“Effect of nutrition, health and hygiene education on knowledge attitude and Practices (KAP) among selected transgender community”

Abstract

The Transgender (TG) community has been steadily growing over the decades, yet they face a unique set of challenges. Apart from communicable diseases many transgenders suffer from nutrition deficiency associatednon communicable diseases, which decreases the quality of living. The purpose of this study was to examine how nutritional, health and hygiene education influences the knowledge, attitudes, and practices (KAP) of theTG population. The participants were TG individuals over 18 years old. TG individuals visiting ESI hospital Gulbarga and few TG from Bengaluru city were selected for the research. A total of 300 TG individuals were initially screened, out of which 120 were selected for the study. The study comprised administering a detailed socio-economic demographic questionnaire, pre-KAPquestionnaire, conducting an awareness program with distribution of education material, and then having a gap period of 60 days a post-KAP assessment was done. The results were statistically analysed, before the awareness session (Group I), the majority of participants (60.83%) were categorized as having "Poor" knowledge, only (7.5%) had "Good" knowledge, after the awareness session (Group II), there was a significant improvement in knowledge levels. The percentage of participants with "Poor" knowledge decreased drastically to only 1.67%, with "Good" knowledge increased to 36.67%. Before the awareness session (Group I), the majority of TG participants (66.67%) held "Unfavourable" attitudes, a smaller percentage (24.17%) held "Neutral" attitudes, the least common attitude was "Favourable," held by 9.17% of participants. After the awareness session (Group II), there was a noticeable shift in attitudes. The percentage of participants with "Unfavourable" attitudes decreased dramatically to only 2.50%,with "Neutral" attitudes increased substantially to 67.50%, similarly, with "Favourable" attitudes increased to 30.00%. Before the intervention (Group I), the majority of participants (70.83%) exhibited "Poor" practices.After the intervention (Group II), "Poor" practices decreased to 7.50%,with "Average" practices increased substantially to 65.83%, similarly,with "Good" practices increased to 26.67%. Rank correlation between pre and post KAP and socioeconomic domains had significant association These findings suggest that educational qualification, family size, facilities available, are important factors associated with knowledge, attitude, and practice regarding the subject under study.

Keywords: Transgender, health, nutrition awareness, knowledge, dietary practices, attitude

Introduction

Transgender (TG) is an umbrella term used to describe individuals whose gender identity differs from the sex they were assigned at birth. Gender identity refers to a person's deeply-

felt internal sense of their own gender, whether it aligns with the sex assigned to them at birth (Stryker, 2008)

Being transgender does not necessarily imply any specific sexual orientation; transgender individuals may identify as heterosexual, homosexual, bisexual, or any other sexual orientation. The experience of being transgender can involve a process of self-discovery, self-acceptance, and, for some, the pursuit of gender-affirming interventions such as hormone therapy or gender confirmation surgeries (Chakrapani, 2010)

It is challenging to provide an exact number of transgender individuals worldwide or in a specific country like India. Transgender people may not always be accurately counted or identified due to various factors, including societal stigma, lack of legal recognition, and the diversity of gender identities. Estimates on the global transgender population vary, and there is no comprehensive and up-to-date worldwide census on transgender individuals. Additionally, self-identification and cultural factors can influence how people identify and report their gender.

As of the World Health Organization's (WHO) report in December 2023 on Malnutrition, the comprehensive definition of malnutrition encompasses various forms, spanning undernutrition, inadequate intake of vitamins or minerals, overweight, obesity, and diet-related noncommunicable diseases. The global scenario reveals a complex picture with 1.9 billion adults classified as overweight or obese, and a contrasting 462 million adults categorized as underweight.

The WHO report (2023) emphasizesthe global prevalence of malnutrition, underscoring that, in 2022, 149 million children under the age of 5 were estimated to be stunted, indicative of inadequate linear growth. Additionally, 45 million children in this age group were estimated to be wasted, reflecting insufficient weight in proportion to height. Furthermore, 37 million children faced the challenge of being either overweight or obese, showcasing the multifaceted nature of malnutrition affecting the youngest members of society.

In a book written by Viswanathan and Agnihotri (2020), they have noted that for women one observes that the decline in undernutrition rates does not translate entirely into overweight or obesity rates. Small increases are also observed in the normal nutrition rates except for the decline in 40 to 49 years group. The 20-29 years age group shows a shift largely towards overweight rates but in the other two age groups there is increase in both components of overnutrition they also mentioned that about 42 per cent of women and about 43 percent of men are in the normal nutrition BMI category with a large burden of double malnutrition and more tilted towards overnutrition rate in the older age group. With demographic composition favouring the middle age of 30-50 years for some more decades in India, the burden of malnutrition is heavily in favour of overnourished.

However, it is crucial to recognize that transgender individuals, much like any other population, confront distinct challenges that may contribute to malnutrition. The report does not explicitly delve into the specific nutritional concerns faced by transgender individuals. These challenges may encompass social factors, discrimination, economic disparities, and healthcare access issues, potentially impacting their nutritional well-being. It remains essential to address the unique needs of diverse populations, including the transgender

community, to ensure comprehensive and inclusive strategies in the global fight against malnutrition.

Transgender group have wider issues of gender identity or gender expression which is differed from the sex that they were assigned at birth. They are at high risk for mental health concerns, nutritional deficiencies, communicable and non-communicable diseases. Most of the non-communicable diseases can be managed by correcting dietary habits and healthy lifestyle changes. Nutritional health education will directly influence the well-being of population there by reducing ill health. In order to lessen the hospitalization, prevention of nutritional related disorders and for promoting good health, there is an urgent need to build a systematic nutrition education program for transgender population.

Keeping the above background the study was conducted to know the effect of nutrition, health and hygiene education on knowledge attitude and Practices (KAP) among transgender community.

Methodology

For the study, respondents (n=120) from Gulbarga and Bengaluru city of Karnataka, India who are over the age of eighteen years and voluntary to enrolfor the study withconsent. With inclusive criteria of not having communicable diseases or organ failure. Majority spoke Kannadalanguage and few understood English and Hindi. All study procedures were approved by the University ethical committee (No.-DR/STA/Ethical committee/2022-23) of UAS, GKVK, Bengaluru, dated 20thOctober 2022.The duration of data collection was 6 months which included gap of 60 days for post KAP assessment.

The TG individuals who were visiting for gender affirmation surgery and few were called for ESI hospital, Kalburgi, under the supervision of medical practitioner, nurse and dietitian.All interviews were conducted by the researcher with the consent of the participants and their identity was kept confidential, no other recordings were done.

The demographics data regarding age, marital status, educational qualification, family type, size, total family income, housing, facilities, occupation were taken from Kuppaswamy scale (Kumar *et al*, 2022).

Knowledge, attitude and practices (KAP), **Knowledge:** Nutritional literacy pertains to an individual's comprehension of nutrition, encompassing their cognitive capacity to remember and recollect information and facts related to food and nutrition. **Attitudes:** Attitudes encompass emotional, motivational, perceptual, and cognitive beliefs that can either positively or negatively impact an individual's behaviour or practices, including their feelings towards feeding or eating habits. These attitudes are shaped by emotions, motivations, perceptions, and thoughts, and they play a significant role in influencing future behaviour regardless of an individual's knowledge or health status. Understanding why an individual adopts certain practices over others can be attributed to their attitudes, beliefs, and perceptions, which are often interchangeable terms. **Practices** : Practices refer to the visible actions of an individual that may impact their nutritional status, encompassing activities such as eating, feeding, cooking, and food selection. The terms practice and behaviour are often used interchangeably, although practice often denotes long-standing or commonly observed behaviour. Good and poor practices pertain to an individual's habitual behaviour. While key

nutritional practices include hygiene and healthcare, responses were scored and analysed for statistical assessment (Macías and Glasauer, 2014)

A structured questionnaire was developed to evaluate the knowledge, attitudes, and practices (KAP) of the transgender population regarding food consumption, dietary practices, health and hygiene, both before and after the KAP assessment intervention. Nutrition education sessions were conducted to highlight the importance of nutrition and health, utilizing teaching aids. Following this, the impact of the nutrition education was assessed through scoring.

A "teacher-made test" consisting of 18 knowledge questions, 17 attitude questions, 20 practices framed around dietary, food consumption and nutrition practices, was employed to gauge the level of knowledge, attitude and practices among the transgender population. Responses were quantified by assigning a code of 1 to correct answers and 0 to incorrect ones. Based on the total score, transgender individuals were classified into poor, average, and good knowledge levels and practice levels, unfavourable, neutral, favourable for attitude, utilizing mean and standard deviation as measures of reference.

To study the association, between socio-economic demographic domains and KAP, rank correlation was analysed.

Results and Discussion:

The results of the data collection on socio-economic demographics a, pre and post KAP assessment for transgender people using pretested questions are shown below with the appropriate tables and figure 1.

Table 1 : Frequency of Socio-economic demographic characteristics of the respondents

1.Age			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**<26 years**	**32**	**26.67**
2	**26 -32 years**	**64**	**53.33**
3	**>32 years**	**24**	**20.00**
Total		**120**	**100**
2. Marital status			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**Married**	**17**	**14.17**
2	**Un Married**	**103**	**85.83**
Total		**120**	**100**
3. Education Qualification			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**Illiterate**	**33**	**27.50**

2	**Primary**	**12**	**10.00**
3	**SSLC**	**23**	**19.17**
4	**PUC**	**36**	**30.00**
5	**Diploma**	**11**	**9.17**
6	**Degree**	**1**	**0.83**
7	**Masters**	**4**	**3.33**
Total		**120**	**100.00**
4. Family Type			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**Nuclear**	**71**	**59.17**
2	**Joint**	**30**	**25.00**
3	**Community**	**19**	**15.83**
Total		**120**	**100.00**
4. Family Size			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**None**	**29**	**24.17**
2	**Small (up to 4 Members)**	**53**	**44.17**
3	**Medium (5-8 Members)**	**13**	**10.83**
4	**Large (>8 Members)**	**25**	**20.83**
Total		**120**	**100.00**
5. Monthly Income			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**<5000 Rs**	**66**	**55.00**
2	**5000 - 10000 Rs**	**5**	**4.17**
3	**10000 - 15000 Rs**	**22**	**18.33**
4	**15000 - 20000 Rs**	**10**	**8.33**
5	**20000 -30000 Rs**	**13**	**10.83**
6	**>30000 Rs**	**4**	**3.33**
Total		**120**	**100**

6. Type of House respondents living in			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**Own House**	**29**	**24.17**
2	**Apartment**	**28**	**23.33**
3	**Sharing**	**18**	**15.00**
4	**Pucca House**	**20**	**16.67**
5	**Others**	**25**	**20.83**
Total		**120**	**100**
7. Facilities in their houses			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**No Sanitary Latrine**	**27**	**22.5**
2	**No Electricity**	**2**	**1.666667**
3	**No Gas**	**3**	**2.5**
4	**No water**	**29**	**24.16667**
5	**Lack of Any other facilities**	**29**	**24.16667**
6	**No response was recorded**	**30**	**25.0**
Total		**120**	**100**
8. Occupation of the respondents			
Sl. No	**Categories**	**Frequency**	**Percentages**
1	**Government sector**	**1**	**0.83**
2	**Private**	**63**	**52.50**
3	**Self Employ**	**30**	**25.00**
4	**NGO**	**20**	**16.67**
5	**House helper**	**1**	**0.83**
6	**Not working**	**5**	**4.17**
Total		**120**	**100**
9. Status of Health Insurance			
Sl. No	**Categories**	**Frequency**	**Percentages**

1	**Having Health Insurance**	**9**	**7.5**
2	**Not Having Health Insurance**	**111**	**92.5**
Total		**120**	**100**

Value in the ( ) indicates scored obtained by different categories

Studying the socio-economic profile is essential for understanding the status of a population. Disparities in social, demographic, and economic factors have significant implications for the status of transgender individuals. Therefore, it is crucial to thoroughly examine the socio-economic conditions of respondents. In this study, analyzing these pointers provides validation and offers a clearer understanding of other criteria

Age: Table 1 illustrates the age distribution of transgender individuals. The majority of TG individuals (53.33%) were in the middle age group, followed by the young group (26.67%) and the older group (20.00%). These findings align with previous research conducted by Madhavan *et al.*(2020) and Arunagiri *et al.* (2018), who similarly noted a higher representation of individuals in the middle age group in their studies. This trend is attributed to the middle age group's greater level of self-independence, ability to express viewpoints, and their role as earners within their families.

Marital status: The majority of transgender individuals who identified as MTF (Male-to-Female) were unmarried (85.83%), while 14.17% were married (Table 1). It's important to note that legal marriage for same-sex couples is prohibited in the Indian constitution. However, some individuals undergo Gender Affirmative Surgery (GFS) and choose to marry. Additionally, some transgender individuals live with their families and identify as men, concealing their transgender characteristics to provide livelihood for their families. Transgender individuals (MTF) present themselves as female in society. Furthermore, the presence of bisexual characteristics may hinder their ability to remain loyal to their partners. A study conducted by George *et al.*(2015)noted that out of 60 respondent who were older transgender adults, majority of the transgender were unmarried and 30% said to be married.

Education qualification: It is clear from Table 1, that One third (30 %) of the TG individuals had studied PUC while other (27.50 %) were illiterate, around 19.17 per cent had SSLC and 10 per cent of them had primary education. Diploma (9.17 %), Masters (3.33 %), Degree (0.83 %) respectively.

As of the 2011 Indian Census, reported by (Chandramouli and General, 2011) ,approximately 490,000 transgender individuals reside in India. Census data reveals a concerning trend: this community exhibits a low literacy rate, with only 46% of transgender individuals being literate, in stark contrast to the 74% literacy rate among the general population. Recognized under the Right to Education Act as a "disadvantaged group," transgender individuals face significant educational challenges, (Ambika Pandit, 2023). One potential explanation could be the disparity in educational opportunities available to transgender individuals. Illiteracy among transgender people can render them more vulnerable and negatively impact their quality of life. As transgender individuals come to terms with their gender identity during

puberty, they may face discrimination from peers, educators, and society, leading some to abandon traditional schooling (Ganguli, 2023). However, it's clear that societal acceptance and familial support can foster an environment where more transgender individuals are able to pursue formal education and even higher studies. Unfortunately, such supportive circumstances are relatively rare among transgender communities.

Type of family and Family size: A significant majority (59.17%) of respondents belong to nuclear families, while 25% are from joint families, and only 15.83% are part of community living arrangements. Table 1 highlights family size, that the largest proportion of the transgender group (44.17%) comes from small families with up to four members. Additionally, 24.17% live either independently or with a partner, 20.83% are part of families with five to eight members, and 10.83% hail from families with more than eight members. Our findings align with those of Afsana and Wani (2022), who reported that out of 200 transgender individuals, 194 resided in nuclear families, with only six in joint family setups. Many transgender individuals across the country live in communities (Mal, 2018).

Monthly Income: Income and earnings significantly influence both family and societal living conditions, as well as interpersonal relationships. Table 1 depicts that 55% of individuals earn less than Rs: 5,000 per month, while 18.33% earn between Rs: 10,000 and Rs: 15,000 per month. Additionally, 8.33% earn Rs: 15,000 to Rs: 20,000 per month, 10.83% have incomes ranging from Rs: 20,000 to Rs: 30,000, and only 3.33% earn above Rs: 30,000 per month. This income disparity stems from the diverse range of jobs and activities undertaken by transgender individuals. Notably, the primary source of income, as highlighted by Chakrapani *et al.* (2004), is from private employment, particularly in sex work. Furthermore, the study reveals that a small percentage of transgender individuals holding master's and diploma degrees are engaged in higher-paying jobs, reinforcing the findings of the study unequivocally. The hospital enrolling for gender change surgery and checkup for few of the transgender individual may be the reason to approach hospitals who are getting higher income jobs.

Housing condition and facilities: Itwas found that majority of transgender population were living in own house 24.17 per cent, 23.33 per cent were in rented apartment, 16.67 per cent were in pucca house, whereas 15.0 per cent were living in sharing type followed by 20.83 per cent living as nomads. Transgender individuals often adhere to the "Guru-Chela" tradition, fostering a sense of community living, often in large groups. With urbanization, many migrate between cities, seeking shelter or becoming disciples under a Guru. In such relationships, the transgender individual assumes the role of a disciple, agreeing to abide by their Guru's conditions and norms (Bhattacharya, 2022).

Transgender multiple responses on facilities from no sanitary latrine (22.5%), no water facility (24.17%) The transgenders don’t have restroom facilities which is a very basic amenity and should have fully sage potable water. However, LPG (2.5%) & electricity (1.67%) is not a limitation. Almost (24.17%) did not respond about the lack of facilities. Many transgender individuals cited several inadequacies, including the absence of essential amenities (24.17%), lack of bus reservation, ongoing discrimination and neglect in public spaces, societal disrespect, and derogatory name-calling by colleagues. Jadhav (2022) highlighted the detrimental impact of being assigned derogatory names on the mental well-being of transgender individuals.

Occupation: With reference to the occupationof respondent only 0.83 per cent working in the government sector as well as house helper and 4.17 per cent are not working, 16.67 per cent of the respondents are working with NGO's However 25 per cent are self-employed but job description is not given, one per cent work as house helper, more than half of the respondents (52.50 %) are involved in private income activities, notably including roles like sex worker, prostitution agents, which entail significant sexual involvement. Addressing the needs of this population requires substantial focus on sexual health education and awareness, covering both communicable and non-communicable disease management (Nataraj, 2019). The study respondents have voiced the necessity for stable employment opportunities offering adequate salaries, enabling them to lead comfortable lives and transition away from the often-precarious private occupations many of them currently rely on.

Health Insurance: With reference to Health Insurance, majority (92.5%) were not having any kind of health insurance and only 7.5% had health insurance to claim. This needs immediate attention for opting for insurance among transgender community.

Effect of Nutrition and health and hygiene education (pre and post KAP)

Overall knowledge of transgender individual regarding food consumption, health and hygiene, nutrition knowledge and cooking practices.

Before the awareness session (Group I), the majority of participants (60.83%) were categorized as having "Poor" knowledge, with a mean score of 3.84 and a standard deviation of 1.58. Only a small percentage (7.5%) had "Good" knowledge, with a mean score of 10.85 and a standard deviation of 1.87.

After the awareness session (Group II), there was a significant improvement in knowledge levels. The percentage of participants with "Poor" knowledge decreased drastically to only 1.67%, with a mean score of 2.87 and a higher standard deviation of 2.74. The percentage of participants with "Good" knowledge increased to 36.67%, with a mean score of 13.47 and a lower standard deviation of 0.47.

Overall, there was an improvement in knowledge levels from before to after the awareness session, as indicated by the increase in mean scores across all categories in Group II compared to Group I. Additionally, the standard deviations provide insight into the variability of knowledge scores within each group, with generally lower variability observed in Group II, suggesting a more consistent improvement in knowledge levels among participants after the intervention

Table: 2 Respondents' Knowledge level before and after Nutrition and health education

Knowledge level	Before [Group I]				After [Group II]			
	Freq.	%	Mean score	Std. dev	Freq.	%	Mean score	Std. dev
Poor	73	60.83	3.84	1.58	2	1.67	2.87	2.74
Average	38	31.67	7.01	2.47	74	61.67	8.04	1.67
Good	9	7.50	10.85	1.87	44	36.67	13.47	0.47
Total/overall	120	100	6.95	1.15	120	100	9.24	1.21

Overall attitude of transgender individual regarding food consumption, health and hygiene, nutrition knowledge and cooking practices.

Before the awareness session (Group I), the majority of TG participants (66.67%) held "Unfavourable" attitudes, with a mean score of 4.78 and a standard deviation of 1.53. A smaller percentage (24.17%) held "Neutral" attitudes, with a mean score of 8.74 and a standard deviation of 2.07. The least common attitude was "Favourable," held by 9.17% of participants, with a mean score of 12.04 and a standard deviation of 2.27.

After the awareness session (Group II), there was a noticeable shift in attitudes. The percentage of participants with "Unfavourable" attitudes decreased dramatically to only 2.50%, with a mean score of 4.13 and a higher standard deviation of 1.98. The percentage of participants with "Neutral" attitudes increased substantially to 67.50%, with a mean score of 9.04 and a lower standard deviation of 0.74. Similarly, the percentage of participants with "Favourable" attitudes increased to 30.00%, with a mean score of 13.46 and a standard deviation of 1.07.

Overall, there was a shift towards more favourable attitudes from before to after the intervention, as indicated by the increase in mean scores across all categories in Group II compared to Group I. The standard deviations provide insight into the variability of attitude scores within each group, with generally lower variability observed in Group II, suggesting a more consistent shift towards favourable attitudes among participants after the intervention.

Table: 3 Respondents' Attitude level before and after nutrition and health education

Attitude level	Before [Group I]				After [Group II]			
	Freq.	%	Mean score	Std. dev	Freq.	%	Mean score	Std. dev
Unfavourable	80	66.67	4.78	1.53	3	2.50	4.13	1.98
Neutral	29	24.17	8.74	2.07	81	67.50	9.04	0.74
Favourable	11	9.17	12.04	2.27	36	30.00	13.46	1.07
Total/overall	120	100	8.24	1.78	120	100	9.71	0.89

Overall practice of transgender individual regarding food and dietary consumption, health and hygiene, nutrition knowledge and cooking practices.

Before the intervention (Group I), the majority of participants (70.83%) exhibited "Poor" practices, with a mean score of 2.17 and a standard deviation of 0.89. A smaller percentage (24.17%) exhibited "Average" practices, with a mean score of 7.98 and a standard deviation of 2.04. The least common practice level was "Good," exhibited by only 5.00% of participants, with a mean score of 11.24 and a standard deviation of 3.14.

After the intervention (Group II), there was a noticeable improvement in practices. The percentage of participants with "Poor" practices decreased to 7.50%, with a mean score of 3.04 and a higher standard deviation of 2.80. The percentage of participants with "Average" practices increased substantially to 65.83%, with a mean score of 8.27 and a similar standard deviation of 0.89. Similarly, the percentage of participants with "Good" practices increased to 26.67%, with a mean score of 13.79 and a standard deviation of 1.57.

Overall, there was a significant improvement in practices from before to after the intervention, as indicated by the increase in mean scores across all categories in Group II compared to Group I. The standard deviations provide insight into the variability of practice scores within each group, with generally higher variability observed in Group II for "Poor" practices, suggesting a less consistent improvement in this category among participants after the intervention. However, for "Average" and "Good" practices, the variability remained relatively low, indicating a more consistent improvement in these categories among participants after the intervention

Table: 4 Respondents' Practice before and after nutrition and health education

Practice level	Before [Group I]				After [Group II]			
	Freq.	%	Mean score	Std. dev	Freq.	%	Mean score	Std. dev
Poor	85	70.83	2.17	0.89	9	7.50	3.04	2.8
Average	29	24.17	7.98	2.04	79	65.83	8.27	0.89
Good	6	5.00	11.24	3.14	32	26.67	13.79	1.57
Total/overall	120	100	9.71	2.07	120	100	11.48	0.89

Assessment of knowledge, attitude and practice (KAP) Pre and Post nutrition and health education programme using paired t test.

The study data table:5, represent comparisons of knowledge level, attitude, and practice between pre and post groups (Group I and Group II) before and after a nutrition education awareness session. The mean values, standard deviations, t-test values, and p-values are provided for each comparison.

1. Knowledge Level: There was a significant increase in knowledge level from Group I (mean = 6.95, SD = 1.15) to Group II (mean = 9.24, SD = 1.21), as indicated by the t-test value of 18.48 ($p < 0.001$).
2. Attitude: Attitudes also showed a significant improvement from Group I (mean = 8.24, SD = 1.78) to Group II (mean = 9.71, SD = 0.89), with a t-test value of 4.52 ($p < 0.001$).
3. Practice: Similarly, practices exhibited a significant enhancement from Group I (mean = 9.71, SD = 2.07) to Group II (mean = 11.48, SD = 0.89), with a t-test value of 16.78 ($p < 0.001$).

Overall, these results suggest that the impact of nutrition and health education has substantial improvements in knowledge, attitude, and practice among the participants. Additionally, the consistency of the improvements across all three aspects (knowledge, attitude, and practice) suggests the positive changes in participants behaviour.

Table: 5 Pre and Post KAP - Comparison using SD, t-test and p- value

Particular	Knowledge Level		Attitude		Practice	
	Group I	Group II	Group I	Group II	Group I	Group II
Mean	6.95	9.24	8.24	9.71	9.71	11.48
Std. dev	1.15	1.21	1.78	0.89	2.07	0.89
t test value	18.48**		4.52**		16.78**	

P value	**<0.001**	**<0.001**	**<0.001**

Rank Correlation of KAP between different socio-economic demographic characteristic of the TG respondents

Educational qualification from Table 6, showed a significant positive correlation with attitude (correlation = 0.204, p = 0.024). Family typeand size exhibited a significant negative correlation with educational qualification (correlation = -0.209, p = 0.021). Facilities available showed highly significant positive correlations with knowledge (correlation = 0.308, p = 0.001) and attitude (correlation = 0.231, p = 0.011), and practice (correlation = -0.175, p = 0.054).

These findings suggest that educational qualification, family size, facilities available, are important factors associated with knowledge, attitude, and practice regarding the subject under study. Importantly for practices to change and have an effect on body will take a longer period of time.

Table : 6 Rank Correlation of KAP between different socio-economic demographic characteristic of the TG respondents

Characters	Knowledge		Attitude		Practice	
	Correlation	p-value	Correlation	p-value	Correlation	p-value
age	0.158	0.082	0.166	0.068	0.043	0.642
Marital status	-0.012	0.893	-0.031	0.738	-0.071	0.437
Educational qualification	0.154	0.091	0.204*	0.024	0.164	0.071
family type	-0.138	0.131	-0.085	0.350	0.055	0.549
family size	-0.011	0.905	-0.125	0.171	-0.209	0.021
Total family income	0.130	0.154	0.115	0.209	0.066	0.468
Housing	-0.059	0.522	0.014	0.880	0.073	0.424
Facilities	0.308**	0.001	0.231*	0.011	0.040	0.660
health insurance	-0.098	0.285	-0.123	0.178	-0.127	0.163

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed)

Conclusion

Throughout various stages of physical development, insufficient nutrition leads to deficiencies and non-communicable diseases, impacting overall health and well-being. Recent research findings reveal a positive correlation between the socioeconomic status and educational attainment of transgender individuals and their nutritional knowledge.

Implementation of nutrition, health, and hygiene awareness initiatives directly improves their quality of life. Moreover, this research not only sheds light on the importance of proper nutrition but also addresses issues such as food adulteration, optimal food preservation techniques for nutritional enhancement, and fostering entrepreneurial opportunities. Economic constraints significantly hinder access to nutritious meals, underscoring the importance of governmental intervention through targeted schemes and ongoing nutrition awareness programs focused on non-communicable diseases. Transforming dietary habits requires sustained efforts, and emphasizing the long-term health benefits can facilitate healthy living among transgender individuals.

Limitation of the study:

The respondents were not assessed for blood composition, as this was not part of study objective, further for blood values to change in body require long term nutrition and health intervention. This study was only survey-based pre and post KAP data was recorded.

References:

1. Stryker, S. (1998). The transgender issue: An introduction. *GLQ: A journal of lesbian and gay studies*, *4*(2), 145-158.
2. Chakrapani, V. (2010). Hijras/transgender women in India: HIV, human rights and social exclusion.
3. MalnutritionWorld Health Organization. (2003). *Diet, nutrition, and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation* (Vol. 916). World Health Organization.
4. Viswanathan, B., & Agnihotri, A. (2020). Double burden of malnutrition in India: decadal changes among adult men and women. Madras School of Economics.
5. Kumar, G., Dash, P., Patnaik, J., & Pany, G. (2022). Socioeconomic status scale-modified Kuppuswamy scale for the year 2022. *International Journal of Community Dentistry*, *10*(1), 1-6.
6. Macías, Y. F., & Glasauer, P. (2014). Guidelines for assessing nutrition related knowledge, attitudes, and practices: food and agricultural organisation of the United Nations.
7. Madhavan, M., Reddy, M. M., Chinnakali, P., Kar, S. S., & Lakshminarayanan, S. (2020). High levels of non-communicable diseases risk factors among transgenders in Puducherry, South India. Journal of Family Medicine and Primary Care, 9(3), 1538-1543.
8. Arunagiri, N., Suganya, C., &Prbaha, J. (2018). Socioeconomic Status of Transgenders (Hijras) In Chennai District (Tamil Nadu, India).
9. George, A., Janardhana, N., & Muralidhar, D. (2015). Quality of life of transgender older adults. Int J Soc Sci Humanit Invent, 4, 7-11.
10. Chandramouli, C., & General, R. (2011). Census of india 2011. *Provisional Population Totals. New Delhi: Government of India*, 409-413.
11. Ambika Pandit (April 2023) accessed on December 2023, Sexual orientation, post retrieved from https://timesofindia.indiatimes.com/india/lgbtqi-community-face-bias-across-nations-due-to-sexual-orientation-gender-identity-undp

12. Ganguli, D. (2023). A strategy analysis of transgender inclusivity in the education system in India: confront issues and challenges. Development, Environment & Education: The Indian perspective, 45.
13. Afsana, K. B., & Wani, M. A. (2022). Aggression, Resilience and Psychological Wellbeing among Transgender. Journal of Positive School Psychology, 3773-3790.
14. Mal, S. (2018). The hijras of India: A marginal community with paradox sexual identity. Indian Journal of Social Psychiatry, 34(1), 79-85.
15. Bhattacharya, S. (2022). Inhabiting the state subjunctively: Transgender life-making alongside death and a pandemic. Global Public Health, 17(10), 2447-2459
16. Jadhav, S. (2022). Social and Political Condition of the Transgender Community. Issue 5 Indian JL & Legal Rsch., 4, 1.
17. Nataraj, S. (2019). Trans-formations: Projects of Resignification in Tamil Nadu's Transgender Rights Movement (Doctoral dissertation, UC Berkeley)