

Table 3: Awareness of warning symptoms/signs of various noncommunicable diseases among participants (n=400)

Signs and symptoms	n (%)
Heart attack	
Chest pain	228 (57.0)
Breathlessness	71 (17.8)
Pain in the upper limbs	51 (12.8)
Fatigue	49 (12.3)
Sweating	46 (11.5)
Dizziness	21 (5.3)
Vomiting	7 (1.8)
Abdominal discomfort	3 (0.8)
Misconceptions	5 (1.3)
Don't know	159 (39.8)
Stroke (n=250)	
Weakness of extremities	140 (56.0)
Numbness	97 (38.8)
Difficulty with speech	54 (21.6)
Difficulty with walking	52 (20.8)
Imbalance	29 (11.6)
Dizziness	21 (8.4)
Misconceptions	27 (10.8)
Don't know	71 (28.4)
Hypertension	
Anger	133 (33.3)
Dizziness	54 (13.5)
Headache	41 (10.3)
Blurring of vision	15 (3.8)
Sweating	11 (2.8)
Breathlessness	9 (2.3)
Sleeplessness	6 (1.5)
Misconceptions	8 (2.0)
Diabetes mellitus	
Delayed wound healing	165 (41.3)
Fatigue	135 (33.8)
Polyuria	49 (12.3)
Dizziness	32 (8.0)
Polyphagia	30 (7.5)
Weight loss	28 (7.0)
Polydipsia	21 (5.3)
Visual disturbances	11 (2.8)
Infections	7 (1.8)
Misconceptions	23 (5.8)
Don't know	135 (33.8)

with awareness level about hypertension among participants. Age, SES, and family history of diabetes mellitus were associated with awareness level about diabetes mellitus among participants [Table 6]. This infers that a greater number of risk factors were associated with awareness level about heart attack among participants.

Of the total participants, 322 (80.5%) had heard of emergency number which needs to be dialed during medical emergencies. However, only 165 (51.2%) of them knew this number correctly.

Multivariate analysis identified several predictors of good awareness level among participants regarding individual types of NCDs. Educational status of high school level and above and being a vegetarian were significant predictors of good awareness level about heart attack, taking illiterate and nonvegetarians as the reference population, respectively. Educational status of intermediate level and above, being a vegetarian, and from an urban area were significant predictors of good awareness level about stroke, taking illiterate, nonvegetarians, and rural residents as the reference population, respectively. Age above 55 years was a significant predictor of good awareness level about diabetes mellitus, taking 18–25 years as the reference population [Table 7].

DISCUSSION

Good awareness level was seen among a greater proportion of participants (62.5%), regarding heart attack compared to other NCDs. Among the total number of various risk factors associated with the awareness level of different NCDs in this study, majority was again for heart attack. This indicates that awareness about heart attack is quite common among people. In a population-based study done in Kuwait,^[11] 40% of participants were not aware of any heart attack symptoms similar to 39.8% observed in this study. In addition, only 50.4% were aware that chest pain is a warning symptom for heart attack in the former study^[11] compared to 57% reported here.

In a study done in Nellore, India,^[10] only 35% of participants were aware about stroke and only 30% of participants knew limb weakness as a warning sign of stroke. These findings were again lesser than that reported in the present study where 250 (62.5%) had heard about stroke and of them, 56% knew that it can manifest with weakness of extremities.

In a multivariate analysis in the former study^[10] and in a systematic review,^[12] high educational status was found to be associated with good awareness level of stroke as also observed in this study along with other risk factors observed here such as being vegetarians and from urban areas.

There has been a tremendous increase in stroke-associated morbidity and mortality in India over the years to an extent that it has exceeded the statistics of industrialized Western countries.^[13] Therefore, it is a matter of concern that 37.5% of participants in this study had not heard about stroke and among those who had heard, 28.4% were not aware of its warning symptoms/signs.

In other studies, it was reported that 20%–50%^[10,12,14] were not aware of any risk factors and 23%–80%^[12,14] of the participants were not aware of even a single warning sign for stroke. The time within 60 minutes of onset of symptoms of stroke is called the golden hour for stroke management.^[15] Hence, awareness of this condition and early recognition of its warning signs and symptoms need further improvement for timely initiation of treatment within this time window.

Table 4: Awareness of immediate management practices in various noncommunicable diseases among participants

Immediate management practices	n (%)
Heart attack (n=400)	
Call for medical help	280 (70.0)
Cardiopulmonary resuscitation	97 (24.3)
Rest	48 (12)
Ventilation	14 (3.5)
Medication	10 (2.5)
Loosen clothes	11 (2.8)
Rub the chest	4 (1.0)
Misconceptions	6 (1.5)
Don't know	76 (19.0)
Stroke (n=250)	
Call for medical help	178 (71.2)
Make them lie on one side	42 (16.8)
Misconceptions	54 (21.6)
Don't know	65 (26.0)

Table 5: Awareness level of participants with respect to different types of noncommunicable diseases

Type of NCD	Level of knowledge			Total
	Poor	Moderate	Good	
Heart attack	134 (33.5)	16 (4.0)	250 (62.5)	400
Stroke	27 (10.8)	79 (31.6)	144 (57.6)	250
Hypertension	4 (1)	160 (40)	236 (59)	400
Diabetes mellitus	4 (1)	173 (43.2)	223 (55.8)	400

NCD: Noncommunicable disease

Table 6: Association between sociodemographic variables and other risk factors with awareness level of participants about various noncommunicable diseases

Risk factors	Awareness level about heart attack		Total
	Poor/moderate	Good	
Age group (years)			
18-25	27 (31.8)	58 (68.2)	85
26-35	54 (41.5)	76 (58.5)	130
36-45	28 (32.6)	58 (67.4)	86
46-55	22 (37.9)	36 (62.1)	58
>55	19 (46.3)	22 (53.7)	41
χ^2, P	4.37, 0.359		
Gender			
Male	101 (37.4)	169 (62.6)	270
Female	49 (37.7)	81 (62.3)	130
χ^2, P	0.003, 0.956		
Marital status			
Married	105 (38.9)	165 (61.1)	270
Unmarried/widow	45 (34.6)	85 (65.4)	130
χ^2, P	0.684, 0.408		
Educational status			
Graduate/postgraduate	11 (15.9)	58 (84.1)	69

Table 6: Contd...

Intermediate/posthigh school diploma	24 (26.1)	68 (73.9)	92
High school	34 (37)	58 (63)	92
Middle school	19 (44.2)	24 (55.8)	43
Primary school	31 (52.5)	28 (47.5)	59
Illiterate	31 (68.9)	14 (31.1)	45
χ^2, P	44.24, <0.001		
Occupation			
Professional/semi-professional	6 (15.4)	33 (84.6)	39
Clerical/shop owner/farmer	15 (26.8)	41 (73.2)	56
Skilled worker	18 (27.7)	47 (72.3)	65
Semi-skilled worker	14 (33.3)	28 (66.7)	42
Unskilled worker	61 (55.5)	49 (44.5)	110
Unemployment	36 (40.9)	52 (59.1)	88
χ^2, P	29.4, <0.001		
Socioeconomic status (n=387)			
Upper/upper middle	17 (20.5)	66 (79.5)	83
Lower middle	31 (31.0)	69 (69.0)	100
Upper lower	86 (47.8)	94 (52.2)	180
Lower	8 (33.3)	16 (66.7)	24
χ^2, P	20.4, <0.001		
Type of family			
Nuclear	88 (35.9)	157 (64.1)	245
Joint	32 (34.4)	61 (65.6)	93
Three generation	30	32	62
χ^2, P	3.78, 0.151		
Place of residence			
Urban area	47 (30.5)	107 (69.5)	154
Rural area	103 (41.9)	143 (58.1)	246
χ^2, P	5.206, 0.023		
Type of diet			
Vegetarian	13 (21.7)	47 (78.3)	60
Nonvegetarian	137 (40.3)	203 (59.7)	340
χ^2, P	7.55, 0.006		
Presence of NCDs			
Yes	27 (38.6)	43 (61.4)	70
No	123 (37.3)	207 (62.7)	330
χ^2, P	0.042, 0.838		
Family history of NCD			
Present	62 (33.5)	123 (66.5)	185
Absent	88 (40.9)	127 (59.1)	215
χ^2, P	2.33, 0.127		
History of substance abuse			
Present	47 (37.3)	79 (62.7)	126
Absent	103 (37.6)	171 (62.4)	274
χ^2, P	0.003, 0.956		
Total	150	250	400
Risk factors	Awareness level about stroke		Total
	Poor/moderate	Good	
Age group (years)			
18-25	22 (46.8)	25 (53.2)	47

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Table 6: Contd...

26-35	33 (45.8)	39 (54.2)	72
36-45	25 (40.3)	37 (59.7)	62
46-55	14 (36.8)	24 (63.2)	38
>55	12 (38.7)	19 (61.3)	31
χ^2, P	1.48, 0.829		
Gender			
Male	71 (41.8)	99 (58.2)	170
Female	35 (43.8)	45 (56.2)	80
χ^2, P	0.088, 0.767		
Marital status			
Married	70 (40.5)	103 (59.5)	173
Unmarried/widow	36 (46.8)	41 (53.2)	77
χ^2, P	0.863, 0.353		
Educational status			
Graduate/postgraduate	15 (28.8)	37 (71.2)	52
Intermediate/posthigh school diploma	24 (34.3)	46 (65.7)	70
High school	29 (50)	29 (50)	58
Middle school	9 (47.4)	10 (52.6)	19
Primary school	15 (51.7)	14 (48.3)	29
Illiterate	14 (63.6)	8 (36.4)	22
χ^2, P	12.457, 0.029		
Occupation			
Professional/semi-professional	9 (32.1)	19 (67.9)	28
Clerical/shop owner/farmer	11 (26.2)	31 (73.8)	42
Skilled worker	18 (43.9)	23 (56.1)	41
Semi-skilled worker	9 (42.9)	12 (57.1)	21
Unskilled worker	32 (51.6)	30 (48.4)	62
Unemployment	27 (48.2)	29 (51.8)	56
χ^2, P	8.69, 0.122		
Socioeconomic status (n=242)			
Upper/upper middle	22 (33.3)	44 (66.7)	66
Lower middle	22 (34.9)	41 (65.1)	63
Upper lower	47 (48.5)	50 (51.5)	97
Lower	9 (56.2)	7 (43.8)	16
χ^2, P	6.31, 0.098		
Type of family			
Nuclear	65 (40.9)	94 (59.1)	159
Joint	22 (42.3)	30 (57.7)	52
Three generation	19 (48.7)	20 (51.3)	39
χ^2, P	0.788, 0.674		
Place of residence			
Urban	36 (32.7)	74 (67.3)	110
Rural	70 (50)	70 (50)	140
χ^2, P	7.525, 0.006		
Type of diet			
Vegetarian	13 (28.9)	32 (71.1)	45
Nonvegetarian	93 (45.4)	112 (54.6)	205
χ^2, P	4.1, 0.043		
Presence of NCDs			
Yes	17 (34.7)	32 (65.3)	49
No	89 (44.3)	112 (55.7)	201
χ^2, P	1.48, 0.223		

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Table 6: Contd...

Family history of NCDs			
Yes	45 (38.1)	73 (61.9)	118
No	61 (46.2)	71 (53.8)	132
χ^2, P	1.66, 0.197		
History of substance abuse			
Present	36 (47.4)	40 (52.6)	76
Absent	70 (40.2)	104 (59.8)	174
χ^2, P	1.1, 0.293		
Total	106	144	250
Risk factors	Awareness level about hypertension		Total
	Poor/moderate	Good	
Age group (years)			
18-25	37 (43.5)	48 (56.5)	85
26-35	57 (43.8)	73 (56.2)	130
36-45	38 (44.2)	48 (55.8)	86
46-55	20 (34.5)	38 (65.5)	58
>55	12 (29.3)	29 (70.7)	41
χ^2, P	4.37, 0.358		
Gender			
Male	118 (43.7)	152 (56.3)	270
Female	46 (35.4)	84 (64.6)	130
χ^2, P	2.511, 0.113		
Marital status			
Married	102 (37.8)	168 (62.2)	270
Unmarried/widow	62 (47.7)	68 (52.3)	130
χ^2, P	3.57, 0.059		
Educational status			
Graduate/postgraduate	34 (49.3)	35 (50.7)	69
Intermediate/posthigh school diploma	44 (47.8)	48 (52.2)	92
High school	43 (46.7)	49 (53.3)	92
Middle school	14 (32.6)	29 (67.4)	43
Primary school	17 (28.8)	42 (71.2)	59
Illiterate	12 (26.7)	33 (73.3)	45
χ^2, P	13.689, 0.018		
Occupation			
Professional/semi-professional	16 (41)	23 (59)	39
Clerical/shop owner/farmer	28 (50)	28 (50)	56
Skilled worker	26 (40)	39 (60)	65
Semi-skilled worker	19 (45.2)	23 (54.8)	42
Unskilled worker	37 (33.6)	73 (66.4)	110
Unemployment	38 (43.2)	50 (56.8)	88
χ^2, P	4.85, 0.434		
Socioeconomic status (n=387)			
Upper/upper middle	41 (49.4)	42 (50.6)	83
Lower middle	46 (46)	54 (54)	100
Upper lower	63 (35)	117 (65)	180
Lower	10 (41.7)	14 (58.3)	24
χ^2, P	6.1, 0.107		
Type of family			
Nuclear	100 (40.8)	145 (59.2)	245

Contd...

Table 6: Contd...			
Joint	39 (41.9)	54 (58.1)	93
Three generation	25 (40.3)	37 (59.7)	62
χ^2, P	0.049, 0.976		
Place of residence			
Urban area	66 (42.9)	88 (57.1)	154
Rural area	98 (39.8)	148 (60.2)	246
χ^2, P	0.357, 0.55		
Type of diet			
Vegetarian	25 (41.7)	35 (58.3)	60
Nonvegetarian	139 (40.9)	201 (59.1)	340
χ^2, P	0.013, 0.909		
Presence of NCDs			
Yes	28 (40)	42 (60)	70
No	136 (41.2)	194 (58.8)	330
χ^2, P	0.035, 0.851		
Presence of hypertension			
Yes	14 (33.3)	28 (66.7)	42
No	150 (41.9)	208 (58.1)	358
χ^2, P	1.14, 0.286		
Family history of NCDs			
Yes	71 (38.4)	114 (61.6)	185
No	93 (43.3)	122 (56.7)	215
χ^2, P	0.978, 0.323		
Family history of hypertension			
Yes	41 (34.5)	78 (65.5)	119
No	123 (43.8)	158 (56.2)	281
χ^2, P	3.0, 0.083		
History of substance abuse			
Present	50 (39.7)	76 (60.3)	126
Absent	114 (41.6)	160 (58.4)	274
χ^2, P	0.132, 0.716		
Total	164	236	400
Risk factors	Awareness level about diabetes mellitus		Total
	Poor/moderate	Good	
Age group (years)			
18-25	45 (52.9)	40 (47.1)	85
26-35	64 (49.2)	66 (50.8)	130
36-45	36 (41.9)	50 (58.1)	86
46-55	27 (46.6)	31 (53.4)	58
>55	5 (12.2)	36 (87.8)	41
χ^2, P	21.3, <0.001		
Gender			
Male	121 (44.8)	149 (55.2)	270
Female	56 (43.1)	74 (56.9)	130
χ^2, P	0.107, 0.743		
Marital status			
Married	115 (42.6)	155 (57.4)	270
Unmarried/widow	62	68	130
χ^2, P	0.925, 0.336		
Educational status			
Graduate/postgraduate	26 (37.7)	43 (62.3)	69

Contd...

Table 6: Contd...			
Intermediate/posthigh school diploma	45 (48.9)	47 (51.1)	92
High school	44 (47.8)	48 (52.2)	92
Middle school	20 (46.5)	23 (53.5)	43
Primary school	28 (47.5)	31 (52.5)	59
Illiterate	14 (31.1)	31 (68.9)	45
χ^2, P	5.98, 0.308		
Occupation			
Professional/semi-professional	16 (41)	23 (59)	39
Clerical/shop owner/farmer	21 (37.5)	35 (62.5)	56
Skilled worker	36 (55.4)	29 (44.6)	65
Semi-skilled worker	20 (47.6)	22 (52.4)	42
Unskilled worker	40 (36.4)	70 (63.6)	110
Unemployment	44 (50)	44 (50)	88
χ^2, P	8.61, 0.126		
Socioeconomic status (n=387)			
Upper/upper middle	25 (30.1)	58 (69.9)	83
Lower middle	54 (54.0)	46 (46.0)	100
Upper lower	83 (46.1)	97 (53.9)	180
Lower	11 (45.8)	13 (54.2)	24
χ^2, P	10.8, 0.013		
Type of family			
Nuclear	109 (44.5)	136 (55.5)	245
Joint	47 (50.5)	46 (49.5)	93
Three generation	21 (33.9)	41 (66.1)	62
χ^2, P	4.2, 0.122		
Place of residence			
Urban area	67 (43.5)	87 (56.5)	154
Rural area	110 (44.7)	136 (55.3)	246
χ^2, P	0.056, 0.813		
Type of diet			
Vegetarian	25 (41.7)	35 (58.3)	60
Nonvegetarian	152 (44.7)	188 (55.3)	340
χ^2, P	0.191, 0.662		
Presence of NCDs			
Yes	29 (41.4)	41 (58.6)	70
No	148 (44.8)	182 (55.2)	330
χ^2, P	0.274, 0.601		
Presence of diabetes mellitus			
Yes	12 (30)	28 (70)	40
No	165 (45.8)	195 (54.2)	360
χ^2, P	3.66, 0.056		
Family history of NCD			
Yes	77	108	185
No	100 (46.5)	115 (53.5)	215
χ^2, P	0.964, 0.326		
Family history of diabetes mellitus			
Present	33 (31.4)	72 (68.6)	105
Absent	144 (48.8)	151 (51.2)	295
χ^2, P	9.49, 0.002		
History of substance abuse			

Contd...

Table 6: Contd...

Present	50 (39.7)	76 (60.3)	126
Absent	127 (46.4)	147 (53.6)	274
χ^2, P	1.56, 0.212		
Total	177	223	400

NCDs: Noncommunicable diseases

Table 7: Ordinal logistic regression analysis of predictors of awareness level of various noncommunicable diseases among the participants (n=400)

Independent predictors of good awareness level	Adjusted OR	95% CIs of adjusted OR		P
		Lower limit	Upper limit	
Of heart attack				
Educational status				
Graduate/postgraduate	0.14	0.05	0.45	0.001
Intermediate/posthigh school diploma	0.25	0.1	0.61	0.003
High school	0.4	0.17	0.95	0.037
Middle school	0.48	0.19	1.22	0.123
Primary school	0.56	0.24	1.34	0.192
Illiterate	0			
Type of diet				
Vegetarian	0.43	0.21	0.9	0.022
Nonvegetarian	0			
Of stroke (n=250)				
Educational status				
Graduate/postgraduate	0.23	0.093	0.58	0.002
Intermediate/posthigh school diploma	0.24	0.098	0.57	0.001
High school	0.48	0.198	1.18	0.111
Middle school	0.64	0.223	1.84	0.409
Primary school	0.69	0.257	1.84	0.455
Illiterate	0			
Place of residence				
Urban	0.55	0.351	0.86	0.01
Rural	0			
Type of diet				
Vegetarian	0.47	0.259	0.84	0.011
Nonvegetarian	0			
Of diabetes mellitus				
Age group (years)				
≥56	0.13	0.045	0.365	<0.001
46-55	0.8	0.4	1.59	0.520
36-45	0.62	0.33	1.16	0.138
26-35	0.87	0.493	1.52	0.616
18-25	0			

CIs: Confidence intervals, OR: Odds ratio

Awareness level regarding stroke was significantly better among urban residents in the present study. Similarly, in a study done in Mysore, India, awareness about diabetes mellitus, hypertension, dyslipidemia, and stroke was significantly higher among participants from urban area.^[16] Better

awareness among them might be due to easy accessibility to medical care and health clubs, more of mass media and internet facilities, and better literacy rate in urban compared to rural areas.

In this study, awareness of hypertension was seen significantly better among those who were illiterate or those educated up to primary school level compared to others. The moderate-to-good awareness level about hypertension in this study was 99%, which was also much higher than that reported in previous studies where it ranged from 36.9% to 60%.^[7,8,17,18] This might be because of opportunistic screening of blood pressure (for those aged above 30 years) by health-care providers, which is done routinely nowadays, under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke. This strategy under NPCDCS which was implemented throughout India in 2015 might have generated awareness about hypertension even among the less educated groups. Previous studies^[17,19] reported awareness about hypertension to be significantly better among women, which was different from our observations where no association with gender was observed.

In another study^[17] done in different parts of Kerala, India, moderate-to-good awareness level about diabetes mellitus was found to be 72.2% compared to 99% reported in the present study. However, knowledge of particular risk factors such as physical inactivity and obesity resulting in diabetes mellitus was reported in 11.9% of participants in a Chennai, India^[20] based study which was more than our observations where only 5.3% and 9% of participants, respectively, knew it. This indicates the urgent requirement of need-based diabetes education programs in both urban and rural India. It should target those who were found particularly to be less aware about diabetes mellitus in the present study such as younger population groups.

CONCLUSION

Good awareness level about various NCDs ranged from 55.8% to 62.5% among participants in this study. There is thus a need for further improvement of awareness of people regarding various NCDs. These awareness programs should be so designed to improve awareness regarding those risk factors of NCDs which are not widely known among people such as those identified in this study. This will help them in the implementation of suitable preventive measures against these risk factors. Awareness on warning symptoms and signs and immediate management measures will additionally ensure early diagnosis and treatment. The various sociodemographic groups identified to have poor knowledge in the present study need to be provided targeted intervention during these health educational campaigns. These measures will help in containing the current increasing burden of NCDs in India.

Limitation

A population-based study would have given a better estimate of the awareness level of various NCDs in comparison to any hospital-based study.

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Conflicts of interest

There are no conflicts of interest.

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