

# NON-COMMUNICABLE DISEASES

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## 2.2 Prevalence of Diabetes mellitus and impaired glucose tolerance in the Raika and other community with similar life style in Rajasthan.

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### OBJECTIVES

1. To estimate the prevalence of Diabetes Mellitus and impaired glucose tolerance in Raika community of Rajasthan.
2. To compare prevalence of Diabetes Mellitus and impaired glucose tolerance in Raika community and other communities with similar life style.
3. To find the association of Diabetes and impaired glucose tolerance with camel milk consumption, if any.

### PROGRESS

A population based study was carried out in four districts of Rajasthan (Jodhpur, Barmer, Pali & Ajmer) in Raika community and non Raika community with similar life style living in the same geographical and socio-economic conditions by Jodhpur Centre. The districts were selected based on camel population, two districts (Jodhpur and Barmer) having camel population more than 15563 and two districts (Ajmer and Pali) having population lesser than 15563. Total sample population selected was 12000 of 18 years and above, out of which 10,003 were from raika community and 2017 from non raika community. Field survey was carried out by team comprising of one Research Scientist (Medical), one Technician, one field Investigators, one Attendant and one local helper from the selected village. During survey, Consent was taken and individuals were interviewed for their socio demographic parameters, personal habits, history of camel milk consumption, physical activity and were measured for body weight, height, Waist Circumference, Hip Circumference and Blood Pressure and data was recorded in pretested schedules.. Fasting Blood Sugar was measured in the field by glucometer and Oral Glucose Tolerance Tests was carried out on those individual having fasting blood sugar more than 110mg/dl. The data obtained was post stratified into Raika consuming camel milk (RCCM), Raika not consuming camel milk (RNCCM), Non-Raika consuming camel milk (NRCCM), Non-Raika, not consuming camel milk (NRNCM).

## Results

Total Raika population covered in study was 10003, out of which 40.5% were males and 59.5% were females while non-Raika population covered was 2017, out of which 873 (43.3%) were males and 1144 (56.7%) were females. Majority of the non Raika population was in 21-30 yrs age group (22.1%) (Table 1). The major occupations of Raika population was labour, farming, herding and housework while non-Raika population, it was farming, housework, labour and others (Table 2). Among the Raika population the percentage of smokers was higher (17.3%) than non-Raika population (13.8%) while, smokeless tobacco (15.7%) and alcohol users (3.3%) were higher in non Raika population than Raika population i.e. 10.9% and 1.3% respectively (Table 3). The Raika population was more vegetarian (97.8%) than non Raika population (79.3%). The number of individuals consuming fruits daily was higher in non raika(0.9%) than raika population (0.7%). The rapeseed or soya oil was used by 92.9% of Raika population as compared to 96.9% of non-Raika population who consumed the same oil. Among Raika population, 65.6% of Raika subjects ever consumed camel milk whereas only 10.2% of non-Raika subjects ever consumed it. The frequency of consumption of camel milk daily was higher in raika (5.4%) population than non raika(0.4%) population. More than 500ml of camel milk was consumed by 5.2% of the Raika and only 0.5% of the non-Raika individuals. Raw camel milk was consumed by 34.9% of the Raika population while 6.9% of the non-Raika consumed raw camel milk (Table 4). Heavy physical or load carrying work was done by 17.3% of Raika and 17.6% of non-Raika population (Table 5).

Socio-economic status among the selected households of Raika community showed that majority (57.0%) of them belonged to lower middle income group as compared to non-Raika community (54.8%). Similarly, no agricultural land was possessed by nearly half (50.7%) of the households of Raika community while 48.0% by non-Raika community. A total of 53.1% of the non-Raikan households were pucca houses as compared to 45.7% of Raika households (Table 6). The mean age among Raika community consuming camel milk (RCCM) was 43.8 years, Raika community not consuming camel milk (RCNCM) was 30.9 years and among non-Raika community consuming camel milk (NRCCM) (48.1 years), non-Raika community not consuming camel milk (NRCNCM) was 37.8 years. The prevalence of Impaired fasting glucose (IFG), impaired glucose tolerance (IGT) and Diabetes Mellitus (DM) among RCCM individuals was 1.0%, 1.0% and 0.7% respectively as compared to prevalence among NRCCM individuals i.e. 1.5%, 1.5% and 2.1% respectively and the prevalence among RCNCM individuals was 0.4%, 0.5% and 0.5% respectively as compared to prevalence among NRCNCM individuals i.e. 0.3%, 0.4% and 1.0% respectively. The mean age of the diabetics among the study population was 50.5 years while it was 39.2 years among the non-diabetics. The Mean BMI, WHR among male and female, SBP and DBP was higher among the diabetics i.e. 22.1, 0.90 and 0.89, 138.8 and 78.9 mmHg as compared to non-diabetics i.e. 19.6, 0.85 and 0.82, 125.3 mmHg 71.5 mmHg respectively (Table 7). Among the 83 diabetics in the study population, 61 belonged to Raika community and 22 belonged to non Raika community (Table 8).

The prevalence of IFG, IGT and DM among Raika Community Consuming Camel Milk was increasing with age except prevalence of DM in the age group of 20-29 years of age group whereas prevalence of IFG, IGT and DM among Raika Community Not Consuming Camel Milk population was also increasing with age except prevalence of IFG in >60 years age group. Among the group of Non Raika Community Consuming Camel Milk, the prevalence of DM was also increasing with age upto 60 years of age Whereas in Non Raika Community Not Consuming Camel Milk population, the prevalence of IFG, IGT and DM was increasing with age except prevalence of IFG in >60 years age group (Table 9)

**Table 1. Age wise distribution of studied population**

Age Group (Years)	Raika N= 10003		Non Raika N=2017	
	Male (%)	Female (%)	Male (%)	Female (%)
15-20	587 (14.5)	1025 (17.2)	146 (16.7)	216 (18.9)
21-30	786 (19.4)	1439 (24.2)	179 (20.5)	267 (23.3)
31-40	833 (20.6)	1166 (19.6)	169 (19.4)	201 (17.6)
41-50	742 (18.3)	991 (16.7)	142 (16.3)	214 (18.7)
51-60	608 (15.0)	665 (11.2)	118 (13.5)	118 (10.3)
61-70	353 (8.7)	464 (7.8)	87 (10.0)	85 (7.4)
>70	144 (3.6)	200 (3.4)	32 (3.7)	43 (3.8)
<b>TOTAL</b>	<b>4053 (40.5)</b>	<b>5950 (59.5)</b>	<b>873 (43.3)</b>	<b>1144 (56.7)</b>

**Table 2. Occupation wise distribution of studied population**

Age Group		Farming (%)	Herding (%)	Housework (%)	Labour (%)	Other (%)	TOTAL
15-20	Raika N=10003	176 (10.9)	81 (5.0)	550 (34.1)	288 (17.9)	517 (32.1)	1611
	Non-Raika N=2017	63 (17.4)	7 (1.9)	114 (31.5)	34 (9.4)	144 (39.8)	362
21-50	Raika N=10003	1383 (23.2)	1062 (17.8)	999 (16.8)	1997 (33.5)	516 (8.7)	5953
	Non-Raika N=2017	515 (43.9)	10 (0.9)	209 (17.8)	320 (27.3)	118 (10.1)	1172
51-70	Raika N=10003	351 (16.8)	499 (23.9)	959 (45.9)	253 (12.1)	28 (1.3)	2090
	Non-Raika N=2017	189 (46.3)	10 (2.5)	163 (40.0)	31 (7.6)	15 (3.7)	408
>70	Raika N=10003	15 (4.4)	19 (5.5)	306 (89.0)	4 (1.2)	0 (0.0)	344
	Non-Raika N=2017	9 (12.0)	1 (1.3)	64 (85.3)	0 (0.0)	1 (1.3)	75

**Table 3. Distribution of personal Habits in studied population**

Sl No.	Habits	Raika N=10003	Non raika N=2017	Total N=12020
1	Smokers	1731 (17.3%)	278 (13.8%)	2009 (16.7%)
2	Smokeless Tobacco	1094 (10.9)	347 (17.2)	1441 (12.0)
3	Alcohol	132 (1.3%)	67 (3.3%)	199 (1.7%)

**Table 4. Distribution of Dietary Habits and Camel Milk Consumption in Studied Population**

Parameters		Raika N=10003	Non-Raika N=2017	Total N=12020
Diet	Vegetarian	9786 (97.8)	1599 (79.3)	11385 (94.7)
	Non-vegetarian	217 (2.2)	418 (20.7)	635 (5.3)
Fruit Consumption	Daily	72 (0.7)	19 (0.9)	91 (0.8)
Oil used in cooking	Rapeseed or Soya Oil	9291 (92.9)	1955 (96.9)	11246 (93.6)
Camel milk	Subjects ever Consumed	6566 (65.6)	205 (10.2)	6771 (56.3)
Frequency of consumption of camel Milk	Daily	539 (5.4)	8 (0.4)	547 (4.6)
	Once in a month	468 (4.7)	11 (0.5)	479 (4.0)
	Occasionally	5322 (53.2)	180 (8.9)	5502 (45.8)
Quantity Consumed	200-300 ml	2415 (24.1)	104 (5.2)	2519 (21.0)
	300-400 ml	1238 (12.4)	37 (1.8)	1275 (10.6)
	400-500 ml	1759 (17.6)	20 (1.0)	1779 (14.8)
	More than 500 ml	522 (5.2)	11 (0.5)	533 (4.4)
Type of camel milk Consumed	Raw	3489 (34.9)	139 (6.9)	3627 (30.2)
	Raw and Warm	2365 (23.6)	56 (2.8)	2421 (20.1)
Duration of Consumption	6-10 yrs	1870 (18.7)	56 (2.8)	1926 (16.0)
	>10 yrs	3120 (31.2)	68 (3.4)	3188 (26.5)

**Table 5: Information Regarding Physical Activity at Work**

		Raika N=10003	Non-Raika N=2017	Total N=12020
Physical activity at work	Very light	211 (2.1)	30 (1.5)	241 (2.0)
	Light	1299 (13.0)	236 (11.7)	1535 (12.8)
	Moderate	3420 (34.2)	568 (28.2)	3988 (33.2)
	Heavy	5068 (50.7)	1183 (58.7)	6251 (52.0)
	NA	5 (0.05)	0 (0.0)	5 (0.04)

**Table 6. Information regarding Socio economic assessment in selected households**

Parameters		Raika N=4604	Non-Raika N=829	Total N=5433
Income Group	Less Than 500/-	936 (20.3)	115 (13.9)	1051 (19.3)
	Lower Middle (5,000 to 9,999/- pm)	2625 (57.0)	454 (54.8)	3079 (56.7)
	Upper Middle (10,000 to 19,999/- pm)	1043 (22.6)	260 (31.4)	1303 (24.0)
Type of House	Pucca	2105 (45.7)	440 (53.1)	2545 (46.8)
Agricultural land	No Land	2334 (50.7)	398 (48.0)	2732 (50.3)
	1-5 acres	2073 (45.0)	329 (39.7)	2402 (44.2)
	>5 acres	197 (4.3)	102 (12.3)	299 (5.5)

Table 7. Demographic profile of study population

		RCCM N=6566		RCNCM N=3437		NRCCM N=205		NRCNCM N=1812	
		Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
Mean age (yrs)		43.8	16.6	30.9	14.1	48.1	16.8	37.8	17.0
Gender	Male	3150		902		149		724	
	Female	3416		2535		(56)		1088	
BMI		19.7	3.4	19.3	3.0	20.5	3.8	20.0	3.4
WHR	Male	0.848	0.070	0.834	0.071	0.884	0.067	0.871	0.071
	Female	0.834	0.074	0.805	0.072	0.860	0.083	0.828	0.070
	Total	0.841	0.072	0.813	0.073	0.878	0.072	0.846	0.073
B.P.	Sys.	127.1	18.4	122.2	14.9	129.0	19.1	125.0	16.7
	Dia.	71.9	11.6	70.0	11.1	75.9	12.2	72.6	11.6
FBS		85.5	19.4	83.9	18.6	86.3	17.3	85.5	16.3
OGTT		134.6	60.7	152.7	69.1	137.4	46.2	152.3	56.6
IFG		64 (1.0)		11 (0.4)		3 (1.5)		5 (0.3)	
IGT		59 (1.0)		15 (0.5)		3 (1.5)		8 (0.4)	
DM		46 (0.7)*		15 (0.5)**		4 (2.1)*		18 (1.0)**	

Table 8. Information about clinical status in diabetic subjects in study population

Parameters		Diabetics in Raika N=61	Diabetics in Non-Raika N=22
Diabetic status	Known	23 (37.7)	10 (45.5)
	Disclosed after test	38 (62.3)	12 (54.5)
Duration of Diabetes (years)		6.7±4.4	3.8±3.2
Treatment for diabetes □	Prescribed dietary modification	16 (26.2)	7 (31.8)
	Prescribed physical exercise	6 (9.8)	2 (9.1)
	Traditional medicine/therapy	5 (8.2)	3 (13.6)
	Insulin	11 (18.0)	0 (0.0)
	Oral anti-diabetic drugs	10 (16.4)	8 (36.4)
	None	0 (0.0)	1 (4.5)

**Table 9. Age specific prevalence of IFG, IGT and DM in different groups**

Age Group (yrs)	Total No.	INFERENCE		
		IFG	IGT	DM
<b>RCCM 20-29</b>	975	4 (0.41)	1 (0.10)	7 (0.71)
<b>30-39</b>	1743	9 (0.51)	8 (0.45)	6 (0.34)
<b>40-49</b>	1335	16 (1.19)	11 (0.82)	8 (0.59)
<b>50-59</b>	1088	14 (1.28)	17 (1.56)	12 (1.10)
<b>&gt;60</b>	1028	21 (2.04)	17 (1.65)	13 (1.26)
<b>Total</b>	6169	64 (1.03)	59 (0.95)	46 (0.74)
<b>RCNCM 20-29</b>	931	3 (0.32)	2 (0.21)	1 (0.10)
<b>30-39</b>	916	5 (0.54)	4 (0.43)	3 (0.32)
<b>40-49</b>	398	0 (0.00)	3 (0.75)	4 (1.00)
<b>50-59</b>	185	2 (1.08)	2 (1.08)	4 (2.16)
<b>&gt;60</b>	133	1 (0.75)	4 (3.00)	0 (0.00)
<b>Total</b>	2563	11 (0.37)	15 (0.49)	12 (0.43)
<b>NRCCM 20-29</b>	27	0 (0.00)	0 (0.00)	1 (3.70)
<b>30-39</b>	37	1 (2.70)	0 (0.00)	0 (0.00)
<b>40-49</b>	44	0 (0.00)	1 (2.30)	2 (4.54)
<b>50-59</b>	44	1 (2.27)	1 (2.30)	0 (0.00)
<b>&gt;60</b>	46	1 (2.17)	1 (2.17)	1 (2.17)
<b>Total</b>	198	3 (1.53)	3 (1.53)	4 (2.05)
<b>NRCNCM 20-29</b>	409	0 (0.00)	1 (0.24)	0 (0.00)
<b>30-39</b>	427	1 (0.23)	1 (0.23)	1 (0.23)
<b>40-49</b>	312	1 (0.32)	0 (0.00)	4 (1.28)
<b>50-59</b>	192	2 (1.04)	2 (1.04)	3 (1.56)
<b>&gt;60</b>	201	1 (0.49)	4 (1.99)	10 (4.97)
<b>Total</b>	1541	5 (0.27)	8 (0.44)	18 (0.99)

**Conclusion:**

The prevalence of Diabetes Mellitus in Raika community was 0.6% which was found to be lower than non Raika community (1.1%). The prevalence of impaired glucose tolerance (IGT) and Diabetes Mellitus (DM) among Raika community consuming camel milk individuals was 1.0% and 0.7% respectively which was lower than prevalence among non Raika community consuming camel milk individuals i.e. 1.5% and 2.1% respectively.

The prevalence of IGT in Raika community not consuming camel milk individuals was slightly higher (0.5%) than the non Raika community not consuming camel milk individuals i.e. 0.4%. The prevalence of DM in Raika community not consuming camel milk individuals was low (0.5%) than the non Raika community not consuming camel milk individuals i.e. 1.0%. The mean age of camel Milk users was 43.8yrs  $\pm$ 16.6, significantly different from non users (30.9yrs $\pm$ 14.1), which is indicative of primitive role of age in prevalence of diabetes irrespective of any Community, lifestyle and SES.