both are high in calories, so this might result in weight gain.”*

224 (Nutritionist)

225

226 **Awareness of obesity**

227 Causes of obesity

228 All FGD participants believed that obesity could result from an unhealthy diet (e.g., oily and

229 fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity or old age as

230 causes of overweight. Participants aged 40 and over reported they gained weight without any

231 specific reasons while maintaining their diet.

232 *“In my case, I eat chapatti in the evening and rice in the morning. Still, my*

233 *belly does not get decreased. In the past, despite my massive eating, I did*

234 *not gain weight. Now, even drinking water leads to weight gain.”*(Male,

235 above 40)

236 *“For some, it looks like genetics. Their grandparents are fat and so are the*

237 *grandchildren.”* (Female, above 40)

238 Female participants further added the reasons for being obese, such as the use of family

239 planning devices, an increase in food intake after childbirth, and the habit of eating leftovers

240 to prevent food waste.

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3 241 *“(I) was told to eat more during my childbirth. Everyone used to say that I*
4 242 *need more than before. So, the amount of my food increased. I used to eat*
5 243 *less before (giggles)” (Female, above 40yrs.)*

7
8 244 *“It’s like, someone leaves the food, and instead of throwing, I feel like [I]*
9 245 *should eat it. Why throw (food)? So, I gained weight.” (Female, above*
10 246 *40yrs.)*

12 247 Complications of obesity

14 248 Musculoskeletal problems, such as difficulty sitting and walking, back pain, and pressure on
15
16 249 the heel due to overweight were the predominant complications reported by participants.

18
19 250 Many also reported high blood pressures, while few mentioned diabetes, high cholesterol,
20
21 251 and heart disease as complications. Participants’ knowledge of complications was not only
22
23 252 based on their experience but also on what they had seen in their family and community.

25
26 253 Participants who had overweight were more concerned about complications, in terms of both
27
28 254 their health and appearance, than those with a normal weight. Male participants under the age
29
30 255 of 40 years were more concerned about their health and appearance due to overweight. One
31
32 256 overweight male participant under 40 years stated he was ashamed of walking with his
33
34 257 friends, and added:

37
38 258 *“As per my experience, it is better to lose weight than to gain it. [...] Once*
39 259 *I had an experience of being overweight. It was difficult. It’s like I had*
40 260 *Asthma [disease]. I could not walk.” (Male, under 40yrs.)*

42 261 *“Our body shape looks bad. [...] (We) look older at a younger age because*
43 262 *of obesity. (Male, under 40yrs.)*

45
46 263 HCPs, however, commented that people do not take obesity seriously because they lack
47
48 264 adequate knowledge about its complications. Once HCP said:

50 265 *“Until and unless the disease does not get complicated, it barely comes*
51 266 *to their mind that they should go for a check-up. Otherwise, they don’t*
52 267 *even give a try to reduce weight although they are asked to do so.”*
53 268 *(Medical Officer)*

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3 270 Participants who feared the health consequences of obesity usually ask the HPs for
4
5 271 suggestions to reduce weight. However, one HCP emphasized that the reason for being
6
7 272 concerned is the appearance rather than disease.

9 273
10 274 *“I see these days that people are concerned with obesity not because of*
11 275 *disease but because of how they look physically. There are very few*
12 276 *who [are] concerned about disease.” (Medical Officer)*
13 277

14 278 **Attitude towards obesity and overweight**

15
16
17 279 FGD participants reported that overweight was considered good in society, both health-wise
18
19 280 and appearance-wise. Some participants under 40 years also expressed their willingness to
20
21 281 increase weight. One female participant described how odd it was to have a thin figure in her
22
23 282 family:

24
25
26
27 283 *“...we are five daughters-in-law in the family...it looks odd when there is*
28 284 *one thin person in the room...it does not match in the family.” (Female,*
29 285 *under 40yrs.)*

30
31 286 For women, gaining weight after marriage was viewed positively.

32
33
34
35 287 *“If I lose my weight and visit there [maternal home], they [neighbors]*
36 288 *would say that my husband did not provide me enough to eat [giggles]. If I*
37 289 *go with my increased weight, they will say that my husband loves me.”*
38 290 *(Female, under 40yrs.)*

39
40 291 However, participants also believed that too much weight gain (obesity) was perceived as bad
41
42 292 in the community and that community perception/attitude towards obesity has been changing.
43
44 293 Participants attributed this change to the information provided through media, such as
45
46 294 television and radio, and to increasing obesity-related disease prevalence in the community.

47
48
49
50 295 *“...My mother-in-law used to say that if she saw any handsome and healthy*
51 296 *person then she thought that the person belongs to high economic class.*
52 297 *[...] She says it is good. However, nowadays, her view has changed. Now*
53 298 *she says that it is not good to gain weight, and excess weight results in*
54 299 *disease. (Female, under 40yrs.)*

55
56
57 300 Most participants expressed a positive attitude towards thinness and expressed their
58
59 301 willingness to lose weight. Those who had already faced problems or are currently facing

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2
3 302 problems due to obesity/overweight, both disease-and appearance-wise, did not want to
4
5 303 increase their weight despite comments from their family and.

6
7
8 304 *“If we, the overweight people, lose weight, we get comments (from others)*
9 305 *like- what happened, what disease you suffered from, are you stressed, and*
10 306 *all. But we have to take care of our own body although people comment.”*
11 307 (Female, above 40yrs.)

12
13
14 308 HCPs also mentioned the low self-esteem and psychological stress they found among obese
15
16 309 people, especially in teenagers, because of negative comments that people make about them.

17
18 310 *“It’s like okay if someone [obese individuals] can take it easy when they*
19 311 *are called fat [“Mote”]. Otherwise, what I also have seen among teenagers*
20 312 *age 16-17 years is that they do not participate in dance [competitions].*
21 313 *They do not participate in game competitions because they think people*
22 314 *will stare at them and flatter them. Such cases come often. (Nutritionist)*
23 315

24
25
26 316 HCPs commented that though excessive weight (obesity) and thinness are considered bad in
27
28 317 the community, overweight is still considered good. This concept is hard to change among
29
30 318 people, even in educated people when it comes to children. The provider described saying,

31
32
33 319 *“(I have seen) a woman with a lean child. She cried after seeing another*
34 320 *chubby baby by her side grieving what had happened to her children.*
35 321 *That was a difficult time for me [to counsel her].” (Nutritionist)*
36 322

37 323 **Body size perception**

38
39
40 324 Before carrying out the discussion, we measured the height and weight of each FGD
41
42 325 participant. All participants aged 40 and above were found to be either obese or overweight.
43
44 326 Nevertheless, when asked what they feel about body size, the majority of them perceived that
45
46 327 their weight was normal.

47
48
49 328 *“It would be good if I could decrease my belly size. Otherwise, I feel like I*
50 329 *am normal.” (Male, under 40yrs.)*

51
52
53 330 The majority of participants under 40 years had normal weight. Two participants, one male
54
55 331 and one female, considered themselves overweight although their measurement indicated
56
57 332 normal weight.

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2
3 333 Most participants perceived their body size and weight by measuring their clothes' size,
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5 334 evaluating themselves in mirrors, and experiencing others' comments about their body, while
6
7
8 335 only a few male participants reported measuring their weight on a scale, when possible.
9
10 336 However, HCPs reported that the number of people who are aware of and/or interested in
11
12 337 measuring their weight is increasing in the community. As one said,

15 338 *"If we remember those people who measured their weight, the count will be double*
16 339 *than our patients."* (Auxiliary Health Worker)

18 340
19 341 **Barriers to weight management**

20 342 Challenges in behavior modification

21
22 343 All FGD participants mentioned that diet modification and exercise are keys to prevent and
23
24 344 control obesity. However, only a few of the participants reported exercising to maintain or
25
26 345 reduce their weight. Both overweight or obese and normal-weight participants reported
27
28 346 similar barriers to weight management. The most commonly reported barriers were busy
29
30 347 schedule and laziness followed by cold weather and lack of space or physical facilities for
31
32 348 exercise. Participants above 40 years of age reported that comorbidities such as
33
34 349 musculoskeletal pain limits their level of physical activity.

35
36 350 *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me*
37 351 *to walk, my leg aches".* (Female, above 40yrs.)

38
39 352 *"I don't have friends to walk together with. Here is no place for Yoga. [...].*
40 353 *I also need to manage time at home"* (Female, under 40yrs.)

41
42 354 Two female participants under 40 years of age reported that they feel normal, and thus do not
43
44 355 feel a need to exercise.

45
46 356 *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I*
47 357 *feel- why should I exercise?"* (Female, under 40yrs.)

48
49 358 Participants had a diverse opinion on the adequate level of physical activity. A Few believed
50
51 359 that household chores like cooking and washing clothes were adequate for exercise, while
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1
2
3 360 others thought that exercise was only adequate when they sweat. Participants' required
4
5 361 duration of exercise ranged from 10 minutes to 3 hours a day.
6
7

8 362 The most frequently reported barrier for diet control was difficulty in changing food habits
9
10 363 due to food taste and desire to eat. Participants also mentioned the unavailability of healthy
11
12 364 food due to the use of excessive pesticides in vegetables and fruits. In addition, participants'
13
14 365 reported that the increased availability and efficiency of consuming junk food has limited
15
16 366 their consumption of healthier food. Consuming junk food was also a status symbol. One
17
18 367 participant explained that people in the community eat junk food to show that they belong to
19
20 368 a higher social status.
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25 369 *"If our children walk taking the juice bottles and drinking juices, then that*
26 370 *reflects a higher status. But, if they walk eating homemade popcorn, then*
27 371 *that reflects the lower status.* (Male, under 40yrs.)
28

29 372 Lack of HCP's knowledge and anthropometric measurement tools

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32 373 HCPs reported that overweight and obesity were identified by measuring a patient's weight
33
34 374 and height, by observation, and by the patient's complaint. When asked specifically about
35
36 375 measuring central obesity, the HCPs at the tertiary level stated that they measure waist
37
38 376 circumference only for those who are diabetic or have a metabolic syndrome. However, the
39
40 377 HCPs at the peripheral level were not aware of measuring central obesity. One put it this
41
42 378 way-
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44
45

46 379 *"We have not done that (measured central obesity). We do not have an*
47 380 *instrument. We also do not have such information. If we were given an*
48 381 *instrument and the District Health Office directed us to do so or if we*
49 382 *were given any training...we do everything based on our knowledge. We*
50 383 *do not have anything extra."* (Auxiliary Health Worker)
51 384

52 385 Lack of counseling

53 386
54 387 HCPs at the peripheral level counsel to patients for 7 mins to half an hour
55
56 388 depending upon the patient's condition and the provider's available time. At the tertiary level,
57
58 389 the Nutritionist spends around half an hour to 45 minutes in counseling. However, the
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3 391 medical officer at the tertiary level could only provide a maximum of 5 minutes for
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5 392 counseling because of their time constraints and high daily patient volume. The medical
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7
8 393 officer mentioned that it would be helpful if they had additional assistance.
9

10 394
11 395 *“Yes, I think it’s a time factor (for not counseling patients). And another, I*
12 396 *think it is helpful if we get a helping hand. One will take a note when one*
13 397 *measure (weight), it expedites the process.” (Medical Officer)*
14 398
15

17 399 **Discussion**

18
19 400 This study explored the perception of obesity and overweight among Nepalese adults living
20
21 401 in a suburban community. We found that participants had inadequate knowledge and
22
23 402 misconceptions regarding obesity and had perceived overweight as normal, healthy, and
24
25 403 attractive. The adults above 40 years of age did not perceive themselves to be overweight or
26
27 404 obese even when they were. Only a few participants reported exercising and controlling their
28
29 405 diet to prevent obesity or manage their weight.
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32

33 406 Obesity was perceived as a growing problem in the Dhulikhel community. A 2016 cross-
34
35 407 sectional study by Shrestha et. al reported the prevalence of overweight and obesity among
36
37 408 DHS participants of 18 years and older were as 28.4% and 8.1%, respectively.⁹ Similarly, the
38
39 409 nationally conducted WHO STEPS survey in 2019 reported the prevalence of overweight and
40
41 410 obesity among Nepalese adults aged 15-45 years as 20% and 4.3%, respectively.⁶ In our
42
43 411 study, participants reported that obesity was mainly a problem among individuals who are 40
44
45 412 years of age and above, married persons, office workers, businessmen, retired individuals,
46
47 413 and housewives. A 2011 study among civil servants in Nepal reported that married
48
49 414 participants were 7.5 times more likely to be overweight/obese than non-married.
50
51 415 Additionally, the occupation was found to be related to being overweight/obese.¹⁸ Based on
52
53 416 the above findings, it is important to design interventional programmes targeting these
54
55 417 populations to prevent overweight and obesity.
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3 418 Participants mainly linked the causes of obesity to personal factors, such as fatty diet and
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5 419 physical inactivity, which is similar to other studies conducted in Nepal, India, Malaysia,
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7 420 South Africa, and Morocco.^{8 17 18 23 24} Few of our participants reported heredity as a cause of
8
9 421 obesity. This contrasts with the result from the previous study done among civil servants in
10
11 422 Nepal, which found that an almost equal number of participants viewed “fatty foods” or “a
12
13 423 genetic disorder” as a cause of obesity.¹⁸ In addition to personal factors, women in our study
14
15 424 stressed social and medical factors such as marriage, childbirth, the habit of eating left-overs,
16
17 425 and the use of contraceptives as causes of obesity and overweight among females. In
18
19 426 Nepalese society, gaining weight right after marriage is considered a good sign of a healthy
20
21 427 relationship with a husband and in-laws. Culturally, Nepalese prefers to finish the food on the
22
23 428 day that is cooked. As women are the last members of a household to eat, they are expected
24
25 429 to consume all remaining food. Additionally, women’s increased food consumption after
26
27 430 childbirth is believed to increase milk production and improved milk quality, and the well-
28
29 431 being of both mother and child. Findings from the study conducted in the Laayoun
30
31 432 community of Morocco also reported socio-cultural pressure as a factor for increasing weight
32
33 433 among females. In contrast to our study, this study reported that single females also desired to
34
35 434 gain weight to maintain an ideal cultural beauty. It is important to educate females of
36
37 435 reproductive age about obesity risks to promote a healthier lifestyle.
38
39
40 436 Health and appearance are the key motives to lose weight.^{25 26} Similar to findings from
41
42 437 previous studies in South Africa and Morocco,^{8 27} participants in our study who were
43
44 438 concerned about the consequences of obesity and their appearance were more willing to lose
45
46 439 or maintain their current weight. However, it is important to consider if people are only
47
48 440 concerned with their appearance because the weight loss for a transient period to appear fit
49
50 441 and attractive, such as in social events, will not be sustainable, and the attempt to lose a lot
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52 442 of weight in a short duration of time can be hazardous.
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3 443 In our study, almost all participants who were 40 years and older underestimated their body
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5 444 weight, though they all met the criteria of overweight and obese. This finding is similar to
6
7 445 studies conducted in Tanzania,¹¹ Cameroon²⁷, and in the United States.²³ Additionally,
8
9 446 studies have also reported variation in weight estimation by gender and age.^{8 28} A qualitative
10
11 447 study in South Africa reported that the majority of overweight and obese female participants
12
13 448 perceived themselves to be normal or moderately overweight, and chose the silhouettes that
14
15 449 were smaller than their body size.⁸ A cross-sectional study in Morocco reported that more
16
17 450 females than males underestimated their body weight and males 40 years of age and above
18
19 451 were more likely to underestimate their weight compared to females in the same age group.²⁷
20
21 452 Individuals who do not perceive themselves as overweight and obese are likely to gain more
22
23 453 weight due to their low-risk perception and unwillingness to lose weight.^{8 11 12} The inability
24
25 454 for our participants to accurately recognize their body-weight status may prevent them from
26
27 455 adopting healthy behaviors and increase their risk to obesity and its complications. Therefore,
28
29 456 the community should be made aware of the importance of measuring their weight at
30
31 457 intervals, and health facilities should also increase educational campaigns to improve
32
33 458 community awareness.

34
35 459 In Nepal, a big belly is culturally accepted as a sign of prosperity.^{7 18} Participants' perception
36
37 460 that overweight is considered good, healthy, and attractive is consistent with other studies
38
39 461 conducted in South Africa, Morocco, and the United States.^{8 23 27} Most strikingly, this was
40
41 462 frequently reported by females under 40 years of age. Research has shown that females may
42
43 463 be more accepting of obesity than men, and thus have a less negative attitude towards obese
44
45 464 individuals.²⁹ However, further studies on the role of gender in weight-related acceptance are
46
47 465 needed.

48
49 466 Although overweight is acceptable, participants have a negative attitude towards an obese
50
51 467 person. This reflects the finding of several other studies,^{8 15 23 30} whereby obese individuals

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2
3 468 are viewed as lazy, heavy, unattractive, and are perceived to have illnesses associated with
4
5 469 obesity. Studies have also shown the consequences of others' negative attitudes among obese
6
7 470 persons.^{8 15 18 23 30} For example, a study in Cameroon reported that overweight Caucasian and
8
9 471 African American women were viewed differently and were discriminated against despite
10
11 472 their hard work.²³ Such internalized stigma among obese individuals is particularly from the
12
13 473 belief that obesity is a result of an individual's failure to maintain a healthy lifestyle.¹⁵
14
15 474 Considering the fact that participants in our study primarily pointed out the internal factors
16
17 475 such as diet and exercise, as causes of obesity, it is important to make people aware of socio-
18
19 476 cultural and medical factors to reduce obesity-related stigma and negative attitude.¹⁵ Further
20
21 477 studies to explore the impact of negative attitudes on overweight or obese individuals in
22
23 478 Nepal would be beneficial to develop interventional programmes in this setting.
24
25
26 479 Adequate exercise and a healthy diet are keys to managing obesity and other chronic
27
28 480 diseases.³¹ Although participants in our study were aware that a healthy lifestyle will benefit
29
30 481 them, they did not implement it. This difference in knowledge and practice has been
31
32 482 described in many studies.^{8 32-34} This could be due to low awareness of obesity complications.
33
34 483 In our study, both the overweight and normal-weight participants reported similar barriers to
35
36 484 weight management. This could be because only a few participants in our study reported
37
38 485 exercising or controlling a diet to reduce or prevent obesity. Moreover, participants who were
39
40 486 overweight did not perceive themselves as overweight and did not feel the need to change
41
42 487 their behavior. The cultural acceptance of overweight in Nepalese culture and the difficulties
43
44 488 in modifying behavior could be a challenge to implementing the effective intervention
45
46 489 programme in this setting.
47
48
49 490 As in other low and middle-income countries,^{15 35 36} obesity is primarily assessed based on
50
51 491 BMI in Nepal. However, BMI cannot differentiate between weight because of excessive
52
53 492 muscle percentage and body fat proportions.¹⁵ Studies have shown that people with normal

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2
3 493 BMI are at risk of cardiovascular diseases because of central obesity.^{15 35 36} The prevalence
4
5 494 of central obesity has been increasing among South Asians. A 2006 study in Nepal reported
6
7 495 a higher prevalence of central obesity than general obesity among the study population in
8
9 496 Dharan.³⁷ Similarly, a study in China reported that the prevalence of central obesity among
10
11 497 adults with BMI <25kg/m² increased by almost two-fold from 11.9% in 1993 to 21.1% in
12
13 498 2009. If the study did not consider measuring WC for obesity, they would have missed 65%
14
15 499 of the cases.³⁶ This highlights the importance of measuring WC to accurately measure obesity
16
17 500 in clinical settings.

21
22 501 This study is the first qualitative study in Nepal that aimed to understand the perception of
23
24 502 obesity among adults in a sub-urban community from both community and healthcare
25
26 503 providers' perspectives. The use of open-ended questions provided insights into participants'
27
28 504 perspectives and lived experiences. However, several limitations exist. This study is
29
30 505 confined to the sub-urban area; therefore, the perception of urban and rural areas is
31
32 506 underrepresented. However, a qualitative study is intended to understand a phenomenon, and
33
34 507 not to analyse the relationship between variables.^{33 34} All the FGD participants belonged to
35
36 508 the Hindu religion; therefore, the study could not explore the perception of individuals of
37
38 509 other religions. However, the majority of the population in this area are Hindu. Although few
39
40 510 numbers of health providers were interviewed in this study, we have considered to include
41
42 511 them from the different health care levels. Given these limitations, however, the study
43
44 512 provides profound information on the community's perception of obesity in Nepal.

51 **Conclusions**

52
53 514 This qualitative study explored the knowledge, attitude, and perception of obesity among
54
55 515 Nepalese adults in a suburban community. Given the participants' misconception and
56
57 516 inadequate knowledge regarding obesity, and the underestimation of their body size, it is
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3 517 suggested to design and disseminate culturally appropriate health information to manage
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5 518 obesity in the community. Our finding shows that the healthcare providers at the peripheral
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7 519 health institutions lack training and instrument to measure central obesity. Since the
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9 520 prevalence of central obesity is rising in South Asians, including the Nepalese population, it
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11 521 is important to consider central obesity while training health workers at the peripheral level.
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19 523 **List of abbreviations**

20 524 BMI: Body Mass Index

21 525 FGD: Focus Group Discussion

22 526 HCP: Healthcare Provider

23 527 IDI: In-depth Interview

24 528 STEPS: STEPwise approach to surveillance

25 529 WHO: World Health Organization

26 530 **Declarations**

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31 535 **Author contributions**

32 536 SS, the principal investigator, conceived the study, transcribed and analysed data, and
33 537 developed the manuscript. BMK and RK contributed to the research design. SA contributed

1
2
3 538 to collecting and analysing the data. SSu contributed to revising the manuscript. All authors
4
5 539 read and approved the final manuscript for publication.
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7

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9
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11
12

13 **542 Competing interests**

14
15 543 None declared
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18 **544 Patient consent for publication**

19
20 545 Not required.
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22

23 **546 Ethics approval**

24
25 547 Ethical approval was obtained from the Kathmandu University School of Medical Sciences
26
27 548 Institutional Review Committee (IRB# 36/16).
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29

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38 **551 Data availability statement**

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40 552 No data are available.
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For peer review only

Standards for Reporting Qualitative Research (SRQR)^a

No.	Topic	Item	Page/ line no(s).
	Title and abstract		
S1	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
S2	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
	Introduction		
S3	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4	Purpose or research question	Purpose of the study and specific objectives or questions	4
	Methods		
S5	Qualitative approach and research paradigm ^b	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7	Context ^b	Setting/site and salient contextual factors; rationale ^a	5
S8	Sampling strategy ^b	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale ^a	5
S9	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	20
S10	Data collection methods ^b	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale ^a	5-6
S11	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	5-6

S12	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13	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/deidentification of excerpts	6
S14	Data analysis ^b	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale ^a	6,8-9
S15	Techniques to enhance trustworthiness ^b	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale ^a	6
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S16	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	7-15
S17	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion			
S18	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	15-18
S19	Limitations	Trustworthiness and limitations of findings	18
Other			
S20	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

^aThe 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.

^bThe 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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Perception of obesity and overweight among adults living in suburban Nepal: A qualitative study

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5 **1 Perception of obesity and overweight among adults living in suburban**
6 **2 Nepal: A qualitative study**

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3 36 **Abstract**

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5 37 **Objective**

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7 38 To explore the perception of obesity and overweight among Nepalese adults living in a
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9 39 suburban community.

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11 40 **Design**

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13 41 A qualitative study comprising of focus group discussion and in-depth interview.

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16 42 **Setting**

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18 43 Community and health care facilities in Dhulikhel, Nepal.

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21 44 **Participants**

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23 45 Four focus group discussions were conducted with community members (n= 22) and four in-
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25 46 depth interviews were conducted with healthcare providers.

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28 47 **Results**

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30 48 Obesity is a rising problem in this suburban community. Participants had inadequate
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32 49 knowledge regarding the consequences of obesity, and they perceived overweight as normal,
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34 50 healthy, and attractive. The participants above 40 years of age did not perceive themselves to
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36 51 be overweight or obese. Despite participants' awareness of the importance of diet control
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38 52 and exercise to prevent obesity, these were not translated into practice.

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42 53 **Conclusions**

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44 54 This study provided insight into perceptions of obesity in a suburban Dhulikhel community
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46 55 through both community members' and healthcare providers' perspective. Misconceptions
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48 56 and inadequate knowledge of obesity among people in this community indicate the need for
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50 57 health education and interventional programme to increase health awareness and preventive
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52 58 practices.

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56 59 **Keywords:** obesity, overweight, perception, qualitative study, Nepal, public health,
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58 60 cardiovascular disease

61 **Strengths and limitations of this study**

- 62 • To our knowledge, this is the first qualitative study in Nepal to explore the perception of
63 obesity among adults in a suburban community in Nepal.
- 64 • The study includes in-depth views of both community members and health care providers
65 working at different levels.
- 66 • The study is limited to the Dhulikhel Heart Study participants residing in a suburban area;
67 therefore, the findings of the study may not be transferable to rural or urban areas.
- 68 • This study provides information on obesity and its perceived threat in a resource-poor
69 setting. The study has generated recommendations and possible strategies for obesity and
70 NCD prevention in the vulnerable population in Nepal.

82 **Background**

83 Obesity is one of the top five causes of cardiovascular mortality and morbidity globally[1]
84 causing an increased risk of coronary artery disease, diabetes mellitus, hypertension, and
85 kidney failure.[2] The rate of obesity has increased in many developing nations, including in
86 Nepal.[3–5] About 24.3% of Nepalese adults are obese or overweight.[6]

87 Several demographic, socio-economic, and cultural factors contributing to obesity have been
88 described elsewhere.[7–9] Like other developing countries, Nepal is undergoing
89 epidemiologic and demographic transition, experiencing significant lifestyle changes.[7–10]
90 Urbanization, leading to an increased number of fast-food restaurants, the growing culture of
91 ‘eating out’, and the availability of lower-priced, higher caloric food have contributed to
92 obesity. The 2019 WHO STEP survey reported low physical activity and low vegetable and
93 fruit consumption in Nepal.[6]

94 Studies have found a relationship between obesity and body weight/size perception. Unlike in
95 developed countries, a heavier body is preferred in many developing countries, such as South
96 Africa and Tanzania.[8,11] In Nepal, traditionally, having a ‘big belly’ is considered a sign of
97 prosperity.[7] This perceived norm might be facilitating weight gain, particularly among
98 high-income individuals and families. However, with epidemiologic transitions and
99 technological advancements occurring globally, this perception may be changing. It is also
100 important to understand how the individual perceives their body size. The individuals who do
101 not see themselves as overweight/ obese are prone to gain weight because of their low-risk
102 perception and unwillingness to lose weight.[8,11,12] On the other hand, females generally
103 misperceive body weight, deeming it higher than it is, and thus are dissatisfied with their
104 bodies compared to males.[13]

105 In 2015, the Dhulikhel Heart Study, a population-based cohort study on cardiovascular
106 disease and its risk factors, was conducted among adults living in Dhulikhel, a suburban town

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3 107 in Nepal.[14] The study found a high prevalence of cardiovascular disease and its risk factors,
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5 108 such as obesity. Given the high prevalence of obesity and poor cardiovascular health literacy,
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8 109 the development of effective health education and interventional programmes to manage
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10 110 obesity in this community is vital. Though studies regarding obesity perception have been
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12 111 conducted in many low- and middle-income countries (LMICs),[8,15–17] information on
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14 112 body size self-perception and willingness to lose weight among Nepalese adults is limited. In
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17 113 2009, Simkhada et.al conducted a cross-sectional study to assess knowledge, attitude, and
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19 114 prevalence of overweight and obesity among civil servants in Nepal.[18] Few qualitative
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21 115 studies that have been conducted in this context focus primarily on diet and exercise.[19,20]
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24 116 To our understanding, there are no qualitative studies conducted to date exploring body size
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26 117 perception and willingness to lose weight among adults in Nepal. Also, no studies exist to
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28 118 understand obesity from the healthcare provider's perspective in Nepal. Our study aims to
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30 119 fulfill the above-mentioned gaps in knowledge by exploring the perception of obesity and
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32 120 overweight among Nepalese adults, including both community members and healthcare
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34 121 providers (HCP).
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39 122 **METHODS**

40 123 **Study design and setting**

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44 124 This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS),
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46 125 which is a longitudinal cohort study conducted between November 2013 and February 2015
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48 126 to assess the prevalence of cardiovascular diseases and its risk factors among adults of 18
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50 127 years and older living in Dhulikhel, a sub-urban town in Nepal.[14]
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54 128 **Participants**

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57 129 We conducted four focus group discussions (FGD) with 22 DHS participants. We used FGDs
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59 130 for community members as this method is proven to adequately gather information on the
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3 131 perception of obesity among adults in LMICs.[8,15] Participants were selected using
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5 132 purposeful sampling methods. A list of DHS participants was obtained and stratified into four
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7 133 groups by gender (male and female) and age (<40years and \geq 40years). The separation of
8
9 134 gender was necessary because women in Nepalese culture are usually shy and do not discuss
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11 135 explicitly in presence of men. The researcher contacted 12 eligible participants from each
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13 136 group via phone call to request participation in the study. Participants who provided verbal
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15 137 consent were invited for discussions. Of the total 48 eligible participants who agreed to
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17 138 participate, 22 took part in the group discussions. Six participants who initially agreed to
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19 139 participate did not attend the discussion. Altogether 26 eligible participants did not participate
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21 140 in the study. The reasons for non-participation were busy schedules on the given time and
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23 141 date and medical illness.

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29 142 For the in-depth interview (IDI), we purposefully selected four health providers (HPs) from
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31 143 different healthcare levels to explore barriers to obesity management. We selected one doctor
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33 144 and a nutritionist from the tertiary hospital, an in-charge from a primary health care center,
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35 145 and an in-charge from an urban health care center. All HCPs who were invited agreed to
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37 146 participate in the study and were interviewed.

38 39 40 41 147 **Data collection**

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44 148 We collected data from October 2016 to December 2016. We developed initial guidelines in
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46 149 Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline
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48 150 was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and
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50 151 modified accordingly. The findings from the pre-tested FGD and IDI were not included in
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52 152 this analysis.

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56 153 All FGDs were moderated by the researcher and assisted by a note-taker. The moderator was
57
58 154 not from the study community and, hence had no prior knowledge about the participants
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1
2
3 155 before the study. The moderator started each session by briefly explaining the aim of the
4
5 156 study and receiving informed consent. Participants' height and weight were also measured
6
7 157 before the discussion commenced. The moderator started the discussion with open-ended
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9
10 158 questions and probed further for in-depth information. The FGD guideline included 10-item
11
12 159 questions under four topics— body size perception; knowledge on obesity; attitude towards
13
14 160 obesity; and barriers to weight management. For the perception of body size, we asked
15
16 161 participants' views on their body size, and then probed why they think their body is normal or
17
18 162 overweight or obese and how they measure their body size. To explore participants'
19
20 163 knowledge of obesity, we asked questions on the perceived cause and complications of
21
22 164 obesity and further probed if certain groups in the community are perceived as more obese
23
24 165 than others. On attitude towards obesity, we asked the following questions, 'How do you
25
26 166 view overweight and obesity?', and 'What influences society's views on obesity?' Regarding
27
28 167 the willingness to lose weight or maintain optimally, we asked about the perceived barriers to
29
30 168 weight management. We conducted FGDs in a private space at a community building. The
31
32 169 group size varied from 3 to 7. FGD participants were offered a light snack for their time and
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34 170 participation.

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40 171 The investigator (SA) conducted IDIs with HCPs in the private room at their respective
41
42 172 health care centers. Informed consent was received before each interview. The IDIs were
43
44 173 conducted to understand the burden of obesity in the community, providers' perspectives on
45
46 174 the community's knowledge and attitude on obesity, and providers' related barriers to obesity
47
48 175 management. The questions included 'What percentage of patients attending to your
49
50 176 institution are overweight or obese?', 'In general, how well do you think patients understand
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52 177 overweight and obesity?', 'How do community members view/perceive obesity?', 'Are there
53
54 178 any common misconceptions in the community about obesity?', and 'What factors affect
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3 179 obesity management?' The moderator further probed on the above questions to explore
4
5 180 further information.
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8 181 **Data analysis**

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11 182 FGDs and IDIs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded
12
13 183 data. Data were analysed using the hybrid thematic analysis approach.[21] We started with an
14
15 184 “a priori” list of codes drawn from the literature review and research questions and included
16
17 185 additional codes that emerged during the inductive analysis process.[22] One FGD and two
18
19 186 interview transcripts were coded separately by two independent coders (SS and SA) to
20
21 187 enhance the data validity. Coders discussed similarities and differences in the way codes were
22
23 188 applied and agreed on the emerging codes. The interconnected codes were then grouped into
24
25 189 sub-groups and sub-groups were further grouped into broad themes. After the discussion, the
26
27 190 final codebook was updated. SS further analysed the transcripts and grouped text units as per
28
29 191 the codes using the Atlas ti.7. Selected quotes were reported.
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35 192 **Ethics statement**

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38 193 All participants who gave verbal consent to participate in the study also signed an informed
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40 194 consent form. Participation in the study was voluntary. All collected data were kept safe and
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42 195 strictly confidential.
43
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45 196 **Patient and public involvement**

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48 197 The study design and objectives were informed by previous findings from the DHS study,
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50 198 which indicated the high prevalence of obesity and poor cardiovascular health literacy among
51
52 199 the community members. Although we did not specifically do separate community
53
54 200 engagement for this study, we did include the discussions in the planning of the DHS in
55
56 201 several community activities at schools, wards, meetings with female community health
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58 202 volunteers, and other local community clubs.
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3 203 **RESULTS**

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5 204 **Characteristics of participants**

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7 205 The characteristics of the FGD participants are presented in table 1.

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10 206 **Table 1: Socio-demographic characteristics of FGD participants**

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employed	3 (13.6)
Self-employed*	9 (40.9)
Homemakers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m ²	9 (40.9%)
≥25-29kg/m ²	6 (27.3%)
≥30kg/m ²	7 (31.8%)

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50 207 *Self-employed includes business and agriculture

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52 208 We categorized themes derived from FGDs and IDIs into five categories: (1) Burden of
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54 209 obesity; (2) Knowledge of obesity; (3) Attitude towards obesity; (4) Body size perception;
55
56 210 and, (5) Barriers to obesity management. The example of coding, categorizing, and
57
58
59 211 formulating themes is given in table 2.
60

212

Table 2: Example of coding, categorizing, and formulating themes

Codes	Definition of codes	Sub-category	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to the patient's lack of time.	Exercise habit	Challenges in behaviour modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to the patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to the patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather conditions.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and/or adequate space to exercise.			
Food taste	Any reference to the difficulty in modifying dietary habits due to food taste.	Food habit		
Desire to eat	Any reference to the difficulty in modifying dietary habits due to the patient's desire to eat what they see.			
Junk food	Any reference to the difficulty in modifying dietary habits due to easy availability and accessibility of junk food.			
Lack of access to healthy food	Any reference to the difficulty in modifying dietary habits due to the inaccessibility of healthy food.			

213

214 **Burden of obesity**

215 Both FGD participants and HCPs identified obesity as a growing problem in the community.

216 A medical officer stated that among the 20-25 patients he examines in a day, 7-8 of them are

217 either overweight or obese. He further commented that while obesity might be increasing

218 among teenagers, these teenagers are not under their radar as they seldom visit doctors.

219 Obesity was found to be higher among females and individuals aged 40 years and over in the

220 community. Participants also pointed out that obesity is high among particular ethnic groups,

221 such as Newar and Tamang, and among other sub-groups such as married persons, office

222 workers, housewives, businessmen, drivers, rich people, and people living in urban areas.

223 *“In Newari culture, there are a lot of feasts and festivals, so they eat a lot.*

224 *In the case of Tamang, they drink (alcohol) a lot. They eat much while*

225 *drinking. Both are high in calories, so this might result in weight gain.”*

226 (Nutritionist)

227

228 **Awareness of obesity**

229 Causes of obesity

230 All FGD participants believed that obesity could result from an unhealthy diet (e.g., oily and

231 fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity or old age as

232 causes of overweight. Participants aged 40 and over reported they gained weight without any

233 specific reasons while maintaining their diet.

234 *“In my case, I eat chapatti in the evening and rice in the morning. Still, my*

235 *belly does not get decreased. In the past, despite my massive eating, I did*

236 *not gain weight. Now, even drinking water leads to weight gain.”*(Male,

237 above 40)

238 *“For some, it looks like genetics. Their grandparents are fat and so are the*

239 *grandchildren.”* (Female, above 40)

240 Female participants further added the reasons for being obese, such as the use of family

241 planning devices, an increase in food intake after childbirth, and the habit of eating leftovers

242 to prevent food waste.

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3 243 *“(I) was told to eat more during my childbirth. Everyone used to say that I*
4 244 *need more than before. So, the amount of my food increased. I used to eat*
5 245 *less before (giggles)” (Female, above 40yrs.)*

7
8 246 *“It’s like, someone leaves the food, and instead of throwing, I feel like [I]*
9 247 *should eat it. Why throw (food)? So, I gained weight.” (Female, above*
10 248 *40yrs.)*

12 249 Complications of obesity

14 250 Musculoskeletal problems, such as difficulty sitting and walking, back pain, and pressure on
15
16 251 the heel due to overweight were the predominant complications reported by participants.
17
18 252 Many also reported high blood pressures, while few mentioned diabetes, high cholesterol,
19
20 253 and heart disease as complications. Participants’ knowledge of complications was not only
21
22 254 based on their experience but also on what they had seen in their family and community.
23
24 255 Participants who had overweight were more concerned about complications, in terms of both
25
26 256 their health and appearance, than those with a normal weight. Male participants under the age
27
28 257 of 40 years were more concerned about their health and appearance due to overweight. One
29
30 258 overweight male participant under 40 years stated he was ashamed of walking with his
31
32 259 friends, and added:

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37
38 260 *“As per my experience, it is better to lose weight than to gain it. [...] Once*
39 261 *I had an experience of being overweight. It was difficult. It’s like I had*
40 262 *Asthma [disease]. I could not walk.” (Male, under 40yrs.)*

41
42 263 *“Our body shape looks bad. [...] (We) look older at a younger age because*
43 264 *of obesity. (Male, under 40yrs.)*

44
45
46 265 HCPs, however, commented that people do not take obesity seriously because they lack
47
48 266 adequate knowledge about its complications. Once HCP said:

49
50 267 *“Until and unless the disease does not get complicated, it barely comes*
51 268 *to their mind that they should go for a check-up. Otherwise, they don’t*
52 269 *even give a try to reduce weight although they are asked to do so.”*
53 270 *(Medical Officer)*

54 271

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3 272 Participants who feared the health consequences of obesity usually ask the HPs for
4
5 273 suggestions to reduce weight. However, one HCP emphasized that the reason for being
6
7 274 concerned is the appearance rather than disease.

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10 275
11 276 *“I see these days that people are concerned with obesity not because of*
12 277 *disease but because of how they look physically. There are very few*
13 278 *who [are] concerned about disease.” (Medical Officer)*

14 279 15 280 **Attitude towards obesity and overweight**

16
17 281 FGD participants reported that overweight was considered good in society, both health-wise
18
19 282 and appearance-wise. Some participants under 40 years also expressed their willingness to
20
21 283 increase weight. One female participant described how odd it was to have a thin figure in her
22
23 284 family:

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26
27 285 *“...we are five daughters-in-law in the family...it looks odd when there is*
28 286 *one thin person in the room...it does not match in the family.” (Female,*
29 287 *under 40yrs.)*

30
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32 288 For women, gaining weight after marriage was viewed positively.

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34
35 289 *“If I lose my weight and visit there [maternal home], they [neighbors]*
36 290 *would say that my husband did not provide me enough to eat [giggles]. If I*
37 291 *go with my increased weight, they will say that my husband loves me.”*
38 292 *(Female, under 40yrs.)*

39
40 293 However, participants also believed that too much weight gain (obesity) was perceived as bad
41
42 294 in the community and that community perception/attitude towards obesity has been changing.
43
44 295 Participants attributed this change to the information provided through media, such as
45
46 296 television and radio, and to increasing obesity-related disease prevalence in the community.

47
48
49
50 297 *“...My mother-in-law used to say that if she saw any handsome and healthy*
51 298 *person then she thought that the person belongs to high economic class.*
52 299 *[...] She says it is good. However, nowadays, her view has changed. Now*
53 300 *she says that it is not good to gain weight, and excess weight results in*
54 301 *disease. (Female, under 40yrs.)*

55
56
57 302 Most participants expressed a positive attitude towards thinness and expressed their
58
59 303 willingness to lose weight. Those who had already faced problems or are currently facing

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3 304 problems due to obesity/overweight, both disease-and appearance-wise, did not want to
4
5 305 increase their weight despite comments from their family and.
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7

8 306 *“If we, the overweight people, lose weight, we get comments (from others)*
9 307 *like- what happened, what disease you suffered from, are you stressed, and*
10 308 *all. But we have to take care of our own body although people comment.”*
11 309 (Female, above 40yrs.)
12
13

14 310 HCPs also mentioned the low self-esteem and psychological stress they found among obese
15
16 311 people, especially in teenagers, because of negative comments that people make about them.
17

18 312 *“It’s like okay if someone [obese individuals] can take it easy when they*
19 313 *are called fat [“Mote”]. Otherwise, what I also have seen among teenagers*
20 314 *age 16-17 years is that they do not participate in dance [competitions].*
21 315 *They do not participate in game competitions because they think people*
22 316 *will stare at them and flatter them. Such cases come often. (Nutritionist)*
23 317
24
25

26 318 HCPs commented that though excessive weight (obesity) and thinness are considered bad in
27
28 319 the community, overweight is still considered good. This concept is hard to change among
29
30 320 people, even in educated people when it comes to children. The provider described saying,
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33

34 321 *“(I have seen) a woman with a lean child. She cried after seeing another*
35 322 *chubby baby by her side grieving what had happened to her children.*
36 323 *That was a difficult time for me [to counsel her].” (Nutritionist)*
37 324
38

39 325 **Body size perception**

40
41 326 Before carrying out the discussion, we measured the height and weight of each FGD
42
43 327 participant. All participants aged 40 and above were found to be either obese or overweight.
44
45 328 Nevertheless, when asked what they feel about body size, the majority of them perceived that
46
47 329 their weight was normal.
48
49

50
51 330 *“It would be good if I could decrease my belly size. Otherwise, I feel like I*
52 331 *am normal.” (Male, under 40yrs.)*
53

54 332 The majority of participants under 40 years had normal weight. Two participants, one male
55
56 333 and one female, considered themselves overweight although their measurement indicated
57
58 334 normal weight.
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3 335 Most participants perceived their body size and weight by measuring their clothes' size,
4
5 336 evaluating themselves in mirrors, and experiencing others' comments about their body, while
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7
8 337 only a few male participants reported measuring their weight on a scale, when possible.
9
10 338 However, HCPs reported that the number of people who are aware of and/or interested in
11
12 339 measuring their weight is increasing in the community. As one said,

15 340 *"If we remember those people who measured their weight, the count will be double*
16 341 *than our patients."* (Auxiliary Health Worker)

18 342 **Barriers to weight management**

20 343 **Challenges in behaviour modification**

22 344 *Physical activity*

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24
25 345 All FGD participants mentioned that diet modification and exercise are keys to prevent and
26
27
28 346 control obesity. However, only a few of the participants reported exercising to maintain or
29
30 347 reduce their weight. Both overweight or obese and normal-weight participants reported
31
32 348 similar barriers to weight management. The most commonly reported barriers were busy
33
34 349 schedule and laziness followed by cold weather and lack of space or physical facilities for
35
36 350 exercise. Participants above 40 years of age reported that comorbidities such as
37
38 351 musculoskeletal pain limits their level of physical activity.
39
40 352

41 353 *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me*
42 354 *to walk, my leg aches".* (Female, above 40yrs.)

43
44 355 *"I don't have friends to walk together with. Here is no place for Yoga. [...].*
45 356 *I also need to manage time at home"* (Female, under 40yrs.)

46
47
48 357 Two female participants under 40 years of age reported that they feel normal, and thus do not
49
50 358 feel a need to exercise.

51
52
53 359 *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I*
54 360 *feel- why should I exercise?"* (Female, under 40yrs.)

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3 361 Participants had a diverse opinion on the adequate level of physical activity. A Few believed
4
5 362 that household chores like cooking and washing clothes were adequate for exercise, while
6
7 363 others thought that exercise was only adequate when they sweat. Participants' required
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10 364 duration of exercise ranged from 10 minutes to 3 hours a day.
11
12

13 365 *Effect of challenging food environment and diet behaviour*

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16 366 The most frequently reported barrier for diet control was difficulty in changing food habits
17
18 367 due to food taste and desire to eat. Participants also mentioned the unavailability of healthy
19
20 368 food due to the use of excessive pesticides in vegetables and fruits. In addition, participants'
21
22 369 reported that the increased availability and efficiency of consuming junk food has limited
23
24 370 their consumption of healthier food. Consuming junk food was also a status symbol. One
25
26 371 participant explained that people in the community eat junk food to show that they belong to
27
28 372 a higher social status.
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33 373 *"If our children walk taking the juice bottles and drinking juices, then that*
34 374 *reflects a higher status. But, if they walk eating homemade popcorn, then*
35 375 *that reflects the lower status. (Male, under 40yrs.)*
36

37 376 Lack of HCP's knowledge and anthropometric measurement tools

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39
40 377 HCPs reported that overweight and obesity were identified by measuring a patient's weight
41
42 378 and height, by observation, and by the patient's complaint. When asked specifically about
43
44 379 measuring central obesity, the HCPs at the tertiary level stated that they measure waist
45
46 380 circumference only for those who are diabetic or have a metabolic syndrome. However, the
47
48 381 HCPs at the peripheral level were not aware of measuring central obesity. One put it this
49
50 382 way-
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53

54 383 *"We have not done that (measured central obesity). We do not have an*
55 384 *instrument. We also do not have such information. If we were given an*
56 385 *instrument and the District Health Office directed us to do so or if we*
57 386 *were given any training...we do everything based on our knowledge. We*
58 387 *do not have anything extra."* (Auxiliary Health Worker)
59 388
60

389 Lack of counseling

390
391 HCPs at the peripheral level counsel to patients for 7 mins to half an hour
392
393 depending upon the patient's condition and the provider's available time. At the tertiary level,
394 the Nutritionist spends around half an hour to 45 minutes in counseling. However, the
395 medical officer at the tertiary level could only provide a maximum of 5 minutes for
396 counseling because of their time constraints and high daily patient volume. The medical
397 officer mentioned that it would be helpful if they had additional assistance.

398
399 *“Yes, I think it's a time factor (for not counseling patients). And another, I*
400 *think it is helpful if we get a helping hand. One will take a note when one*
401 *measure (weight), it expedites the process.” (Medical Officer)*
402

403 **Discussion**

404 This study explored the perception of obesity and overweight among Nepalese adults living
405 in a suburban community. We found that participants had inadequate knowledge and
406 misconceptions regarding obesity and had perceived overweight as normal, healthy, and
407 attractive. The adults above 40 years of age did not perceive themselves to be overweight or
408 obese even when they were. Only a few participants reported exercising and controlling their
409 diet to prevent obesity or manage their weight.

410 Obesity was perceived as a growing problem in the Dhulikhel community. A 2016 cross-
411 sectional study by Shrestha et. al reported the prevalence of overweight and obesity among
412 DHS participants of 18 years and older were as 28.4% and 8.1%, respectively.[9] Similarly,
413 the nationally conducted WHO STEPS survey in 2019 reported the prevalence of overweight
414 and obesity among Nepalese adults aged 15-45 years as 20% and 4.3%, respectively.[6] In
415 our study, participants reported that obesity was mainly a problem among individuals who are
416 40 years of age and above, married persons, office workers, businessmen, retired individuals,
417 and housewives. A 2011 study among civil servants in Nepal reported that married

1
2
3 418 participants were 7.5 times more likely to be overweight/obese than non-married.[18]
4

5 419 Additionally, the occupation was found to be related to being overweight/obese. Based on the
6

7
8 420 above findings, it is important to design interventional programmes targeting these
9

10 421 populations to prevent overweight and obesity.
11

12
13 422 Participants mainly linked the causes of obesity to personal factors, such as fatty diet and
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15 423 physical inactivity, which is similar to other studies conducted in Nepal, India, Malaysia,
16

17 424 South Africa, and Morocco.[8,17,18,23,24] Few of our participants reported heredity as a
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19 425 cause of obesity. This contrasts with the result from the previous study done among civil
20

21 426 servants in Nepal, which found that an almost equal number of participants viewed “fatty
22

23 427 foods” or “a genetic disorder” as a cause of obesity.[18] In addition to personal factors,
24

25 428 women in our study stressed social and medical factors such as marriage, childbirth, the habit
26

27 429 of eating left-overs, and the use of contraceptives as causes of obesity and overweight among
28

29 430 females. In Nepalese society, gaining weight right after marriage is considered a good sign of
30

31 431 a healthy relationship with a husband and in-laws. Culturally, Nepalese prefers to finish the
32

33 432 food on the day that is cooked. As women are the last members of a household to eat, they
34

35 433 are expected to consume all remaining food. Additionally, women’s increased food
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37 434 consumption after childbirth is believed to increase milk production and improved milk
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39 435 quality, and the well-being of both mother and child. Findings from the study conducted in
40

41 436 the Laayoun community of Morocco also reported socio-cultural pressure as a factor for
42

43 437 increasing weight among females.[16] In contrast to our study, this study reported that single
44

45 438 females also desired to gain weight to maintain an ideal cultural beauty. It is important to
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47 439 educate females of reproductive age about obesity risks to promote a healthier lifestyle.
48

49 440 Health and appearance are the key motives to lose weight.[25,26] Similar to findings from
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51 441 previous studies in South Africa and Morocco, participants in our study who were concerned
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53 442 about the consequences of obesity and their appearance were more willing to lose or
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3 443 maintain their current weight.[8,27] However, it is important to consider if people are only
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5 444 concerned with their appearance because the weight loss for a transient period to appear fit
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7 445 and attractive, such as in social events, will not be sustainable, and the attempt to lose a lot
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9 446 of weight in a short duration of time can be hazardous.

11
12 447 In our study, almost all participants who were 40 years and older underestimated their body
13
14 448 weight, though they all met the criteria of overweight and obese. This finding is similar to
15
16 449 studies conducted in Tanzania, Cameroon, and in the United States.[11,23,27] Additionally,
17
18 450 studies have also reported variation in weight estimation by gender and age.[8,28] A
19
20 451 qualitative study in South Africa reported that the majority of overweight and obese female
21
22 452 participants perceived themselves to be normal or moderately overweight, and chose the
23
24 453 silhouettes that were smaller than their body size.[8] A cross-sectional study in Morocco
25
26 454 reported that more females than males underestimated their body weight and males 40 years
27
28 455 of age and above were more likely to underestimate their weight compared to females in the
29
30 456 same age group.[27] Individuals who do not perceive themselves as overweight and obese are
31
32 457 likely to gain more weight due to their low-risk perception and unwillingness to lose
33
34 458 weight.[8,11,12] The inability for our participants to accurately recognize their body-weight
35
36 459 status may prevent them from adopting healthy behaviours and increase their risk to obesity
37
38 460 and its complications. Therefore, the community should be made aware of the importance of
39
40 461 measuring their weight at intervals, and health facilities should also increase educational
41
42 462 campaigns to improve community awareness.

43
44 463 In Nepal, a big belly is culturally accepted as a sign of prosperity.[7,18] Participants'
45
46 464 perception that overweight is considered good, healthy, and attractive is consistent with other
47
48 465 studies conducted in South Africa, Morocco, and the United States.[8,23,27] Most strikingly,
49
50 466 this was frequently reported by females under 40 years of age. Research has shown that
51
52 467 females may be more accepting of obesity than men, and thus have a less negative attitude
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3 468 towards obese individuals.[29] However, further studies on the role of gender in weight-
4
5 469 related acceptance are needed.
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8 470 Although overweight is acceptable, participants have a negative attitude towards an obese
9
10 471 person. This reflects the finding of several other studies,[8,15,23,30] whereby obese
11
12 472 individuals are viewed as lazy, heavy, unattractive, and are perceived to have illnesses
13
14 473 associated with obesity. Studies have also shown the consequences of others' negative
15
16 474 attitudes among obese persons.[8,15,18,23,30] For example, a study in Cameroon reported
17
18 475 that overweight Caucasian and African American women were viewed differently and were
19
20 476 discriminated against despite their hard work.[23] Such internalized stigma among obese
21
22 477 individuals is particularly from the belief that obesity is a result of an individual's failure to
23
24 478 maintain a healthy lifestyle.[15] Considering the fact that participants in our study primarily
25
26 479 pointed out the internal factors such as diet and exercise, as causes of obesity, it is important
27
28 480 to make people aware of socio-cultural and medical factors to reduce obesity-related stigma
29
30 481 and negative attitude.[15] Further studies to explore the impact of negative attitudes on
31
32 482 overweight or obese individuals in Nepal would be beneficial to develop interventional
33
34 483 programmes in this setting.
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41 484 Adequate exercise and a healthy diet are keys to managing obesity and other chronic
42
43 485 diseases.[31] Although participants in our study were aware that a healthy lifestyle will
44
45 486 benefit them, they did not implement it. This difference in knowledge and practice has been
46
47 487 described in many studies.[8,32–34] This could be due to low awareness of obesity
48
49 488 complications. In our study, both the overweight and normal-weight participants reported
50
51 489 similar barriers to weight management. This could be because only a few participants in our
52
53 490 study reported exercising or controlling a diet to reduce or prevent obesity. Moreover,
54
55 491 participants who were overweight did not perceive themselves as overweight and did not feel
56
57 492 the need to change their behaviour. The cultural acceptance of overweight in Nepalese culture
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2
3 493 and the difficulties in modifying behaviour could be a challenge to implementing the
4
5 494 effective intervention programme in this setting.
6
7

8 495 The surrounding environment influences our food choices and eating behaviour.[35] Studies
9
10 496 have shown a positive relationship between easy access to fast food and its high
11
12 497 consumption, leading to obesity and other cardiovascular diseases.[36,37] Participants in our
13
14 498 study also reported the increased availability of junk food as a cause of obesity. Interestingly,
15
16 499 few participants in our study related junk food with a higher social status. This might be due
17
18 500 to the influence of appealing advertisements and the increasing adoption of western food,
19
20 501 such as fries and chips in Nepal. A study conducted among school children in urban Nepal
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22 502 reported that children belonging to families with higher income were 1.7 times more likely to
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24 503 consume junk food than those belonging to families with lower income.[38] Whereas, few
25
26 504 other studies on school children showed no relationship between family income and junk
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28 505 food consumption.[39,40] In addition, a cross-sectional study conducted among the DHS
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30 506 participants in 2016 reported no association between income status and fast food
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32 507 consumption.[41] Therefore, further studies exploring the relationship between
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34 508 socioeconomic status and junk food consumption are warranted in Nepal. In addition to junk
35
36 509 food, our study participants also reported the use of pesticides in food as a barrier to healthy
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38 510 eating. In Nepal, pesticides are widely used in agriculture, especially in vegetable cropping.
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40 511 The pesticides formulation and import increased by more than 6-fold between 1997/1998 and
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42 512 2011/2012.[42] Kavrepalanchok, the district of Dhulikhel, is one of the highest pesticide user
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44 513 districts in Nepal.[43] A study conducted among potato growers in kavrepalanchok reported
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46 514 that approximately 94% of potato growers apply pesticides in potatoes.[44] A qualitative
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48 515 study conducted among cafeteria managers in Dhulikhel Hospital reported the unavailability
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50 516 of healthy food in a local market as an obstacle to consuming healthy food in cafeterias.[20]
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52 517 Most of the studies in Nepal are so far concentrated on modifying individual behaviours to
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3 518 prevent obesity. However, the above findings suggest that we need to direct our focus on the
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5 519 broader level, addressing the challenges associated with the food environment.
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8 520 As in other low and middle-income countries, obesity is primarily assessed based on BMI in
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10 521 Nepal.[15,45,46] However, BMI cannot differentiate between weight because of excessive
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12 522 muscle percentage and body fat proportions.[15] Studies have shown that people with normal
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14 523 BMI are at risk of cardiovascular diseases because of central obesity.[15,45,46] The
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16 524 prevalence of central obesity has been increasing among South Asians. A 2006 study in
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18 525 Nepal reported a higher prevalence of central obesity than general obesity among the study
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20 526 population in Dharan.[47] Similarly, a study in China reported that the prevalence of central
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22 527 obesity among adults with BMI <25kg/m² increased by almost two-fold from 11.9% in 1993
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24 528 to 21.1% in 2009.[46] If the study did not consider measuring WC for obesity, they would
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26 529 have missed 65% of the cases. This highlights the importance of measuring WC to accurately
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28 530 measure obesity in clinical settings.
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34 531 This study is the first qualitative study in Nepal that aimed to understand the perception of
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36 532 obesity among adults in a sub-urban community from both community and healthcare
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38 533 providers' perspectives. The use of open-ended questions provided insights into participants'
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40 534 perspectives and lived experiences. However, several limitations exist. This study is
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42 535 confined to the sub-urban area; therefore, the perception of urban and rural areas is
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44 536 underrepresented. However, a qualitative study is intended to understand a phenomenon, and
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46 537 not to analyse the relationship between variables.[33,48] All the FGD participants belonged
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48 538 to the Hindu religion; therefore, the study could not explore the perception of individuals of
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50 539 other religions. However, the majority of the population in this area are Hindu. Although few
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52 540 numbers of health providers were interviewed in this study, we have considered to include
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54 541 them from the different health care levels. Given these limitations, however, the study
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56 542 provides profound information on the community's perception of obesity in Nepal.
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543 **Conclusions**

544 This qualitative study explored the knowledge, attitude, and perception of obesity among
545 Nepalese adults in a suburban community. Given the participants' misconception and
546 inadequate knowledge regarding obesity, and the underestimation of their body size, it is
547 suggested to design and disseminate culturally appropriate health information to manage
548 obesity in the community. Also, it is essential to consider challenges associated with food
549 environment while designing health intervention. Our finding shows that the healthcare
550 providers at the peripheral health institutions lack training and instrument to measure central
551 obesity. Since the prevalence of central obesity is rising in South Asians, including the
552 Nepalese population, it is important to consider central obesity while training health workers
553 at the peripheral level.

554

555 **List of abbreviations**

556 BMI: Body Mass Index

557 FGD: Focus Group Discussion

558 HCP: Healthcare Provider

559 IDI: In-depth Interview

560 STEPS: STEPwise approach to surveillance

561 WHO: World Health Organization

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3 562 **Declarations**

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9
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11
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15 567 **Author contributions**

16
17 568 SS, the principal investigator, conceived the study, transcribed and analysed data, and
18
19 569 developed the manuscript. BMK and RK contributed to the research design. SA contributed
20
21
22 570 to collecting and analysing the data. SSu contributed to revising the manuscript. All authors
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24 571 read and approved the final manuscript for publication.
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28
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32 574 **Competing interests**

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34 575 None declared
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37 576 **Patient consent for publication**

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39 577 Not required.
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42 578 **Ethics approval**

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44 579 Ethical approval was obtained from the Kathmandu University School of Medical Sciences
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46 580 Institutional Review Committee (IRB# 36/16).
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50 581 **Provenance and peer review**

51
52 582 Not commissioned, externally peer reviewed.
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56 583 **Data availability statement**

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58 584 No data are available.
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Standards for Reporting Qualitative Research (SRQR)^a

No.	Topic	Item	Page/ line no(s).
	Title and abstract		
S1	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
S2	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
	Introduction		
S3	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4	Purpose or research question	Purpose of the study and specific objectives or questions	4
	Methods		
S5	Qualitative approach and research paradigm ^b	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7	Context ^b	Setting/site and salient contextual factors; rationale ^a	5
S8	Sampling strategy ^b	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale ^a	5
S9	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	20
S10	Data collection methods ^b	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale ^a	5-6
S11	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	5-6

S12	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13	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/deidentification of excerpts	6
S14	Data analysis ^b	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale ^a	6,8-9
S15	Techniques to enhance trustworthiness ^b	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale ^a	6
Results/Findings			
S16	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	7-15
S17	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion			
S18	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	15-18
S19	Limitations	Trustworthiness and limitations of findings	18
Other			
S20	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

^aThe 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.

^bThe 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