A STUDY ON HEALTH HAZARDS OF JUNK FOODS AMONG SCHOOL CHILDREN

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ABSTRACT

The children of today will be the adult of tomorrow, central to this vision of the future, focusing on today's children and educating them to change their behaviour towards healthy eating pattern is necessary. Nutritional problem is one of the major health problem faced by the millions children of all age group .Preventive approach to maintain good health with specific education can be of greater benefit for the children to prevent mental and physical ailments.

INTRODUCTION

It's the 21st century and "junk food" has gone global. For worse junk food is now available all over the world. We see it all most everywhere we go in grocery shop and also in convenience stores.

Children find themselves amidst of a complex society that is undergoing breath-taking changes. Concepts, relationships, lifestyles are metamorphasised to accommodate the new jet-setting age. Food is of no exception, Healthy nutritious foods have been replaced by the new food mantra - JUNK FOOD! Junk food comprises of anything that is quick, tasty, convenient and fashionable. It seems to have engulfed every age, every race and the newest entrants in children.

The director of the Centre for Science, Michael Jacobson (1972) invented the term junk food called "Empty calories". He was accredited as the "chief of the food police" by the food industry, for uncovering the harmful effects of junk food with its use of additives such as vibrant food colors, Salt and Tranfat.

Junk food is an empty calorie food. These foods have little enzyme producing vitamins, minerals, amino acids and contain high level of calories from sugar or fat. So these are called as unhealthy foods.

Foods commonly considered junk foods include salted snack foods, gum, candy, sweet desserts, fried fast food, and sugary carbonated beverages, Soft drinks, chips, wafers, noodles, pizza, burgers, French fries etc. are few examples from the vast variety of fast food available in the market.

STATEMENT OF THE PROBLEM:

Recently there has been a warning about the high fat content of foods in school students' lunch boxes. We want to investigate the fat content in student's lunch boxes.Across the planet, obesity in children is reaching epidemic levels. More kids are getting fatter; and not coincidentally, many of these children are the targets of saturation marketing by the junk food industry, which seeks to displace healthful local eating habits with its own high calorie, high-added-fat, and high-added-sugar junk food. A study to assess the Effectiveness of planned instructional module regarding knowledge about health hazards of junk foods among school

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children.

OBJECTIVES:

- To assess the level of knowledge on health hazards of junk foods among school children before the planned instructional module [pre-test].
- To assess the effectiveness of health hazards of junk foods among school children after planned instructional module [post test].
- To determine the effectiveness of planned instructional module among school children.
- To find the association between selected demographic variables and the level of knowledge among school children.

REVIEW OF LITERATURE:

Johnson.C.M et al, (2011) conducted a study that aimed to understand mother's everyday food choices using one type of visual method-participant-driven photo-elicitation. The study revealed that mothers with a more defined health identity made healthier choices for themselves and similar food choices for their children. In addition, they exhibited behaviours that positively influenced their children's foods choices. Mother who struggled to see themselves as healthy indulged with more junk food and indicated a feeling of anxiety and guilt, these mothers food choices were more disconnected from their children and they tend to prepare more junkfood for their children instead of healthy nutritious foods.

Boyland (2012) stated in British department of health that almost one in ten of six year olds and fifteen percent of fifteen year old children in England were currently classified as obese. Britain is facing an obesity epidemic, A watershed for junk food adverts would ensure that they are banned from not just children's programs during the day but programs shown at night where families view them together. Parents also need to limit their children's screen time and talk to them about the motives behind advertising junk foods.

Ashley Gerhardt (2013) published in his journal of archives of general psychiatry found that the addictive nature of many junk foods is literally the same as the addictive nature of drugs. These rewarding properties however lie primarily in junk food chemicals. Many processed junk foods are loaded with flavor enhancing chemicals like monosodium glutamate (MSG), high-fructose corn syrup (HFCS), and aspartame which are known to be highly-addictive. MSG, for instance, over-excites the brain to the point that it actually causes neurological brain damage.

Table 1 -AGEWISE PREFERENCE OF RESPONDENTS

S.NO	AGE	NO OF RESPONDENTS	PERCENTAGE
1	8-9 Years	5	10
2	9-10 Years	10	20
3	10-11 Years	10	20
4	11-12 Years	25	50
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their age composition. It is revealed that 10% of the respondents are between 8-9 years, 20% of the respondents are between 9-10 years, 20% of the respondents are between 10-11 years, 50% of the respondents

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are between11-12 years.

Table 2 - GENDER USING

S.NO	GENDER	TOTAL RESPONDENTS	PRECENTAGE
1.	Male	20	40
2.	Female	30	60
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their gender composition. It is revealed that 40% of the respondents are Males, 60% of the respondents are Females

Table 3 - RESIDENTIAL AREA

S.NO	RESIDENTIAL AREA	TOTAL RESPONDENTS	PRECENTAGE
1.	Urban	25	50
2.	Rural	25	50
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Residential area composition. It is revealed that 50% of the respondents are in urban area, 50% of the respondents are in rural area. Thus it is inferred that majority of respondents are in Urban areas.

Table 4 - EDUCATION OF THE RESPONDENTS

S.NO	EDUCATION	TOTAL REPONDENTS	PERCENTAGE
1	Illiterate	3	6
2	Primary	5	10
3	High school	7	14
4	HSC	20	40
5	Graduate	15	30
	TOTAL	**50**	**100**

The above table shows the distribution of sample respondents by their Education composition. It is revealed that 6% of the respondents are illiterate, 10% of the respondents are Primary, 14% of the respondents are High School, 40% of the respondents are HSC, 30% of the respondents are Graduate and above.

Table 5 - FATHER'S OCCUPATION

S.NO	OCCUPATION	TOTAL RESPONDENTS	PERCENTAGE
1	Salaried	23	46
2	Business	17	34
3	Cooley	10	20
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Fathers occupation composition. It is revealed that 46% of the respondents are Salaried, 34% of the respondents are Business, 20% of the respondents are Cooley.

Table 6 - FAMILY INCOME

S.NO	FAMILY INCOME	TOTAL RESPONDENTS	PERCENTAGE
1	< Rs5000	3	6
2	Rs 5001-Rs10000	17	34
3	Rs10001- Rs 15000	14	28
4	Above Rs 15000	16	32
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Family Income composition. It is revealed that 6% of the respondents are <Rs5000,34% of the respondents are Rs 5001-Rs10000,28% of the respondents are Rs10001- Rs 15000, 32% of the respondents are Above Rs 15000.

Table 7 - FAMILY TYPE

S.NO	SIZE OF FAMILY	TOTAL RESPONDENTS	PERCENTAGE
1	Nuclear Family	37	74
2	Joint Family	13	26
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Size of Family composition. It is revealed that 74% of the respondents are in Nuclear family,26% of the respondents are in Joint family.

Table 8 - NUMBER OF SIBILINGS

S.NO	NO.OF.SIBLINGS	TOTAL RESPONDENTS	PERCENTAGE
1	One	13	26
2	Two	27	54
3	Three	7	14
4	More than Three	3	6
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Siblings composition. It is revealed that 26% of the respondents are single child, 54% of the respondents are Two, 14% of the respondents are Three, and 6% of the respondents are More than Three.

Table 9 - POCKET MONEY PER MONTH

S.NO	POCKET MONEY PER MONTH	TOTAL RESPONDENTS	PERCENTAGE
1	No pocket money	4	8
2	Below Rs 50	11	22
3	Rs 50-100	14	28
4	Above Rs100	21	42
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Pocket money

composition. It is revealed that 8% of the respondents don't get pocket Money, 22% of the respondents get below Rs 50, 28% of the respondents get Rs.50-100, and 50% of the respondents get Above Rs100.

Table 10 - FREQUENCY OF EATING JUNKFOOD

S.NO	FREQUENCY OF EATING JUNKFOOD	TOTAL RESPONDENTS	PERCENTAGE
1	Nil	**13**	**26**
2	1-3 Times	**20**	**40**
3	More than 3 times	**17**	**34**
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Frequency of Eating Junk food composition. It is revealed that 26% of the respondents doesn't eat frequency, 40% of the respondents eat 1-3 Times, 34% of the respondents eat More than 3 times. Thus it is inferred that majority of the respondents eat 1-3 times.

Table 11 - REASONS

S.NO	REASONS	TOTAL RESPONDENTS	PERCENTAGE
1	Feel Hungry	10	20
2	Time pass	15	30
3	School interval	13	26
4	Peer pressure	12	24
	Total	**50**	**100**

The above table shows the distribution of sample respondents by their Reasons in consumption of junk food composition. It is revealed that 20% of the respondents eat when they feel hungry, 30% of the respondents eat for Time pass, 26% of the respondents eat in school intervals, and 24% of the respondents eat due to peer pressure.

Table 12 - SOURCE OF INFORMATION

S.NO	SOURCE OF INFORMATION	TOTAL RESPONDENTS	PERCENTAGE
1	Mass media	**27**	**54**
2	Friends/ Relatives	**15**	**30**
3	Health personnel	**2**	**4**
4	Family member	**6**	**12**
	Total	**50**	**100**

The above table shows the distribution of sample respondents by theirsource of information composition. It is revealed that 54% of the respondents from Mass Media, 30% of the respondents from Friends/Relatives, 4% of the respondents from Health personnel, and 12% of the respondents from Family member.

FINDINGS

This study on among school children reveals that 50 percent of respondents belong to age group of 15-18 yrs. This study finds that, 60 percent females are addicted to Junk Foods. This study reveals that, 60 percent of urban area children consume Junk Foods. This study explains that, 46 percent of salaried parents spend more to Junk Foods for their children. This study finds

that, 74 percent of nuclear sized Family children eat more Junk Foods. This study reveals that, 54 percent of two siblings in a family consume more Junk Foods. This study explains that, 42 percent of children having above 100 rupees as pocket money eat lots of Junk Foods. This study explains that, 40 percent of children eat Junk Food 3 times a day. This study finds that, 30 percent of children eat Junk Foods for Time pass. This study explains that, 54 percent information about Junk Foods is found in Mass Media.

SUGGESTIONS

Parents should not give more pocket money for their children. Most of the school students intake junk food so that the school administration should provide healthy snack like fresh juice, green grams, fruits etc.Children eat due to depression; parents should give more attention and spend time with them.

CONCLUSION

The findings of the study revealed that before the planned instructional module the school children had inadequate knowledge and lack of awareness about health hazards of junk foods. But after the intervention of planned instructional module, there was improvement in their level of knowledge about the hazards of junk foods. Today's children are Tomorrow's future. Nutrition during the formative period has a meaningful long-term effect, providing building blocks to construct the growing brain. So, it is necessary for the Educators, Health Personnel and the Government to create awareness about healthy eating habits among the school children in order to improve their physical and mental wellbeing.

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THE BHEVIOUR OF EMPLOYEES AND THE LEVEL OF SATISFACTION OF RESPONDENTS IN AVAILING OF THE BANKING SERVICES RENDERED BY THE STATE BANK OF INDIA

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ABSTRACT

Banks cater to the needs of agriculturists, industrialists, traders and all the other sections of the society. Thus, they accelerate the economic growth of the country and steer the wheels of the economy towards the goal of 'self reliance' in all fields. The employers in the banks should always work towards the acceleration of financial growth of public and they should always treat their customers politely and help the bank in maintaining the better customer relationship. There is a certain way individuals behave in a particular situation. No two individuals behave in similar ways. Employee behaviour is defined as an employee's reaction to a particular situation at workplace. Employees need to behave sensibly at workplace not only to gain appreciation and respect from others but also to maintain a healthy work culture. Male employees need to respect their female counterparts. Employees need to understand that some information is confidential and should not be discussed with anyone. It is always not healthy to break the manager's trust and it is not good to disclose the team's strategies or internal policies to others. It is good to avoid browsing objectionable websites at workplace. The employers of the bank should always maintain the code of trustworthiness and they should not try to open blocked sites through proxy server and fake passwords. Rather than wasting their energy on unproductive things, it is always good if we concentrate on our work. As there is are some differencec, this study is essential.

Key Words: Behaviour, Demands, Employees and Browsing.

INTRODUCTION

The employers of the bank should always maintain the code of trustworthiness and they should maintain good team sprit with all the employees. On the other hand **Managers need to pay attention to the needs and demands of employees so that** employees develop a sense of loyalty and attachment towards the organization. **Communication is one of the most essential factors influencing employee's behaviour**. Employee's perception towards the organization and their team manager determines their behaviour. Communication enables employees to understand what their organization wants them to do. Communication helps in changing an individual's attitude and thought process. In the modern economy, the customers generally expect that they must be recognized, their needs be fulfilled and must be given cordial treatment during their visits to the bank premises. Thus, the scale of operations, prompt service and

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understanding the customers are important factors which determine an effective distribution strategy. In this connection, the role of bank employees is not less important to that of a salesman.

OBJECTIVE

The objective of the present study is to examine the employees behaviour and level of satisfaction of respondents in availing of banking services rendered by SBI.

REVIEW OF LITERATURE

M. Eapen Varghese in his thesis entitled 'Marketing of Banking Service' stressed that a good reward scheme like medals or certificates should be introduced to motivate employees. According to him only motivated employees can render effective customer service.

Pine, in his study entitled, "Building Customer Relationships that Lasts" has suggested that in view of consumers increasingly demanding customization and service bundling, the capacity to learn is critical. Employees need to integrate new products and sales information into their existing knowledge to explain these changes to customers.

METHODOLOGY

This study is an empirical research, based on the survey method. First-hand data required for the study were collected from respondents directly by the researcher herself.

Data pertaining to the employees behavior and their level of satisfaction towards customers regarding the availing of banking services (Likert's five point scale), a have been collected with the help of a structured the interview schedule, analysed and presented in this paper. Four hundred sample respondents were selected by applying stratified sampling techniques. It consists of 120 agriculturists, 150 business man and 130 employed respondents. The various components selected are employees behavior, physical facilities reaction during commission of error behavior of enquiry counter and functioning of brand manager.

EMPLOYEES' BEHAVIOUR

In general, the bank employees must be in a position to extend all sorts of guidance and help, when a customer approaches the bank for availing of a service, of any sort. Since the approaching customers may be in different mind sets and also of different understanding levels, many of them may require assistance from the bank employees. Therefore the attitude of customers generally depends on the behaviour of the bank employees. The respondents Opinion about the Behaviour of Employees When Opening an Account is shown in Table.

Table:1: Respondents Opinion about the Behaviour of Employees When Opening an Account

Sl. No.	*Statement*	*Agriculturists*		*Business Men*		*Employed*		*Total*	
		Total Score	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*
1.	Guiding to fill up the application	510 (4.25)	II	590 (3.933)	II	566 (4.353)	I	1666 (4.165)	I
2.	Filling up the application themselves	374 (3.116)	IV	688 (4.586)	I	501 (3.853)	II	1563 (3.907)	II
3.	Asking him to do for himself	460 (3.833)	III	412 (2.746)	IV	362 (2.784)	IV	1234 (3.085)	IV
4.	Asking sub-ordinates to help	299 (2.491)	V	434 (2.893)	III	298 (2.292)	V	1031 (2.577)	V
5.	Entertain only filled on applications	545 (4.541)	I	360 (2.4)	V	431 (3.315)	III	1336 (3.34)	III

Source: Computed data.
Figures in parentheses represent mean scores.

It is evident from Table.1 that in the case of the agriculturists respondents, the highest scores were awarded to the statement "Entertain only filled in application (545) which tops the list followed by the statements, "Guiding to fill up the application" (510), "Asking him to do it himself" (460), "Filling up the application themselves" (374), "Asking subordinates to help" (299) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the business men respondents, the highest scores were awarded to the statement "Filling up the application themselves" (688) which tops the list followed by the statements, "Guiding to fill up the Application" (590), "Asking subordinates to help" (434), "Asking him to do it himself" (412), "Entertain only the filled in application (360) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the employed respondents the highest scores were awarded to the statement "Guiding to fill up the Application" (566) which tops the list followed by the statements, "Filling up the application themselves" (501), "Entertain only the filled in applications" (431), "Asking him to do himself" (362), "Asking subordinates to help" (298) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In comparing the three sectors "Guiding to fill up the application" with 4.16 mean score tops the rank and "Asking subordinates to help" has ranked the last with a least mean score of 2.57.

PHYSICAL FACILITIES

A bank branch office is a place where customers are expected to spend some time for getting their requirements attended to. A pleasant environment and physical comforts available there will have a psychological impact on the minds of customers. Neat and tidy toilet facility, potable drinking water facility, sufficient vehicle parking facility, seating facility, availability of sufficient number of bank employees and their accessibility and even an air conditioned waiting hall are some of the physical facilities that will create a strong opinion on banking customers. Table.2 shows the scores obtained by the respondents for each component classified under physical facilities.

Table:2: Scores of Respondents Relating to Physical Facilities

Sl. No.	*Statement*	*Agriculturists*		*Business Men*		*Employed*		*Total*	
		Total Score	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*
1.	There is toilet facility	305 (2.541)	IV	365 (2.433)	V	316 (2.430)	V	986 (2.465)	V
2.	There is availability of staff	466 (2.883)	II	580 (3.866)	II	412 (3.169)	III	1458 (3.645)	II
3.	There is good seating arrangement	400 (3.333)	III	420 (2.8)	IV	460 (3.538)	II	1280 (3.2)	III
4.	Vehicle parking shed is available	294 (2.45)	V	515 (3.433)	III	345 (2.653)	IV	1154 (2.885)	IV
5.	There is drinking water facility	542 (4.516)	I	690 (4.6)	I	540 (4.153)	I	1772 (4.43)	I

Source: Computed data

Figures in parentheses represent mean scores.

It is evident from Table:2 that the agriculturists respondents awarded the highest scores to the statement “There is drinking water facility” (542) which tops the list followed by the statement, “There is availability of staff” (466), “There is good seating arrangement” (400), “There is toilet facility” (305), “Vehicle parking shed is available” (294) ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the business men respondents, the highest scores were awarded to the statement “There is drinking water facility” (690) which tops the list followed by the statement, “There is availability of staff” (580), “Vehicle parking shed is available” (515), “There is good seating arrangements” (420), “There is

toilet facility" (365) ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the employed respondents, the highest scores were awarded to the statement "There is drinking water facility" (540) which tops the list followed by the statements, "There is good seating arrangement" (460), "There is availability of staff" (412), "Vehicle parking shed is available" (345), "There is toilet facility" (316) ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

Overall the "drinking water facility" with a mean score of 4.43 topped the best and toilet facility had the lowest mean score of 2.47.

REACTION DURING COMMISSION OF ERRORS

Usually during peak hours of transactions, naturally the employees may get tired or may feel irritated at the need to work fast to attend to the needs of the customers. As a result, they want to follow a patient approach, avoid customers to some extent or get help from other staff members. When the employees commit mistakes in making entries, they rectify them with an apology or with formal notice or with formal notice and apology. Table.3 shows the scores on the opinion of the respondents on the employees who react when errors are committed.

Table:3: Scores on the Reaction by the Employees on Commission of Errors

Sl. No.	*Statement*	*Agriculturists*		*Business Men*		*Employed*		*Total*	
		Total Score	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*
1.	Rectified with apology at times	290	III	487	III	437	II	1214	II
2.	Rectified with formal notice	494	I	369	IV	380	III	1243	III
3.	Rectified with formal notice and apology	262	IV	610	II	311	IV	1183	IV
4.	Employees always seek excuse	332	II	702	I	569	I	1803	I
5.	Sometimes apologize	206	V	219	V	249	V	674	V

Source: Computed data.

Figures in parentheses represent mean scores.

It is evident from Table.3 that in the case of the agriculturists respondents the highest scores were awarded to the statement "Rectified with formal notice" (494) which tops the list followed by the statements, "Employees always seek excuse" (332), "Rectified with apology at times" (290), "Rectified

with formal notice and apology" (262), "Sometimes apologize" (206) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the business men respondents, the highest scores were awarded to the statement "Employees always seek excuse" (702) which tops the list followed by the statements, "Rectified with formal notice and apology" (610), "Rectified with apology at times" (487), "Rectified with formal notice" (369), "Sometimes apologize" (219) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the employed respondents, the highest scores were awarded to the statement "Employees always seek excuse" (569) which tops the list followed by the statements, "Rectified with apology at times" (437), "Rectified with formal notice" (380), "Rectified with formal notice and apology" (311), "Sometimes apologize" (249) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

It has also been observed that in total, the factor 'Employees always apologize' stood first with 4.12 mean score while the factor 'sometimes apologize' stood last with the least mean score of 1.71.

BEHAVIOUR OF ENQUIRY COUNTER STAFF

Every commercial bank has a separate enquiry counter to guide the customers. In some banks, staff will be available at the counter or available rarely or will not be available at all. The non-availability of staff at the counter or indifferent behaviour of the available staff may cause annoyance inconvenience to the customers. Table.4 shows the scores on the opinion of the respondents on the behaviour of the staff at the enquiry counter.

Table:4: Scores on the Behaviour of Staff at the Enquiry Counter

Sl. No.	*Statement*	*Agriculturists*		*Business Men*		*Employed*		*Total*	
		Total Score	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*
1.	Rational behaviour	571 (4.758)	I	690 (4.6)	I	588 (4.523)	I	1849 (4.622)	I
2.	Rude behaviour	300 (2.5)	IV	246 (1.64)	V	210 (1.615)	V	756 (1.89)	V
3.	Moderate behaviour	433 (3.608)	II	602 (4.013)	II	419 (3.223)	II	1454 (3.635)	II
4.	Timely behaviour	326 (2.716)	III	507 (3.38)	III	380 (2.923)	III	1213 (3.032)	III
5.	No 100 per cent involvement	236 (1.966)	V	381 (2.54)	IV	294 (2.261)	IV	911 (2.277)	IV

Source: Computed data.

Figures in parentheses represent mean scores.

It is evident from Table. 4 that in the case of the agriculturists respondents the highest scores were awarded to the statement "Rational Behaviour" (571) which tops the list followed by the statements, "Moderate behaviour" (433), "Timely behaviour" (326), "Rude Behaviour" (300), "No 100 per cent involvement" (236) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statement also confirm the same reading.

In the case of the business men respondents, the highest scores were awarded to the statement "Rational Behaviour" (690) which tops the list followed by the statements, "Moderate behaviour" (602), "Timely behaviour" (507), "No 100 per cent involvement" (381), "Rude Behaviour" (246) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the employed respondents, the highest scores were awarded to the statement "Rational Behaviour" (588) which tops the list followed by the statements, "Moderate behaviour"(419), "Timely behaviour"(380), "No 100 per cent involvement" (294), "Rude Behaviour"(210) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

It is noted in total that the 'Rational behaviour' was top ranked in all sectors with the highest mean score of 4.62 and the factor 'Rude behaviour' stood last with the least mean score of 1.89.

FUNCTIONING OF BRANCHMANAGERS

Most of the branch managers are friendly. In rendering services, the branch managers and the organizational representatives of the banks, have to establish good rapport with their customers. For that, they have to entertain them with pleasing manners. They must always be accessible to the customers and render good service to them.

Table 5.5 shows the scores in the opinion of the respondents on the functioning of the branch managers.

Table. 5: Scores on the Functioning of Branch Managers

Sl. No.	*Statement*	*Agriculturists*		*Business Men*		*Employed*		*Total*	
		Total Score	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*	*Total Score*	*Rank*
1.	Dealing with the customers with pleasure	512 (4.266)	I	700 (4.666)	I	601 (4.623)	I	1813 (4.532)	I
2.	Dealing with the customers roughly	316 (2.633)	III	611 (4.073)	II	521 (4.007)	II	1448 (3.62)	II

3.	Dealing with the customers in an authoritarian tone	415 (3.458)	II	222 (1.48)	V	390 (3)	III	1024 (2.567)	IV
4.	Easily accessible to the customers	301 (2.508)	IV	527 (3.513)	III	275 (2.115)	V	1103 (2.757)	III
5.	Avoids meeting customers	289 (2.408)	V	386 (2.573)	IV	319 (2.453)	IV	994 (2.485)	V

Source: Computed data.
Figures in parentheses represent mean scores.

It is evident from Table 5.5 that in the case of the agriculturists respondents, the highest scores were awarded to the statement "Dealing with the customers with pleasure" (512) which tops the list followed by the statements, "Dealing with the customers in an authoritarian tone" (415), "Dealing with the customers roughly" (316), "Easily accessible to the customers" (301), "Avoids meeting customers" (289) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the business men respondents the highest scores were awarded to the statement "Dealing with the customers with pleasure" (750) which tops the list followed by the statements, "Dealing with the customers roughly" (611), "Easily accessible to the customers" (527), "Avoids meeting the customers" (386), "Dealing with the customers in an authoritative tone" (222) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In the case of the employed respondents, the highest scores were awarded to the statement "Dealing with the customers with pleasure" (601) which tops the list followed by the statements, "Dealing with the customers roughly" (521), "Dealing with the customers in an authoritative tone" (390), "Avoids meeting customers" (319), "Easily accessible to the customers" (275) which ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading.

In total in all the three sectors the factor "Dealing with the customers with pleasure" stood first with 4.53 mean score and the factor "Vvoid meeting customers" stood the last with a minimum mean score of 1.48.

FINDINGS AND SUGGESTION

The attitude of respondents on the availing of banking services was studied with the help of variables like employees behaviour, physical facilities, reaction to commission of errors, behaviour of enquiry counter staff and function of branch managers.

In comparing the three sectors in case of employees behavior "Guiding to fill up the application" with 4.16 mean score tops the rank and "Asking subordinates to help" has ranked the last with a least mean score of 2.57. likewise in comparing the three sectors physical facilities guiding to fillup the application with

The agriculturist respondents awarded the highest scores to the statement "There is drinking water facility" (542) which tops the list followed by the statement, "There is availability of staff" (466), "There is good seating arrangement" (400), "There is toilet facility" (305), "Vehicle parking shed is available" (294) ranked second, third, fourth and fifth respectively. The mean scores for all the five statements also confirm the same reading. It is suggested that the banks should concentrate more on agriculture activity doing respondents.

Availability at remittance challenges on the counter. The Banks should concentrate more specialties to agriculture people.

CONCLUSION

The present study has been undertaken mainly to help the customers of banks to decide on the selection of State Bank of India with regard to the services rendered.The attitude on the distribution strategy is concerned with the distribution of services at the bank counters. Since the distribution of services takes place between the employees inside the bank counters and the customers outside the bank counters, the quality of service depends upon how the services are distributed at the counters. As such, better services are distributed at the counters. Better service to customers depends upon the physical facilities provided to the employees, the attitude and the behaviour of the employees, the functioning of the employees in the different sections of the bank and the like. In other words, better customer service depends upon the effective distribution of banking services by the employees at the counters. Besides this, an examination of the various services, operational system and practices followed in rendering banking services according to the environmental changes is also essential for better distribution of banking services. As such, the distribution strategy should be such that the customers are recognized, their needs are attended to and they are given equal treatment.

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A Comparative Study on Customers Perception towards Service Quality of Public and Private Sector Banks in Southern Districts of Tamil Nadu, India

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Abstract

The aim of the present study is to assess the perception of customers towards service quality of public and private sector banks in Southern districts of Tamil Nadu. In the current scenario banking area of India is running in a dynamic task concerning both customer base and performance. Service quality is an essential competitive strategy to retain customer base. Customer satisfaction hang on Service quality of banks. This study to be utilized a quantitative survey design and the five dimensions of service quality tangibility, reliability, responsiveness, empathy and assurance were considered as variables for this study. The researcher has selected five districts from Southern districts of Tamil Nadu such as, Thoothukudi, Tirunelveli, Kanyakumari, Tenkasi, and Ramanathapuram. Purposive sampling method was espoused to select the respondents. Customers who are availing banking services from the select banks are selected for the study. The total sample size is 846 out of which 423 samples are from the selected public sector bank and 423 from the selected private sector bank in Southern districts of Tamil Nadu. Customer's perception differences towards service quality of private sector and public sector banks is thoroughly analyzed in the research work. The mean score of perception on service quality is high in private banks compared with public banks. Hence, the study suggested that, the public sector banks have to concentrate more on providing quality services. The study concluded that, both public and private sector banks are instructed to enhance their service quality, thereby customer's satisfaction can be increased.

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Keywords

Customers Perception, Private Sector Banks, Public Sector banks, Service Quality Dimensions, Customer satisfaction.

Introduction

Service sector is the life line for the social economic growth of a country and includes activities which help in the development of the primary and secondary sectors. The financial services sector affords financial services to public and corporations. This sector of the economy is made up of a variety of financial firms including banks, investment houses, lenders, finance companies, real estate brokers, and insurance companies. The Banking sector plays a pivotal role in the economic development of our country in the service sector. The banking sector came into force to compete in a market driven by environment measuring service quality in the service sector. Therefore, there is a challenge for Indian public and private sector banks to cater to the changing needs of their customers. It is not only to attract new customers but also emphasise on retaining the loyal customers which is only possible with providing quality services to the customers.

Statement of the Problem

Service Quality of the banks referred as requirement of all banks to fulfill the objectives and wishes of the customers. In General, it is perused that, service quality in private sector banks is good when compared to the public sector banks. The various issues raised by the general public includes: no immediate response to customers, service time duration is more, long queue to deposit and withdraw the money, waiting for longer time, staff deeds is not good, especially public sector banks are not providing mass services like payment of bills, payment of tax, bank assurance etc. and problem relating to banking service such as bank statements, error in the statements are not solved immediately.

Moreover, parking facility in banks is very poor compared to private sector banks. The biggest challenge today for the bank is to establish customers intimacy without which all other efforts towards operational excellence are meaningless. The present necessity of banks is to have good relationship with customers by providing quality services to retain the existing and generate or acquire new customers. Thus, this research attempts to study the perception of service quality of public and private sector banks in the present scenario.

Review of Related Literature

Jitendra Kumar Sahu and Manabhanjan Sahu (2016) in their research paper titled "Service Quality of Public Sector Banks in India: A Gap Between Perception and Expectation" described a conceptual framework of service quality of selected public sector banks in the city of Berhampur. The researcher used SERQUAL questionnaire having two parts i.e., Expectation and Perception. There were 22 questions under five dimensions of service quality. This research had some limitations as the results showed the perceived service quality of customer of one city only.

Kakouris and Finos (2016) in the study article with the caption, "Applying SERVQUAL to the Banking Industry" surveyed the service quality perceptions of customers of the leading bank in the Serbian market.

Moreover, comparison between SERVQUAL findings and customer satisfaction surveys was conducted along with an attempt to prove correlation between customers' perceptions regarding service quality. The study recommendation was not to abandon SERVQUAL measurements but to remove limitations and adapt it to better correspond to each case. Keshav Raj Bhatta and Bhanu Pratap Durgapal (2016) in their article entitled, "Service Quality Perceptions and Customer Satisfaction in Nepalese Banking Sector" investigated the association and relationship between service quality and customer satisfaction. Service quality was measured using SERVPERF approach.

The questionnaire included 27 questions relating to the five dimensions of service quality viz. reliability, assurance, tangibility, empathy and responsiveness. The result of regression analysis revealed reliability, tangibility, empathy and responsiveness as statistically significant predictors of customer satisfaction.

Karthihai Selvi and Vimal Priyan (2017) in their research paper entitled, "Perception of Customers towards Service Quality of Canara Bank towards Deposit Schemes", found that age, marital status and income of the respondents determine the preference of various deposit schemes. The study has informed that the banks were an important social organization rendering various financial services to its customers. Realizing the importance of customer service in banks, recommendations were made by various committees to improve the service quality of Banks.

Neelotpaul Banerjee and Santosh Sah (2012) in their research titled "A Comparative Study of Customers' Perceptions of Service Quality Dimensions between Public and Private Banks in India" concluded that private banks had been successful to a greater extent in achieving such relationship with customers than the public sector banks. In case of private banks, the service gap was lowest in reliability dimension and it might imply that customers felt these banks to be sincere and keep their promises.

Significance of the Study

Banking industry has undergone many changes in the recent past. Technological development and competition among banks have made banks to think of new strategies to attract more customers and retain the existing customers. With the increased competition among banks, quality of service rendered and customer satisfaction play a crucial role in sustainability and profitability of banks. Measuring service quality and level of satisfaction of bank customers becomes inevitable in the present scenario. So, the present study examines perception of service quality among the public and private sector banks.

Scope of the Study

The scope of this research is to identify perception of service quality of banks. This research is constructed on primary data and secondary data. This study focuses on the dimensions of service quality i.e. SERVQUAL. In the present study, an attempt has been made to explore the relationship between the demographic variables of customers and their perception of service quality dimensions. The study was carried out in the Southern districts of Tamil Nadu.

Objectives of the Study

The study has the following objectives

To know the demographic profile of the customers and to study the details about holding account profile of customers in selected public and private sector banks in southern districts of Tamil Nadu.

To analyze the customers perception towards service quality of public sector banks and private sector banks in Southern districts of Tamil Nadu.

Hypotheses of the Study

H_o^1: There is no significant difference between in the various service quality dimensions among the respondents in public and private sector banks.

H_o^2: There is no significant difference among classification of selected bank with respect to service quality dimensions.

Materials and Methods

Eloquent research design has been used for this study and an assessment has done for fact finding inquiries of different kinds. The data is collected through the questionnaire. The survey is conducted among the banking customers of public and private sector banks in Southern districts of Tamil Nadu.

The researcher has selected five districts from Southern districts of Tamil Nadu such as, Thoothukudi, Tirunelveli, Kanyakumari, Tenkasi, and Ramanathapuram. The total sample size is 846 out of which 423 samples are from the public sector banks and 423 from the private sector banks in Southern districts of Tamil Nadu. Such categorisation of selected sample respondents is given in the following table:

The service quality model established by Zeithmal, Parasuranam and Berry (1988) has been used in the current study. The main assumption of the model is that service quality is multidimensional concept. These dimensions contribute to the assessment of the service quality in any setting. The30 statements have been grouped under five dimensions. In order to ascertain the perception of service quality, Likert's five point scale has been used for its fitness to estimate the range and variations in the perceptions. The scale 1-5 denotes '5' as strongly agree and '1' as strongly disagree.

Results and Discussion

The above table shows demographic profile of the respondents concern to gender, age, marital status, type of family, size of the family, place of the residence, educational qualification, unemployment category, occupation and monthly family income. A major portion of the sample respondents are male both in public sector banks (68.8 per cent) as well as in private sector banks (71.6 per cent). A majority of the sample respondents belonging to the age group of 26-35 years both in the public sector banks (44.7 per cent) as well as in private sector banks (38.3 per cent). A majority of the sample respondents belong to the married group both in the public sector banks (70.2 per cent) and private sector banks (77.8 per cent).

A majority of the sample respondents lead the joint family both in the public sector banks (70.7 per cent) and private sector banks (73.5 per cent). A majority of the sample respondents have a family size of above 5 members both in the public sector banks (61.0 per cent) and private sector banks (68.3 per cent). A majority of the sample respondents belong to the Tirunelveli both in the public sector banks (44.7 per cent) and private sector banks (45.4 per cent).A major portion of the sample respondent's is UG degree holders in public sector banks (29.8 per cent) and Diploma holders in private sector banks (26.5 per cent). A major portion of the sample respondents in public sector banks (23.5 per cent) is retired and job seeker category and unable to work category in private sector banks (35.3 per cent).

It is inferred that majority of the respondents are business people in public sector banks (24.9 per cent), and government employee in private sector banks (27.6 per cent). It is inferred that majority of the respondents' monthly family income of above Rs. 45, 000 in both public sector banks (45.6 per cent) and private sector banks (44.0).

The above table shows holding account profile of the respondents concern to number of bank account hold, classification of selected banks, kinds of account and number of years using banking services. It is inferred that in public sector banks majority (48.7 per cent) holding account in two banks and in private sector majority (45.6 per cent)) customers are holding the account in one bank. In case of Public Sector Banks out of 423 respondents, each 141 respondents from Public Sector Bank-1, Public Sector Bank-3 and Public Sector Bank-2. In case of Private Sector Banks out of 423 respondents, each 141 respondents from PRIVATE SECTOR BANK-1, PRIVATE SECTOR BANK-2 and Private Sector Bank-3 Bank. A majority of the sample respondents are having saving bank account in both public sector banks (44.7 per cent) and private sector banks (48.0 per cent). It is inferred that majority of the respondents have been availing services with bank for a period of more than 8 years both in public sector banks (67.8 per cent) and private sector banks (71.9 per cent).

Table.1 Classification of Sample Respondents

S. No.	Type of Bank	Name of the Bank	No of Respondents
1.	Public Sector	Public Sector Bank-1	141
2.		Public Sector Bank-2	141
3.		Public Sector Bank-3	141
4.	Private Sector	Private Sector Bank-1	141
5.		Private Sector Bank-2	141
6.		Private Sector Bank-3	141

Table.2 Demographical Analysis

Demographic Details of the Respondents					
		Public Sector Banks		Private Sector Banks	
Variable	**Category**	**No. of Respondents**	**Percentage**	**No. of Respondents**	**Percentage**
Gender	Male	291	68.8	303	71.6
	Female	132	31.2	120	28.4
	Total	**423**	**100**	**423**	**100**
Age	Below 25	34	8.0	17	4.0
	26 - 35	189	44.7	162	38.3
	36 - 45	119	28.1	105	24.8
	46 - 55	59	13.9	99	23.4
	Above 55	22	5.2	40	9.5
	Total	**423**	**100**	**423**	**100**
Marital Status	Single	96	22.7	65	15.4
	Married	297	70.2	329	77.8
	Widow	24	5.7	22	5.2
	Divorced	6	1.4	7	1.7
	Total	**423**	**100**	**423**	**100**
Type of Family	Nuclear Family	124	29.3	112	26.5
	Joint Family	299	70.7	311	73.5
	Total	**423**	**100**	**423**	**100**
Size of the Family	Below 3 Members	124	29.3	112	26.5
	3 - 5 Members	41	9.7	22	5.2
	Above 5 Members	258	61.0	289	68.3

	Total	**423**	**100**	**423**	**100**
Place of Residence	Thoothukudi	83	19.6	95	22.5
	Tirunelveli	189	44.7	192	45.4
	Kanyakumari	43	10.2	40	9.5
	Tenkasi	63	14.9	49	11.6
	Ramanathapuram	45	10.6	47	11.1
	Total	**423**	**100**	**423**	**100**
Educational Qualification	Illiterate	1	.2	1	.2
	Up to Primary level	40	9.5	47	11.1
	HSC level	24	5.7	27	6.4
	UG degree	126	29.8	106	25.1
	Diploma Holders	118	27.9	112	26.5
	PG degree	71	16.8	89	21.0
	Doctoral	25	5.9	14	3.3
	Professional Degree	18	4.3	27	6.4
	Total	**423**	**100**	**423**	**100**
Unemployed category	Student	2	5.9	2	11.8
	Job seeker	8	23.5	2	11.8
	Unable to work	7	20.6	6	35.3
	Retired	8	23.5	4	23.5
	Home maker	6	17.6	2	11.8
	Others	3	8.8	1	5.9
	Total	**34**	**100**	**17**	**100**
Occupation	Agriculture	58	14.9	76	18.7
	Daily wage earner	40	10.3	51	12.6
	Business	106	27.2	63	15.5
	Professional	17	4.4	26	6.4
	Government Employee	71	18.3	112	27.6
	Private Employee	97	24.9	78	19.2
	Total	**389**	**100**	**406**	**100**
Monthly Family Income	Below Rs.25,000	43	10.2	45	10.6
	Rs.25,001 - Rs. 35,000	171	40.4	162	38.3
	Rs. 35,001 - Rs. 45,000	16	3.8	30	7.1
	Above Rs. 45,000	193	45.6	186	44.0
	Total	**389**	**100**	**406**	**100**

Source: Primary data

Table.3 Holding Account Profile Analysis

Holding Account Profile of the Respondents					
		Public Sector Banks		**Private Sector Banks**	
Variable	**Category**	**No. of Respondents**	**Percentage**	**No. of Respondents**	**Percentage**
Number of Bank Account	One	136	32.2	193	45.6
	Two	206	48.7	173	40.9
	Three	47	11.1	44	10.4
	More than three	34	8.0	13	3.1
	Total	**423**	**100**	**423**	**100**
Classification of Selected Banks	Public Sector Bank-1	141	33.33	-	-
	Public Sector Bank-3	141	33.33	-	-
	Public Sector Bank-2	141	33.33	-	-
	PRIVATE SECTOR BANK-1	-	-	141	33.33
	PRIVATE SECTOR BANK-2	-	-	141	33.33
	Private Sector Bank-3 Bank	-	-	141	33.33
	Total	**423**	**100**	**423**	**100**
Kind of Account	Savings A/C	189	44.7	203	48.0
	Current A/C	98	23.2	107	25.3
	Loan A/C	13	3.1	17	4.0
	Both savings and Loan Account	57	13.5	63	14.9
	Both Current and Loan Account	37	8.7	19	4.5
	Recurring Deposits A/C	14	3.3	9	2.1
	Demat A/C	15	3.5	5	1.2
	Total	**423**	**100**	**423**	**100**
Number of years	Below Two Years	20	4.7	11	2.6
	2 - 4 Years	6	1.4	3	.7
	4 - 6 Years	23	5.4	12	2.8
	6 - 8 Years	87	20.6	93	22.0
	Above 8 Years	287	67.8	304	71.9
	Total	**423**	**100**	**423**	**100**

Source: Primary data

Table.4 Perception on the Quality of Banking Services

S. No	Service Quality of Banks	Type of Banks	
		Public Sector banks	**Private Sector banks**
	TANGIBILITY	**22.21**	**24.75**
1.	The banking companies will have modern looking equipment	3.43	3.70
2.	The physical facilities at banks will be visually appealing	3.60	3.90
3.	The Bank's employees who have a neat in their appearance	3.74	4.24
4.	Communication materials in banking company are visually appealing, easy to read, Informative and useful	3.74	4.39
5.	Bank Location easily accessible	3.78	4.23
6.	ATM machines are always in working condition to withdraw money	3.91	4.29
	RELIABILITY	**23.29**	**25.91**
7.	When banks promise to do something by a certain time, they do	3.73	4.13
8.	Doubts regarding banking services were cleared	3.59	4.24
9.	The bank safeguards customer data confidentially	4.26	4.30
10.	Prompt communication of transaction information	3.97	4.37
11.	Service reminders are provided on the time without any delay	3.71	4.47
12.	Banks will insist on error free records	4.02	4.41
	RESPONSIVENESS	**24.63**	**26.51**
13.	Staff is willing to help anytime	4.30	4.44
14.	Staff are prompt in responding to questions and queries	3.81	4.31
15.	Bank keeps customers informed about when services will be performed	4.41	4.56
16.	Employees are work at organised time table	3.70	4.36
17.	Personals of the bank are benevolent and cooperative to the customers	4.16	4.43
18.	All interventions and transactional services are understandable.	4.27	4.42
	ASSURANCE	**23.68**	**24.88**
19.	All the services provided by the bank are authentic	4.13	4.42
20.	Safe and secure with the transaction of the bank	4.19	4.34
21.	Bank is unique compared with others	3.94	4.37
22.	The behavior of employees in banks instill confidence in customers	4.15	4.39
23.	Bank staff give assurance with regard to their efficient service	3.55	3.69
24.	Employees in banks have knowledge and competence to solve customer's problem	3.72	3.67
	EMPATHY	**23.46**	**24.51**
25.	Equal importance is given to the customers	4.07	4.23
26.	The customers are provided with the clock service	3.77	3.92
27.	In case of loss of cards, immediate block of access and replacement of duplicate card provided	4.03	4.18

28.	Consistency of charges comparing others banks is reasonable	3.75	3.98
29.	System of pin security is reliable	4.08	4.23
30.	Giving caring and individual attention to customers by having the customer's best interest in mind	3.76	3.96

Source: Computed Primary Data

Table.5 Measures of Perception of Customers on Various Dimensions of Service Quality (Both Public and Private Sector Banks)

S. No	Dimensions	Public Sector Banks		Private Sector Banks	
		Mean	**S. D**	**Mean**	**S. D**
1.	Tangibility	22.21	3.52	24.75	2.59
2.	Reliability	23.29	3.22	25.91	2.30
3.	Responsiveness	24.63	2.71	26.51	2.10
4.	Assurance	23.68	2.98	24.88	2.54
5.	Empathy	23.46	3.145	24.51	2.58

Source: Computed Primary Data

Table.6 Assessment of service quality dimensions among Public and Private Sector banks

Service Quality Dimensions	Public Sector Banks					Result
	No. of Respondents	**Mean**	**Standard Deviation**	**t-value**	**P-value**	
Tangibility	423	22.2128	3.51869	112.300	.000**	Significant
Reliability	423	23.2861	3.21666	129.707	000**	Significant
Responsiveness	423	24.6288	2.71241	164.002	000**	Significant
Assurance	423	23.6761	2.97646	142.869	000**	Significant
Empathy	423	23.4586	3.14463	133.807	000**	Significant
Private Sector Banks						
Tangibility	423	24.7541	2.59439	172.455	000**	Significant
Reliability	423	25.9102	2.29185	205.595	000**	Significant
Responsiveness	423	26.5106	2.09587	230.712	000**	Significant
Assurance	423	24.8842	2.54035	177.177	000**	Significant
Empathy	423	24.5130	2.58215	171.352	000**	Significant

Source: Computed Primary Data

The p-value of all the service quality dimensions is less than 0. 01 and statistically important at 1 per cent level.

Table.7 Classification of selected bank with Respect to Service Quality Dimensions

Service Quality Dimensions		Public Sector Banks					
		Sum of Squares	**DF**	**Mean Square**	**F-value**	**P-value**	**Result**
Tangibility	Between Groups	57.291	2	28.645	2.328	.002**	Significant
	Within Groups	5167.560	420	12.304			
	Total	**5224.851**	**422**				
Reliability	Between Groups	5.196	2	2.598	.250	.779	Not Significant
	Within Groups	4361.191	420	10.384			
	Total	**4366.388**	**422**				
Responsiveness	Between Groups	1.225	2	.612	.083	.920	Not Significant
	Within Groups	3103.504	420	7.389			
	Total	**3104.728**	**422**				
Assurance	Between Groups	35.948	2	17.974	2.039	.013*	Significant
	Within Groups	3702.681	420	8.816			
	Total	**3738.629**	**422**				
Empathy	Between Groups	21.338	2	10.669	1.079	.341	Not Significant
	Within Groups	4151.688	420	9.885			
	Total	**4173.026**	**422**				
Private Sector Banks							
Tangibility	Between Groups	40.941	2	20.470	3.071	.047*	Significant
	Within Groups	2799.489	420	6.665			
	Total	**2840.430**	**422**				
Reliability	Between Groups	.459	2	.229	.043	.957	Not Significant
	Within Groups	2216.128	420	5.276			
	Total	**2216.586**	**422**				
Responsiveness	Between Groups	2.440	2	1.220	.277	.758	Not Significant
	Within Groups	1851.262	420	4.408			
	Total	**1853.702**	**422**				
Assurance	Between Groups	33.991	2	16.995	2.654	.027*	Significant
	Within Groups	2689.333	420	6.403			
	Total	**2723.324**	**422**				
Empathy	Between Groups	17.721	2	8.861	1.331	.265	Not Significant
	Within Groups	2795.957	420	6.657			
	Total	**2813.678**	**422**				

Source: Computed Primary Data

It is evident from table that the customers of both public and private sector banks selected for the study are satisfied with 'Responsiveness' dimension of service quality which occupies the first place.

In public sector banks, the P-value of tangibility factor is less than 0.01and statistically crucial at 1 per cent level. And assurance factor is less than 0.05 and statistically important at 5 per cent level. Hence the research concluded that there is significant difference among the classification of selected bank of the respondents and Service Quality Dimensions concerning towards these two factors such as tangibility and assurance. Among the private sector banks, the P-value of tangibility and

assurance is 0.047 and 0.027. It is less than 0.05 and concluded that there is a significant difference among the classification of selected bank of the respondents concerning towards tangibility and assurance in the study area.

Suggestions

The customer's perception of Tangibility dimension of service quality is lower in public sector banks. Hence, it is suggested that public sector banks may take steps to improve their physical facility, ATM centers and alter the banking environment. ATM services must be provided within the accessibility of the customers. When ATM centers are available within a short distance, it will improve the quality of services.

The customer's perception of Empathy dimension of service quality is lower in private sector banks. Hence, it is suggested that private sector banks equal importance is given to the customers, giving caring and individual attention to customers by having the customer's best interest in mind.

Private sector banks deliver a variety of services to meet every need of the customer with operational efficiency, while the services are offered at affordable rates by public sector banks. The major insight gained from this study suggests that the banking sector, both private and public need to stick on to the best standards of service quality which can produce a positive sequential impact on satisfaction. Thus, the perception of service quality is influenced by several factors which are discussed factors in the study and are influential in determining the customer satisfaction, which the banks need to concentrate and can culminate development.

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EFFECT OF PEER GROUP NUTRITION EDUCATION AMONG SCHOOL GOING ADOLESCENT GIRLS IN THOOTHUKUDI DISTRICT

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ABSTRACT

Adolescents are considered to be a nutritionally vulnerable segment of the population. A rapid growth rate combined with a marginal nutrient intake increases the risk of nutritional deficiencies in this population. Healthy diets and adequate regular physical activity are major factors in the promotion and maintenance of good health during adolescence and throughout the entire life course. The phenomenal growth that occurs in adolescence creates increased demands for energy and nutrients.

The need of nutrition education is to determine strategies to prevent the occurrence of under nutrition, anaemia and over nutrition among school going adolescents in order to increase their nutritional status and to enable them to grow into complete individuals, with mental as well as physical wellbeing. Adolescents are the future generation of any country. Their nutritional needs are critical not only for the wellbeing of a society, but their health has been neglected because they are considered to be less vulnerable to diseases compared to relatively young children or the old people. If the adolescents are well-nourished, they can make optimal use of their skills, talents and energies and would be healthy and responsible citizens (Priyadharshini*et al.*, 2011).

Keywords : Adolescents, Nutrition Education, Knowledge, Attitude and Practice

INTRODUCTION

Adolescence is the transition period between childhood and adulthood. It is an important stage of growth and development in the lifespan of human beings. Nutritional health during adolescence is important for supporting the growing body and for preventing future health problems (Cmade,2012)Adolescent nutritional problems are common throughout the country. They have adequate amount of food but make poor choices. They develop a series of nutritional problems like anaemia,under nutrition, obesity,vitamin A deficiency and iodine deficiency(Gupta *et al.*, 2009).Peer education method is a new technique in nutrition education wherein a group of children will be trained by nutrition experts, who in turn will teach their fellow mates. This method can be especially beneficial in adolescent girls because they are open minded and friendly in their age groups and as a result they can communicate more freely with their fellow mates. Another advantage of this method is that, one can reach a large group in a short period (Sarkar*et al.*, 2015).

In order to lead a healthy, responsible and fulfilling life and to protect them from health problems adolescence need to be knowledgeable about themselves and need adequate information about the physical, psychological changes that take place during puberty, menstruation, pregnancy and child birth. The need to address these problems through nutrition education has been recognized at various national and international forums. Though several options are available, creating awareness among adolescents appears to be an important tool and adolescent education programmes face many challenges.

Nutrition education in adolescence suggests components of promotion, prevention and treatment. Thus, promoting adequate nutrition by having a control over their food and food resources and improving their access to appropriate nutrition services in addition to strengthen food-related skills and encouraging healthy lifestyle (Sundarlal, 2007).Dietary knowledge and access to resources are critical to improve health and nutrition in a sustainable way.Adolescence is the time to learn and adopt healthy habits to avoid many health and nutritional problems later in life. Adolescents have more easy access to health and nutrition information through schools, recreational activities, and mass media than they have later in their lives. Particularly, health and nutrition knowledge and healthy habits of female adolescents will have critical roles to play in maintaining future family health and nutrition (Alam*et al.*, 2010).

NUTRITION EDUCATION

Nutrition education is the process. According to the individual needs and available food resources, knowledge, attitudes, and understanding about food lead to practices. It sounds scientifically correct practical and consistent.

SCHOOL GOING ADOLESCENT GIRLS

Adolescence is a unique point of the life cycle. It is a stage of new ideas and a point at which lifestyle choices may determine an individual's life course.In this study the school going adolescent girl's age group is between 12- 14 years.Hence the study entitled "Effect of Peer Group Nutrition Education Among School Going Adolescent Girls in Thoothukudi District".

OBJECTIVES :

- To impart nutrition education to the selected adolescent girls by the peer group.
- To assess the impact of nutrition education on the selected adolescent girls

METHODOLOGY

In an investigation, certain tools and techniques are adopted depending upon the type of research undertaken. Main tool for collection of the primary data was the questionnaire. In a questionnaire respondents read the questions interpret what is expected and then write down the answer. The questionnaire was framed with a clear thought to assess the nutrition knowledge and dietary practices of the adolescent girls before and after the nutrition education program. As surveys are the most popular means of obtaining the desired data, the selected adolescent girls were interviewed and information regarding their age, economic background, BMI, was obtained by the questionnaire.The investigator also examined the knowledge, practice, and attitude (KAP) on nutrition, nutritional deficiency and its symptoms. The data obtained was recorded.

NUTRITION EDUCATION

Nutrition education is an important strategy to combat many nutritional issues like underweight, anaemia, overweight and other disorders in adolescent girls, stressing the importance of nutrients and consumption of nutritious foods which are excellent sources of protein, iron and other micronutrients. Nutrition education has been described as the process, which assists the public in applying knowledge from the nutrition science and the relationship between diet and health to their practices (Canadan*et al.*,2010). Thus, nutrition education helps adolescentsto gain knowledge of nutrition and persuades to bring about required changes in their food habits.Nutrition education was conducted for a period of 10 months. A sample of 530 school going girls, were given nutrition education. The selected 530 respondents were grouped in two groups namely Experimental Group (265) and Control Group (265). Nutrition education was given to experimental group by seventy five peer educators called communicators.

SCORING OF KNOWLEDGE, ATTITUDE AND PRACTICE (KAP)

The nutritional KAP questionnaire was containing three parts (Knowledge, Attitude and Practice). A nutritional knowledge questions were designed to test the knowledge of nutrition. There were 15 questions, each with yes or no answer. The score was given 1 for correct answer and 0 for the wrong answer respectively. The adolescent girls can score minimum 0 marks and maximum 15 marks. Same method was followed for attitude and practice of nutrition. 1 to 15 for control group higher the score the better the adolescents girls nutrition education related, knowledge, attitude and practices.

The questions provided in an attitude section were designed to know the beliefs among the school going adolescent girls regarding nutrition. There were 15 questions provided and the adolescent girls were asked to indicate their attitudes. In the attitude section agree / disagree choice questions were assigned to them. The mark criterion for agree was 2 and for disagree was 1.

EFFECT OF NUTRITION EDUCATION

The impact of nutrition education was assessed on all the selected respondents in terms of anthropometric measurement, skin fold thickness, clinical examination bio-chemical, dietary survey and testing their Knowledge, Attitude and Practice (KAP).

RESULT AND DISCUSSION

Effect of nutrition education on nutritional knowledge of the respondents after the nutrition education

Table 1

Nutrition education on nutritional knowledge of the respondents

Knowledge	Before (n=265)				After (n=265)			
	Control		Experimental		Control		Experimental	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Do you know food pyramid?	145	55	152	57	148	56	265	100
Green leafy vegetables prevent anaemia.	130	49	145	55	142	54	265	100

Food rich in Carbohydrate are roots and tubers.	127	48	128	48	121	46	265	100
Food rich in protein are pulses and nuts.	113	43	110	42	118	45	265	100
Fruits & vegetables are vitamins and minerals.	99	37	142	54	128	48	265	100
Fiber content food are fruits, leafy vegetables.	99	37	88	33	98	37	265	100
Food advised to eat plenty of vitamin and minerals.	80	30	85	32	77	29	265	100
Skipping meals leads to underweight.	129	49	115	43	122	46	265	100
Underweight&anemia weakened immune system.	126	48	107	40	101	38	265	100
Drinking lots of water reduces weight loss.	101	38	96	36	110	42	265	100
Lack of nutrients leads to underweight.	95	36	115	43	96	36	265	100
Fast food consumptions leads overweight.	99	37	111	42	105	40	265	100
Snacks / bakery products exceeds metabolism.	118	45	107	40	118	45	265	100
Anemia leads to unhealthy skin, brittle hair.	104	39	100	38	100	38	265	100
Iron def- impaired cognitive functioning.	109	41	131	49	111	42	265	100

The table 1 reveals that the percentage score on knowledge level for control group remains same as there was no improvement among the respondents and the maximum score was fifty five per cent. Among the two groups after the nutrition education, the experimental group gained more knowledge to hundred per cent. The knowledge level of all the respondents in the experimental improved their involvement in peer group. The peer education plays an important role in their dietary habits.The result of the study reveals that the knowledge in the experimental group improved.

Barooah (2012) assessed the knowledge regarding nutrition and nutritional needs to maintain good health and also to gain an insight into food behaviour and practices among adolescents aged between 13-19 years. The results of the study revealed that the children of the target population have knowledge regarding nutrition but they are not well informed about nutritional needs.

Effect of nutrition education on nutritional attitude of the respondents after the Nutrition Education

Table 2

Nutrition education on nutritional attitude of the respondents

Attitude	Before (n=265)				After (n=265)			
	Control		Experimental		Control		Experimental	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Do you prefer to eat rice, pulses?	50	20	34	13	70	26	263	99
Do you prefer vegetables in your menu?	47	18	43	16	45	17	265	100
Do you take fruits to maintain your diet?	39	15	38	14	39	15	262	99
Do you take supplementary food?	48	18	55	21	48	18	265	100
Do you add more vegetables in the diet?	47	18	42	16	47	18	265	100
Do you prefer fried food often?	51	19	54	20	57	22	265	100
Do you have interest in doing physical activity?	37	14	36	14	44	17	265	100
Good eating habits maintain health	52	20	58	22	55	21	265	100
Improving nutrition knowledge is good for health	46	17	61	23	53	20	265	100
Skipping the breakfast is not good for health	51	19	52	20	57	22	265	100
Do you have confidence about nutrition education?	59	22	40	15	48	18	265	100
Three meals a day good for health	60	23	48	18	63	24	265	100
Eating disorder is not a concern for adolescent girls	49	19	47	17	52	20	265	100

Appropriate body weight is good health	47	18	40	15	46	17	265	100
Iron-rich diet reduces fatigue , improves learning	49	19	36	14	49	19	265	100

The table 2 reveals that after the education in the control group, the maximum percentage score was 26 per cent and respondents in the experimental group scored hundred per cent. The attitude of nutrition education was found to be effective to improve the level of nutrition education among the respondents. There was an increase in values in the experimental group due to impact of attitude. This positive impact of nutrition education was also found among the respondents.

The studies reveal that schools provide a social context in which children learn and develop, thus making schools a desirable environment for nutrition education promotion (Petrie *et al.*,2004).

Effect of nutrition education on nutritional practice of the respondents after the nutrition education

Table 3

Nutrition education on nutritional practice of the respondents

Practice	Before (n=265)				After (n=265)			
	Control		Experimental		Control		Experimental	
	No.	(%)	No.	(%)	No.	%)	No.	(%)
Do you prefer veg or non veg in daily meals?	152	58	152	57	153	58	265	100
Do you take leafy vegetables in your lunch?	139	53	133	50	149	56	263	99
Do you prefer all the fruits?	102	39	97	37	118	46	263	99
Do you eat morevegetables?	129	49	119	45	112	42	265	100
Do you drink plenty of water?	112	42	128	48	91	34	265	100
Do you do physical exercise in future?	120	45	128	48	111	42	263	99
Do you eat any supplementary food?	119	45	128	48	112	42	265	100
Do you prefer dairy products?	104	39	121	46	132	50	265	100
Do you have regular eating in future?	125	47	114	43	111	42	265	100
Do you skip your breakfast hereafter?	123	46	109	41	104	39	265	100
Do you prefer spicy food?	102	39	102	39	77	29	265	100
Do you take any soft drinks often?	89	34	104	39	95	36	265	100
Do you take junk food here after?	90	34	90	34	104	39	265	100
Do you prefer cooked or fried foods?	85	32	96	36	105	40	265	100
Do you teach nutrition education to the family?	122	46	129	49	109	41	265	100

The table 3 indicates that there was no improvement among the respondents in the control group. The improvement could be observed only in the experimental. The scoring was hundred per cent. This implies that nutrition education has brought about changes in their practices and makes the respondents tried to practise the knowledge in their day to day life. (Begum Raheena, 2002). Practices scores were helpful in assessingthe practice adopted on nutrition by school going adolescent girls in the presentstudy.Nutrition education helps to promote good health and well-being of the respondents. Improvement in the nutritional practices was found among the respondents belonging to experimental group.

CONCLUSION

The researcher pointed out that the selected adolescent girls were having basic ideas about nutrition but they were lacking in scientific concepts related to nutrition. It was also found that provision of nutrition education had a significant impact on nutritional knowledge, attitude and practice among the respondents which in turn will improve the nutritional status of the respondents.

Peers may have had more influence to their colleagues who may have developed more confidence in their teaching hence better performance in many aspects of the education is needed. After the education overweight of the adolescent girls in experimental group was decreased, underweight and anaemic girls increased in weight, as well as in their haemoglobin. The respondents in the control group who did not receive any nutrition education remained same. This implies that the nutrition educations were effective and were improving relationship between proper intake of nutrition and KAP. The findings of the nutrition education study leads to the conclusion that the food based approach using the KAP nutrition education

teaching strategies peer facilitated, could have some influence and hence an effective strategy to combat overweight, underweight and anaemia deficiency and promote good health and well-being of the adolescent girls. Emphasis should be laid on the importance of nutrition education among the adolescent girls. Hence, it is conclude from the present nutrition education is an important measure to improve dietary habits, nutrition knowledge, and food choices of the adolescent girls, as poor dietary habits and ignorance are the main reason for poor nutritional status of the adolescent girls. The lack of concentration which can interfere with learning and they have low energy.Future curriculum can focus on some or all of these areas for building a dietary component in childhood obesity prevention programs.Nutrition education could be effective tool to improve the nutrition knowledge.It would not only improve the health of adolescent girls, but future generation also, as adolescent girls are would be mothers.

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Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, Dec 2022

STUDY ON SOCIOECONOMIC STATUS AND SOURCE OF WATER IN THOOTHUKUDI DISTRICT

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Abstract:

The primary sources of drinking water are groundwater and surface water, in this direct noted association between poor water quality and infectious diarrhoea. The present study was carried out both in rural and urban areas of Thoothukudi district A large proportion of the stored water in houses was found to be contaminated and therefore promotion of household water treatment and safe storage combined with hygienic practices would be very useful in preventing waterborne diseases. microbiologically contaminated which is a cause for concern as many diseases such as Diarrhoea, cholera, typhoid etc. are caused by contaminated water.

Keywords : Diarrhoea, hygienic, diseases, water borne

Introduction

Water is the elixir of life, a precious gift of nature to mankind and millions of other species living on the earth. Tamil Nadu constitutes 4 percent of India's land area and is inhabited by 6 percent of India's population, but has only 2.5 percent of India's water resources (Amer 1995). More than 95 percent of the surface water and 80 percent of the ground water have already been put into use. Major uses of water include human/animal consumption, irrigation and industrial use. One of the primary differences between rural and urban housing is that much infrastructure that is often taken for granted by the urban resident and does not exist in the rural environment and the range from fire and police protection to drinking water and sewage disposal (Azeez 2000)

Water Sources In Rural And Urban Areas:

The primary sources of drinking water are groundwater and surface water. In addition, precipitation rain and snow can be collected and contained. The initial quality of the water depends on the source. Surface water such as lakes, reservoirs, streams, and rivers are the drinking water source for approximately 50% of our population, is generally of poor quality and requires extensive treatment. Groundwater, the source for the other approximately 50% of our population, is of better quality. it still may be contaminated by agricultural runoff or surface and subsurface disposal of liquid waste, including leach ate from solid waste landfills. Other sources, such as spring water and rain water, are of varying levels of quality, but each can be developed and treated to render it potable (Handa B.K 1975).

The researcher believes that increasing the awareness on water systems consist of a water source such as a well, public tap water lake , river some type of tank for storage, and a system of pipes for distribution. Means to treat the water to remove harmful bacteria or chemicals may also be required. The system can be as simple as a well, a pump, and a pressure tank to serve a single home.

It may be a complex system, with elaborate treatment processes, multiple storage tanks, and a large distribution system serving thousands of homes (Singaraja C et al 2012). Regardless of system size, the basic principles to assure the safety and potability of water are common to all systems. Large-scale water supply systems tend to rely on surface water resources, and smaller water systems tend to use groundwater.

Groundwater is pumped from wells drilled into aquifers. Aquifers are geologic formations where water pools, often deep in the ground (Magesh N.S et al 2011). Some aquifers are actually higher than the surrounding ground surface, which can result in flowing springs or artesian wells. Artesian wells are often drilled; once the aquifer is penetrated, the water flows onto the surface of the ground because of the hydrologic pressure from the aquifer. Thus the study entitled "Study on socioeconomic status and source of water in Thoothukudi District"

Methodology:

- Selection of study area
- Sampling methods
- Assessment of socioeconomic status of the selected samples
- Creating awareness on availability of clean water, and to improve sanitation and hygiene

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Selection Of Study Area

The present study was carried out both in rural and urban areas of Thoothukudi district of Tamil Nadu. Thoothukudi district is situated in the extreme south east of Tamil Nadu state and this district is divided into eight taluks (Administration unit within a district) as Thoothukudi, Tiruchendhur, Srivaikundam, Sathankulam, Kovilpatti, Ettayapuram, Vilathikulam, and Ottapaidaram. were selected for investigation.

The population of Thoothukudi district is a mix-up of people with high income low income, high development and poor economic growth. There are also illiterates and unemployed. People work as agriculturists, fishermen, domestic workers, and are engaged in business. Many also work as coolies in salt pans, small scale industries and factories (Mondal N.C. 2010).

Various water sources such as springs, wells, handpumps, water stored in reservoirs and in household storage system were studied - In this studies and outbreak investigations have found a direct association between poor water quality and infectious diseases (Selvam S et al 2012). Where it is not only water contaminated at the source or during distribution that is an issue, but also water stored within the home which may become contaminated. Awareness were provided to increase the availability of clean water, and to improve sanitation and hygiene.

Sampling Methods

Each area the samples were selected randomly sample, taken as close to the actual source itself mainly Public stand tap, well and handpump, microbiological contamination could occur at points of leakage at any stage in between the source and tap, as well as through careless storage/handling in the house (Srinivasamoorthy K. etal 2011) . From the selected 610 families only 410 were sleeted for the study.

Result And Discussion

1. **Depicts the type of families**

Table 1

Type of family	No.	Percent
Nuclear	313	76.3
Joint	97	23.7
Total	410	100.0

Table 1 shows the details of the type of family majority of the families i.e about 76.3 per cent were from nuclear families and about 23.7 per cent were from joint families.

2. **Details the size of the families**

Table 2

Family Size	No.	Percent
4 members	300	73.2
6 members	65	15.9
> 6 members	45	11.0
Total	410	100.0

Table 2 reveals that the majority of the family size i.e. about 73.2 per cent were in small size families. Medium size was about 15.9 per cent and 11.0 per cent lived in large size families.

3.Distribution of education of the fathers

Table 3

Education of the fathers	No.	Percent
Illiterate	111	27.1
Primary	179	43.7
Secondary	120	29.3
Total	410	100.0

Table 3 indicates the distribution according to the education of the fathers. Majority of the them i.e. 43.7 per cent were educated up to primary level and by one third of the father up to higher secondary level and 27.1 per cent of the fathers were illiterates.

4. Indicates the education of the mothers

Table 4

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Mothers' education	No.	Percent
Illiterate	120	29.3
Primary	158	38.5
Higher Secondary	122	29.8
Under graduate	10	2.4
Total	410	100.0

Table 4 gives a picture of the distribution according to the education of the mother. Majority of them were educated up to primary level. One third of them completed were up to higher secondary level and anther one third of the mothers were illiterate Negligible number of mothers were graduate.

5. Reveals the occupational status of the fathers

Table 5

Occupation of the fathers	No.	Percent
Daily wages	159	38.8
Agriculture	107	26.1
Fishing	72	17.6
Business/ Trade	23	5.6
Unemployed	49	12.0
Total	410	100.0

Table 5 explains the occupational status of the fathers. About 38.8 per cent were employed on daily wages. About 26.1 per cent of them practised agriculture. The occupation of 17.6 per cent was fishing; negligible per cent of them did business trade. Minimum per cent was unemployed.

6. Indicates the occupational status of the mothers

Table 6

Occupation of the mothers	No.	Percent
Daily wages	158	38.5
Agriculture	113	27.6
Teacher	12	2.9
House wife	127	31.0
Total	410	100.0

Table 6 shows the occupational status of the mothers. Majority of the mothers earned daily wages. About one fourth of them were house wives very negligible per cent of the mothers were teachers About 27.6 per cent were doing agriculture.

7. Depicts the monthly income of the families

Table 7

Monthly income of the families	No.	Percent
3000-5000 low	192	46.8
5000-10000 middle	189	46.1
>15000 high	29	7.1
Total	410	100.0

Table 7 explains the distribution monthly income. The income of majority of them was Rs 3000- 5000 per month, and middle income was Rs 5000- 10000 and a minimum were with high income of > 15000 per month.

8. Distribution for the source of drinking water

Table 8

Drinking Water	No.	Percent
Public Tap	269	65.6

Hand pump	88	21.5
Well	22	5.4
Spring	31	7.6
Total	410	100.0

Table 8. portrays the source of drinking water. From the table it is clear that majority of them were getting tap water. About 21.5 per cent were availing water from the hand pump. About 7.6 per cent and 5.4 per cent were getting drinking water, from the other sources like well water and spring water.

9. Explains the type of houses

Table 9

Type of Houses	No.	Percent
Hut	17	4.1
Tin - sheet	220	53.7
Asbestos roof	113	27.6
Terraced house	60	14.6
Total	410	100.0

Table 9 describe the distribution with regard of their type of houses. It is evident that most of them about 53.7 per cent were living in tin - sheet houses. One fourth of them were residing asbestos roof houses and 14.6 per cent were having with terraced houses and minimum per cent were staying in the huts.

10. Depicts the toilet facilities for the selected adolescent girls

Table 10

Toilet facilities	No.	Percent
Private	343	83.7
Common	67	16.3
Total	410	100.0

Table 10 represents the sources of toilets in the houses. Majority of the them had private toilet. Minimum per cent used common toilets.

Conclusion

The study was very useful in understanding socio economic and the water quality situation in the district physical and bacteriological parameters were studied. There is a need to promote household water treatment through boiling, filtration, solar disinfection of water, adding chlorine depending on the type of water and safe storage at the household level. In rural area majority of the people not getting regular water stored in the house 15 days. Compare to urban area microbiological contamination could occur at points of leakage at any stage in between the source and tap, as well as through careless storage, handling in the house.

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IMPACT OF SUPPLEMENTATION OFSEAWEED INCORPORATED NUTRITIONAL MIX ON UNDERNOURISHED SCHOOL GOING ANEMIC ADOLESCENT GIRLS (13-14YRS) THOOTHUKUDI

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ABSTRACT

Anemia is a major public health problem worldwide. Adolescent girls are the most vulnerable group of population due to different reasons. The aim of this study was to assess the prevalence of anemia and associated factors among school going adolescent girls. Anemia during adolescence is nutritional problem and it has irreversible negative effects on growth and cognitive, work performance and serious impact throughout the reproductive years of life and beyond. The impact of anemia among adolescent girls is still public health problem globally although there are specific actions like encouraging consumption of iron-rich foods through dietary change, nutritional education, supplementation of iron rich foods and improving iron status among adolescent girls in Thoothukudi. The various anthropometric measurements. Height, weight, BMI were commonly used and the same is adopted in the present study. Diet survey was conducted to find out the dietary intake of the selected samples using interveners' schedule. Biochemical assessment was carried out to analyses the blood picture of the selected sample to understand the nutritional status Chaudhuri, (2004).
Keywords : Seaweed, Supplementation, Anemic Adolescent Girls

INTRODUCTION

Iron deficiency and anemia are the most prevalent nutritional deficiencies in the world. The body uses iron to produce hemoglobin, a protein that transports oxygen from the lungs to other tissues in the body via the blood stream and anemia is defined as having a hemoglobin level below a specific level.Adolescence represents a window of opportunity to prepare for a healthy adult life. During adolescence, nutritional problems originating earlier in life can potentially be corrected in addition to addressing current ones. It is also a timely period to shape and consolidate healthy eating and lifestyle behaviors thereby preventing or postponing the onset of nutrition related chronic diseases coupled with under nutrition in adulthood.

For overcoming anemia, dietary modification is essential. We believe that Anemia can be prevented and controlled, when basic modifications in the diet are made by inclusion of foods that are rich in Iron and foods that will help in enhancing the absorption of Iron. Diet can play a major role in preventing nutritional Iron deficiency anemia.Taking into consideration the above facts nutritional supplementation with inclusion of cereals, pulses and seaweeds were formulated.

The prevalence of under nutrition and anemia among adolescent girls has been studied out in the southern parts of Tamilnadu and reportedto be very high. Thus the investigator was interested to formulate health mixes with cereals ,pulses ,nuts,jaggery and a novel ingredient the seaweed.Sea vegetables contain Folate, a nutrient that helps break down protein in the body and aids in the regeneration of red blood cells, seaweed is also a superior source of Vitamin - C, thiamin, riboflavin and niacin.Seaweedis also a superior source of calcium and iron (Soynyc, 2002).

Therefore, the investigator has formulated and developed health mixes by using the indigenous foods and seaweed and also interested to study its impact on the nutritional status of the selected group of population. The present study is therefore designed to introduce seaweeds that can be incorporated with the health mix. The seaweed contains vitamins and iron, because of which, seaweed products can act as a substitution of iron and protein sources to meet the challenges of malnutrition.

OBJECTIVES

- To formulate and develop health mixes
- To analyze the nutritive quality of the seaweed and the developed health mixes
- To standardize the developed health mixes.
- To study the shelf life of the developed health mixes
- To study the impact of supplementation of health mixes on the nutritional status of undernourished school going anemic adolescent girls.

METHODOLOGY

St. Charles Middle School at Polldenpuram in Thoothukudi(Tamilnadu) was selected for the study.A detailed interview schedule was developed by the investigator inorder to elicit information regarding the socioeconomic status and dietary pattern and also to get an insight in the relationship between economic and educational status of the parents and the health status of the selected childrenthe 36 samples were divided into 3 groups as Experimental - I, Experimental - II and Control, with 12 samples in each group. Each group consisted of samples suffering from severe, moderate and mild form of anemia. Experimental I was supplemented with health mix incorporated with seaweed, Experimental - II supplemented with health mix without seaweed, Control Group was not supplemented with the developed health mixElizabeth, Lestie (2007).

The various anthropometric measurements. Height, weight, BMI were commonly used and the same is adopted in the present study. Diet survey was conducted to find out the dietary intake of the selected samples using interveners' schedule.

Biochemical assessment was carried out to analyses the blood picture of the selected sample to understand the nutritional status. Blood Hemoglobin and Total iron binding capacity of the samples were analyzed. The Blood Hb was taken four times during the study period Total iron binding capacity was analyzed only on the 90the day of supplementation.

The selected 36 samples which were divided into three groups as E1, E2 and Control, with 12 samples in each group. The experimental group – I was supplemented with seaweed health mix, experimental group – II was supplemented with health mix without seaweed, control group with no health mix.

RESULTS AND DISCUSSION

Table 1: Body Mass Index of the Selected Person

General Characteristics	Range of BMI (Kg/m^2)	Control Group (N=12)		Experimental Group-I (N=12)		Experimental Group –II (N=12)	
		No	%	No	%	No	%
Initial Day	<18.5	11	91.5	10	83	10	83
	18.5-24.9	1	8.5	2	17	2	17
	>24	-	-	-	-	-	-
90^{th} Day	<18.5	11	91.5	4	33.5	8	83
	18.5-24.9	1	8.5	8	66.5	4	17
	>24	-	-	-	-	-	-

The table 1 depicts that about 83 percent, 17 percent of samples in the Experimental I (E1) and II had BMI range of <18.5 and 18.5 - 24.9 respectively, on the initial day of supplementation. On the 90th day of supplementation the BMI of the samples under Experimental I (E1) had improved. It increased from 33.5 percent to 66.5 percent under the range of 18.5 - 24.9. Indicating the samples had improved their body composition and shifted from underweight to normal weight. Thus it is clear that supplementation of healthmix incorporated with seaweed helps to improve the physical dimension of the body.

BMI is calculated for adolescent, the criteria used to interpret the meaning of the BMI (Grummer, 2002). Figure 6 shows the BMI of the selected samples.

Table 2: Biochemical Assessment of the Selected Samples

General Characteristics	Hemoglobin Range g/dl	Control Group (N=12)		Experimental Group-I (N=12)		Experimental Group – II (N=12)	
		No	%	No	%	No	%
Initial Day	<7	8	66	11	91.5	4	33.5
	7-9	2	17	1	8.5	8	66.5
	9-12	2	17	-	-	-	-
	>12	-	-	-	-	-	-
30th Day	<7	8	66	4	33.5	7	33.5
	7-9	2	17	8	66.5	8	66.5
	9-12	2	17	-	-	-	-
	>12	-	-	-	-	-	-
60th Day	<7	8	66	-	-	-	-
	7-9	2	17	-	-	5	41.5
	9-12	2	17	11	91.5	7	58.5
	>12	-	-	1	8.5	-	-
90th Day	<7	8	66	-	-	-	-
	7-9	3	22.5	-	-	3	25
	9-12	1	8.5	9	75	8	66.5
	>12	-	-	3	25	1	8.5

Table 2 Indicates the Hemoglobin profile of the selected samples during the 90 day period of supplementation.It is seen from the table that the Haemoglobin levels were recorded for the initial, 30th, 60th and 90th day of supplementation and it is found that all the three groups had samples under severe, mild and moderate degrees of anemia.

On the initial day of supplementation, the number of samples under severe anemia <7 was 8,11 and 4 under control, Experimental I (E1) and Experimental II (E2) groups respectively. It was found that on the 30th day of supplementation the number of samples under this severe anemia was reduced to 4 against the 11 that was on the initial day and to 11 in this group on the 60th and 9 on the 90th day of supplementation and it is also seen that the selected 9 samples under this group were found to have Hb level below 9-12gm indicating that they are suffering from moderate anemia and 3 samples had >12gm of Hb on the 90th day of supplementation.

Where as in the control and Experimental II (E2) there was not much change in the Hb profile. On the Initial day there were 8 and 4 under severe anemia and the same number was seen on the 90th day of supplementation under Control group but there was a little change in the Experimental II (E2), where there were 1 sample with Hb level >12 against none in the initial, 30th and final day of supplementation.

Table 3: Comparison of Hemoglobin and Total Iron Binding Capacity of the Selected Samples

Particulars	TIBC Values						Reference Range (ug/dl)
	Control Group (N=12)		Experimental Group I (N=12)		Experimental Group II (N=12		
	g/dl	Ug/dl	g/dl	Ug/dl	g/dl	Ug/dl	
90th Day of supplementation	6.7	480	11.6	429	10.8	324	228-450
	6.8	470	12.0	430	9.2	383	
	7.0	472	12.0	435	10.0	380	
	6.8	450	11.8	430	9.9	254	
	7.7	222	12.0	422	9.8	393	
	7.6	410	12.2	432	12.0	376	
	8.0	236	11.8	436	9.7	338	
	8.2	300	12.0	430	8.8	330	

	6.8	456	12.8	440	10.0	320	
	6.0	485	11.6	398	9.8	360	
	5.8	486	12.0	415	8.5	323	
	6.0	468	12.4	426	8.4	146	

The comparison of Haemoglobin levels and Total iron binding capacity on the 90th day of supplementation reveals that the control group the Hb levels are low and Total iron binding capacity concentration are very high, leading to a definite conclusion that these children are suffering from Iron deficiency anemia.Where as in Experimental group I (E1) the Haemoglobin level is moderate to is normal from 11.6 - 12.4gm/dl and Total iron binding capacity count is also with in normal limits of 228 – 450µg/dl.

In Experimental group II 50 per cent of the samples had an increase in Hb level after the 90th day of supplementation, except for few samples the Total iron binding capacity was also found to be with in the normal limits but the impact was not as much as seen in group I supplemented with healthmix with seaweed.

CONCLUSION

It may be concluded from the study that seaweeds are rich in nutrients like protein, calcium and iron. The consumption of seaweed with other major ingredients helps to improve that nutritional status of undernourished children suffering with nutritional deficiencies. The present study concludes that the samples have gained weight on consuming the nutritional mix incorporated with seaweed. Seaweed consumption can improve nutrition which will lead to better health. So we should promote the consumption of seaweeds among malnourished women and children. Thus supplementation with seaweed incorporated healthmix can be recommended for iron deficiency anemia.

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IMPROVING THE NUTRITIONAL STATUS OF UNDERNOURISHED SCHOOL GOING ANEMIC ADOLESCENT GIRLS (11-14YRS) THOOTHUKUDI

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ABSTRACT

Adolescence is a critical period of growth and development as it is transition between childhood and adulthood. Health and nutrition of the girls affect the health and survival of future generation. The nutritional status of adolescents, particularly from Thoothukudi District. The present study was undertaken to study the nutritional status of undernourished school going Anemic adolescent girls (11-14yrs).

Keywords: Adolescence, Nutritional status, Undernourished

INTRODUCTION

The World - Health Organization (WHO) estimated that 852 million people worldwide were undernourished in 2000-2002. This includes 815million in developing countries, 28 million in the countries in transition and 9 million in the industrialized countries. Hunger and malnutrition inflict heavy costs on individuals, house holds, communities and nations. Undernourishment and stunting frequently overlap with vitamin and mineral deficiencies and significantly increase the risk of death and severe illness. These micronutrient deficiencies can cause irreversible cognitive damage in children and reduced productivity in adults (Chaudhuri, 2004).

Iron deficiency and anemia are the most prevalent nutritional deficiencies in the world. The body uses iron to produce hemoglobin, a protein that transports oxygen from the lungs to other tissues in the body via the blood stream and anemia is defined as having a hemoglobin level below a specific level. (Elizabeth, Leslie, 2007). For overcoming anemia, dietary modification is essential. We believe that Anemia can be prevented and controlled, when basic modifications in the diet are made by inclusion of foods that are rich in Iron and foods that will help in enhancing the absorption of Iron. Diet can play a major role in preventing nutritional Iron deficiency anemia.

Taking into consideration the above facts nutritional supplementation with inclusion of cereals, pulses and seaweeds were formulated. The prevalence of under nutrition and anemia among adolescent girls has been studied out in the southern parts of Tamilnadu and reported to be very high. Thus the investigator was interested to formulate health mixes with cereals ,pulses ,nuts, jaggery and a novel ingredient the seaweed.

The present study is therefore designed to introduce seaweeds that can be incorporated with the health mix. The seaweed contains vitamins and iron, because of which, seaweed products can act as a substitution of iron and protein sources to meet the challenges of malnutrition.

OBJECTIVES

- To select undernourished school going anemic adolescent girls (11-14 years)
- To understand the nutritional status of the selected samples.

METHODOLOGY

St. Charles Middle School at Polldenpuram in Thoothukudi (Tamilnadu) was selected for the study. The investigator selected 36 school going undernourished anemic adolescent girls in the age group of 11 - 14 years using purposive sampling method.

A detailed interview schedule was developed by the investigator in order to elicit information regarding the socioeconomic status and dietary pattern and also to get an insight in the relationship between economic and educational status of the parents and the health status of the selected children the 36 samples were divided into 3 groups as Experimental - I, Experimental - II and Control, with 12 samples in each group. Each group consisted of samples suffering from severe, moderate and mild form of anemia. Experimental I was supplemented with health mix incorporated with seaweed, Experimental - II supplemented with health mix without seaweed, Control Group was not supplemented with the developed health mix.

The various anthropometric measurements. Height, weight, BMI were commonly used and the same is adopted in the present study. Diet survey was conducted to find out the dietary intake of the selected samples using interveners' schedule.

RESULTS AND DISCUSSION

Table 1: Occupational Status of the Families of the Selected Samples

S. No	Occupation of the family (N=36)	Control Group N=12 %		Experimental Group I N=12 %		Experimental Group II N=12 %	
1.	Fishing	5	42	6	50	8	66
2.	Code	4	33	4	33	2	17
3.	Domestic Work	3	25	2	17	2	17

The occupational status of the samples of the parents are given in the table it is seen that 42 per cent, 50 percent and 66 percent were involved in fishing in control group, Experimental I (E1) and Experimental II (E2) respectively. About 33 percent, 33 percent and 17 percent were coolie in control group, Experimental I (E1) and Experimental II (E2) respectively

Table 2: Annual Income of the Families of the Selected Samples

S. No	Annual Income of the Family (in Rs) (N=36)	Control Group N=12 %		Experimental Group I N=12 %		Experimental Group II N=12 %	
1.	20,000-30,001	5	42	4	33	8	66.5

2.	30,001-40,001	4	33	6	50	3	25
3.	40,001-50,000	3	25	2	17	1	8.5

The analysis of annual income level of the families of the selected samples could be seen in table 2 . The average annual income of the families ranged from Rs. 20,000 - Rs. 50,000, about 42 per cent, 33 percent, 66.5 percent it ranged from Rs. 20,000 - Rs. 30,001 in control group, Experimental I (E1) and Experimental II (E2) respectively. About 30 percent, 50 percent, 25 percent it ranged from Rs. 30,001 - 40,001 in control group, Experimental I (E1) and Experimental II (E2) respectively. About 25 percent, 17 percent and 8.5 percent it ranged from Rs. 40,001 - 50,000 in control group, Experimental I (E1) and Experimental II (E2) respectively. It was observed that majority of the families received low income.

Table 3: Nutrient Intake of the Selected Samples

Nutrients	RDA	Control (N=12)		Experimental – I (N=12)		Experimental –II (N=12)	
		Mean Per day	Percent of RDA Deficit/ Excess	Mean Per day	Percent of RDA Deficit/ Excess	Mean Per day	Percent of RDA Deficit/ Excess
Energy (kcal)	2060	1265.37	-38.57	1823.16	-10.49	1600	-46.0
Protein (g)	65	64	-1.53	58	-10.76	50.72	-21.96
Calcium (mg)	600	400	-33.33	500.00	-75	550	-8.30
Iron (mg)	28	24.00	-14.28	26.00	-7.14	26.65	-4.82
Ascorbic Acid (mg)	40	52.00	30.00	44.00	10.00	86.00	-10.00
Folic Acid (mg)	100	90	-10.00	80	-20.00	110	+10.50

Nutrient intake of the samples are given in table 3 which shows that intakes of most of the nutrients was found to be lower than the recommended dietary allowances (RDA). The nutrient intake of the control group was found to be less than the RDA. The energy (-38.57%) Protein (-1.53 percent) Calcium (-33.33 percent) Iron (-14.28) Folic acids (90mg percent) were deficit from that of the RDA, only the intake of ascorbic acid was found to be 30% more than RDA. It is clear from the table that the nutrient intake of the Experimental II group is also deficit in energy (-10.49%), protein (-10.76%), calcium (-75%), Iron (-7.14%) and folic acid (-20%) except for ascorbic acid which is excess of RDA by +10%. The nutrient intake of the Experimental II group was also found to be deficit in all the nutrients. Thus from the study it is clear that nutrient intake by the samples were grossly inadequate in terms of energy, protein, calcium, iron, and folic acid in control group, Experimental I and II group respectively. Where as only intake of ascorbic acid was in excess of the RDA. This may be attributed to the intake of lime, tomatoes and fruits like amla, bear, pineapple etc., which is sold near the schools.

The intake of energy, protein and iron was similar to the observation of (NNMS 2002) Which states that the intake of all the nutrients was found to be low among the young adolescent, in developing countries which becomes a leading cause to under nutrition and micronutri and deficiencies.

Summary and Conclusion

The Study nutritional status of undernourished school going anemic adolescent girls (11 - 14 years) in Thoothukudi District, was undertaken to study the nutritional status. The mal nutrition in school children is a major cause of concern in developing countries and nutritional adequacy is one of the key elements throughout the lifecycle. Due to inadequate intake of nutrients in diet like energy, protein, vitamin, Iron, calcium, etc., various deficiency disorders occur.

It may be concluded that seaweeds are rich in nutrients like protein, calcium and iron. The consumption of seaweed with other major ingredients helps to improve that nutritional status of undernourished children suffering with nutritional deficiencies. The present study concludes that. Seaweed consumption can improve nutrition which will lead to better health. So we should promote the consumption of seaweeds among malnourished women and children. Thus the seaweed incorporated health mix can be recommended for iron deficiency anemia.

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DEVELOPMENT OF BOVINE COLOSTRUM POWDER FOR AUTISM CHILDREN IN THOOTHUKUDI

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ABSTRACT

The study aimed to develop Bovine Colostrum Milk powder for autism children to improve their immunity. Autism is a complex and clinically heterogeneous disorder with a spectrum of symptoms. Although autism affects primarily brain function (especially affect, social functioning, and cognition), it is unknown to what extent other organs and systems are disrupted. Bovine colostrum is a milky fluid that comes from the breasts of cows the first few days after giving birth, before true milk appears. It contains proteins, calcium, vitamins and minerals. Antibody levels in bovine colostrum can be 100 times higher than levels in regular cow's milk. Since the bovine colostrum is also loaded with nutrients that promote growth, it boosts immunity, treats infections and offer more benefits for humans especially for autism children. The sample is prepared by boiling the Bovine Colostrum milk and drying it at sunlight for 5-6 hours. The dried sample is then made into fine powder, it is then added with sugar powder, cocoa powder and cardamom powder to enhance the flavor. The sensory evaluation was done using a 5 point hedonic scale with the help of seven experts and the results were computed accordingly. The microbial analysis was carried out and absence of fungi, yeast and moulds were noted. The Nutritive analysis was carried out for calories, carbohydrates, protein, calcium, iron, zinc and fat. These nutrients are present in high amounts whereas microbial count of yeast and moulds were absent. Bovine Colostrum powder was popularized to the autism children's parents at Thoothukudi.

Keywords : Bovine colostrum Powder, Probiotics, Autism children

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INTRODUCTION

Autism is a complex and clinically heterogeneous disorder with a spectrum of symptoms. Although autism affects primarily brain function (especially affect, social functioning, and cognition), it is unknown to what extent other organs and systems are disrupted. (Kercood, 2014)

Brain specimens from autism children exhibit signs of active, ongoing inflammation, as well as alterations in gene pathways associated with immune signaling and immune function. Autism may in fact be a systemic disorder with connections to abnormal immune responses. Such immune system dysfunction may represent novel targets for treatment. A better understanding of the involvement of the immune response in autism, and early brain development is altered, may have important therapeutic implications.(Milo Carega, 2010), The probiotics play an essential role in boosting the immunity by destroying the harmful microbes in humans. (Fijan, 2019) Probiotics also enhance immunity beyond the GI tract through interactions with the common mucosal immune system (CMIS).

The probiotic obtained from bovine colostrum is rich in macro and micro nutrients as well as antibodies like immunoglobins which fight against antigens. Since the bovine colostrum is also loaded with nutrients that promote growth, it boosts immunity, treats infections and offer more benefits for humans especially for autism children. (Dzik 2017)

Bovine colostrum is a milky fluid that comes from the breasts of cows the first few days after giving birth, before true milk appears. It contains proteins, calcium, vitamins and minerals. Antibody levels in bovine colostrum can be 100 times higher than levels in regular cow's milk.

Hence the development of probiotic foods using bovine colostrum will improve the health of autism children. As autism is a serious developmental disorder that impairs the ability to communicate and interact. The impairment is mainly due to decreased immune level and other nutrients, thus the investigator designed the study on “The Development of Probiotic Foods using Bovine Colostrum Powder for Autism children in Thoothukudi”. The following objectives are carried out.

OBJECTIVES:

- To develop and formulate the Bovine Colostrum powder.
- To find out the keeping quality of developed Bovine Colostrum powder.

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- To analyze the nutrients in developed Bovine Colostrum powder.
- To analyze the microbial content of the Bovine Colostrum powder.
- To popularize and provide the product to the autism children.

METHODOLOGY

The raw material Bovine Colostrum milk was collected from Kootampuli Dairy farm, in Thoothukudi district. It was kept in a clean vessel to boil at 100.5^{o}C. Vanilla essence was added to enhance the flavour and the milk curls were removed separately, kept in direct sunlight for drying. The dried bovine colostrum was blended in a mixer, along with cardamom which enriches the aroma. Cocoa powder was added to develop chocolate flavor. For the above prepared samples (S_A, S_B, S_C) were evaluated by five panel members for sensory characteristics using 5- hedonic ranking scale ranging from ‘’like to dislike ”. The developed Bovine Colostrum Powder was subjected to nutrient analysis. The energy (calories), carbohydrates, protein, calcium, iron, zinc and fat were determined using protocols antibody levels in bovine colostrum can be 100 times higher than levels in regular cow's milk. The prepared probiotic powder was analyzed for microbial estimation using the standard methods at the interval of 15 to 30 days. Bacteria such as *E,coli* and *Salmonella typhi* were analyzed.Total Plate Count (TPC), including yeast and mold count were analyzed. The developed powered was distributed to the autism children at the age of 8-15 years.

Result and Discussion

Organoleptic evaluation of the Bovine Colostrum powder

Table 1

Score card of the Bovine Colostrum Powder

Samples	Appearance/ Colour (%)	Taste / Flavour (%)	Smell/ Odour (%)	Texture/ Mouth feel (%)	Overall acceptability (%)
Sample-I	90	80	79	85	82
Sample-II	95	90	85	89	90
Sample-III	96	95	90	96	96

Table 1 described that sample III(100g Bovine Colostrum milk powder and 15g Cocoa powder) got the highest score about 96 percent sample III was highly accepted than sample I and

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Sample II. The scores were observed by the appearance, taste, smell, texture and overall acceptability. The Sample- II had a better acceptability score about 95 percent appearance, 90 percent taste, 85 percent smell and 89 percent texture. The sensory characteristics of Bovine Colostrum Milk powder were studied by organoleptic evaluation. It revealed that the Bovine Colostrum milk powder was highly accepted by the panel members.

Shelf life study of the Bovine Colostrum powder

Table 2 explained that Bovine Colostrum powder Sample-I was not changed in the appearance, taste, flavor, smell and texture in 15th day. In 30th day. In 45th day the appearance was slightly changed sample II there was no changes was observed and till 30th day. The colour was not changed in the 30th day, but there was slight change in the colour in 45th day. Sample III there was no change in the appearance, taste, flavor, smell and texture in 15th day to 30th day only there was slight change in colour 45th day.

Microbial analysis of the Bovine Colostrum powder

The prepared Bovine Colostrum powder was stored in container at room temperature for a period of 45 days and the microbial analysis was done during initial 15 days, 30 days, and 45 days of storage. The packaging was placed visible and catalysis role in a modern economy and development of product according to the consumer preferences. It enables to preserve the quality and increases the shelf life of the Bovine Colostrum powder.

The developed Bovine Colostrum powder was analysed for microbial testing. On the initial day there was no change. In the 45th day of storage it was revealed that microbial content of the powder increased shelf life storage in container. It was understood that the growth of the bacteria is less when the Bovine Colostrum Milk powder was tightly closed in air tight container. No yeast and fungus was observed.

Table 2

Microbial analysis of the Bovine Colostrum powder

Parameter	Bovine Colostrum powder (Sample-I)
	Total count
Bacterial count	25cfu/gm
Fungal count	Absent
Yeast and Mould	Absent

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Table 2 shows that the bacterial count in Bovine Colostrum powder was contained within the standard limits of 25cfu/gm. Fungi was not seen in the Bovine Colostrum milk powder. The yeast and moulds were absent in the sample. The absence of fungi, yeast and moulds in the sample increases the shelf life of the sample.

Nutrient analysis of the Bovine Colostrum powder

Table 3

Nutrient analysis of the Bovine Colostrum powder

Nutrients	Nutritive value
Calories	441 kcal
Carbohydrates	63.8gm
Protein	19.5gm
Iron	11.3gm
Calcium	357mg
Zinc	15.6gm
Fat	12gm

Table 3 reveals that the Bovine Colostrum powder contains about 441kcal of Calories, 63.8g of Carbohydrates, 19.5g of Protein, 11.3g of Iron, 357mg of Calcium, 15.6g of Zinc and 12g of Fat. It was revealed that the sample was rich in calcium, calories and zinc.

Popularization of the Bovine Colostrum Powder

The developed Probiotic Bovine Colostrum Powder was popularized among the autistic children and parents in Alangarthitu. The acceptability of the powder was analyzed through demonstrations. The investigator created awareness about the immunity and nutritional importance of Bovine Colostrum Milk Powder among the parents and children. Pamphlet was distributed to the parents.

CONCLUSION

This study was highlights the essential role of Bovine Colostrum powder in boosting immunity for autism children. Autism children suffer from various immune disorders, the probiotic Bovine Colostrum powder has vast nutritive value. This study has confirmed the acceptability of Bovine Colostrum powder which was found to be convenient, nutritive and appealing to the respondents.

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There were several methods for producing Bovine Colostrum powder. Comparing new drying technologies with existing methods and their effect on bio active components of produced product would be an important subject for future research. Also, further studies, especially clinical trials are needed to be considered in order to confirm the health benefits of the Bovine Colostrum powder.

The vast amount of nutrients found in the Bovine Colostrum powder could be even consumed by persons recovering from illness to increase their immune health. The amount of calcium was found in satisfactory amount, which could reduce the problems of calcium deficiency in women. Protein deficiency also be treated by consuming Bovine Colostrum powder.

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STUDY ON PIRANDAI POWDER FOR MARGIN LIST WOMEN WITH OSTEOPOROSIS IN TIRUNELVELI DISTRICT

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ABSTRACT

In modern era non-communicable diseases are rapidly increasing in developing countries including India**. (Aquigley Maria, *et al.,* 2006).** Osteoporosis, a silent epidemic has become a major health hazard in recent years, afflicting over 2000 million of people worldwide.**(Svedbom, *et al.,* 2013)** Osteoporosis is one of the most widespread metabolic bone disorders, affecting one in three women and one in twelve men at some point in their lives. **(Meryl, *et al.,* 1997)**

Pirandai powder with high calcium and fibre content which helps to increase the serum calcium level and to reduce body weight. This was decided to distribute to the selected respondents. Pirandai powder also gave quicker healing of broken bones. The nutritional status of the osteoporotic women was assessed by investigating the anthropometric measurements of the respondence and the dietary pattern using food- frequency method. The shelf life of the pirandai powder was tested once in three day up to 30 days. Microbial and nutrient analysis were carried out for the studies.

Key words : Osteoporosis, Socioeconomic status, nutritional status , Pirandai Powder

INTRODUCTION

The osteoporosis is a deficiency of certain hormones, as androgen in men and estrogen in women. Menopause is a foremost factor that cause lower estrogen levels and increase women's risk for osteoporosis. Risk factors for osteoporosis include genetics trouble, absence of exercise, deficiency of calcium and vitamin D, malabsorption, high-dose oral corticosteroids, low body mass, smoking, alcohol intake, rheumatoid arthritis, and family history of osteoporosis. **(Malay, *et al.,* 2015)**

Osteoporosis is a bone disease which characterized by low bone mass as result of body

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loses too much bone and makes too little bone. This leads to increased bone fragility so increased susceptibility to fracture, especially in the hip, spine, wrist and shoulder.

Keeping in mind, pirandai is used as a herbal support for treating hypocalcaemia in osteoporosis women. The Pirandai, contain a various Ayurvedic formulations and medicinal properties of *C. quadrangularis* include antimicrobial activity, analgesic, anti-inflammatory activity, bone healing, weight loss, anti-diabetic, digestive disorders treatment etc. This plant also possesses antioxidant as well as anticancer activity **(Arshad et *al.,* 2016).**

Pirandai treats all digestion related problems like gastritis, indigestion and lack of appetite. Pirandai is very good for treating sprains and swollen joints. It is also one home remedy in the village use often for minor injuries, as it heals the minor sprains and fractures very fast.

P. longum (Thippili) is a medicinal herb commonly used in traditional medicine and has a distinct odor and a pungent bitter taste. It is known as a remedy against gonorrhea, menstrual pain, viral hepatitis, tuberculosis, chronic malaria, sleeping problems, chronic bronchitis, asthma, chronic gut-related pain paralysis of the tongue, diseases of the spleen, cough, tumors and arthritis. The investigator believes that focusing on the needy osteoporosis women in Tirunelveli and to provide awareness and distribute to them. Hence the study entitled on “Pirandai powder for margin list women with osteoporosis in Thirunelveli District”.

OBJECTIVES

- To select the women with osteoporosis in the selected area.
- To study the socio economic status of the selected osteoporosis respondents.
- To assess the nutritional status and dietary pattern of the osteoporosis respondents.
- To prepare and supplement the pirandai powder.

METHODOLOGY

The nutritional status of the osteoporosis women was assessed by socio economic status, anthropometric measurements and the dietary pattern using food- frequency method. About 40 osteoporosis respondence were randomly selected for the study. The investigator chosen the Pirandai and formulated with dryginger, pepper and thipilli were raw ingredients taken for the studies.

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The shelf life of the pirandai powder was tested once in three days up to 30 days. Microbial analysis was carried out by total place count and the nutrients content were analyzed for the prepared pirandai powder the pirandai powered was popularized and suggested to the osteoporosis women.

RESULT AND DISCUSSION

Size of the Families of the Respondents

Table - 1

Size of the Families of the Respondents

Family Size	Experimental Group (%)	Control Group (%)
<4	35	60
4-6	45	35
>6	20	5
Total	**100**	**100**

The table 1 describes that 35% and 60% of the selected respondents had < 4 family members in both groups. The experimental and control groups about 45% and 35 % had 4-6 family members. And about 20% and 5 % had >6 family members in both the groups respectively.

Educational Status of the selected respondents

Table 2

Educational status of the selected respondents

Educational Status	Experimental Group (%)	Control Group (%)
Illiterate	30	25
School	35	30
U.G	25	30
P.G	10	15
Total	100	100

Table 2 said that in experimental group, 30% of the respondents were illiterate. 35%, 25% and 10% were up to school level, under graduates and post graduates respectively. And in control group, 25% of the respondents were illiterate, 30%, were under school level and under graduates only 15% respondence were post graduates respectively.

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Occupational Status of the selected respondents

Table 3

Occupational Status of the Selected Respondents

Occupational Status	Experimental Group (%)	Control Group (%)
Business	35	45
Teaching	15	10
Professional	5	5
Others	45	45
Total	100	100

The table 3 depicts that the details of occupation of the selected respondents. About 35%, 15%, 5%, 45% of the respondents in experimental group were in business, teaching, professionals and in other employments respectively. While in control group 45%, 10%, 5% and 45% of the respondents were in business, teaching, professionals and in other employments respectively.

Income Status of the Families of the respondents

Table 4

Income status of the families of the Respondents

Total Family Income	Experimental Group (%)	Control Group (%)
Below Rs10,000	40	40
Rs 10,000-15,000	45	60
Rs 15,000-20,000	15	-
Total	100	100

The table 4 explained that about 40% families of the respondents had income about below Rs.10,000, 45% of them had in between Rs.10,000 – 15,000 and 15% of them had in between Rs.15,000 – 20,000 in experimental group. While in control group, about 40% families of the respondents had income below Rs. 10,000 and 60% of them had in between Rs.10,000 – 15,000 respectively. The study observed that majority of the respondents were low income groups.

Food Frequency of the selected respondents

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Table 5

Frequency of Food Intake of the selected respondents

Food frequency intake of various foods of the respondents

Food Groups	Percentage Frequency of food intake(n=40)				
	Daily	Weekly	Fortnightly	Occasionally	Never
Cereals and millets	100	-	-	-	-
Pulses and legumes	14	32	32	22	-
Green leafy vegetables	0	17	22	34	27
Roots and tubers	29	38	30	-	3
Other vegetables	24	26	26	20	4
Fruits	-	30	27	43	-
Milk and milk products	27	40	33	-	-
Fats and oils	86	14	-	-	-
Sugar and jaggery	100	-	-	-	-
Flesh foods	0	48	47	5	-
Junk/ Fast foods	55	45	-	-	-
Carbonated beverages	68	32	-	-	-
Chocolates and baked sweets	79	21	-	-	-

From the table 5 observed that all the respondents were consumed daily cereals, nuts and oils milk & milk, sugar and sugar products. The majority of the respondents consumed once in a week

Majority of the respondents take green leafy vegetables once in a week or once in a month. But mostly other vegetables were consumed daily by the respondents. In case of roots and tubers, the consumption of the respondence were noted very high.

It was observed that all the respondence, were consumed nuts and oils daily. The intake of Fruits, was observed that rarely and once in a week.

The intake of non veg majority of the respondence of the respondents consumed once in a week. Milk was daily consumed by all the respondents. While other products like butter was occasionally taken. Sugar is daily consumed by all the respondents than jiggery. It was concluded that majority of the patients preferred vegetables than non-vegetarian.

CONCLUSION

As a conclusion, a serious concern should be taken on Osteoporosis. Because of the dormant properties of the disease, it is hard to recognize the symptoms until fracture occurs.

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Several studies have shown that androgen deficiency can lead to osteoporotic fractures. Therefore, various treatments should be considered to promote the healing period of the fracture. Natural products could be considered as a natural heritage from mother nature as a source of medicine. Thus, more extensive studies should be conducted to explore the healing properties of different types of medicinal plants to produce an alternative and effective treatment for the osteoporotic patient.

A group of osteoporosis sufferers aged between 40 to 70 were encouraged to take gentle exercise on a regular basis, consisting of either brisk walking or low impact gymnastics. The scientists then kept track of bone density in their spines. The results suggested that while exercise did indeed help to maintain bone density, this quickly declined once exercise ceased. The experts concluded that continued exercise over a long period of time is required to maintain bone mass.

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Soft Computing
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APPLICATION OF SOFT COMPUTING

Deep neural network with reduced feature for classification of breast cancer mammogram

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Abstract
Breast disease is the prevalent malignant growth in female all over the world and it is expanding in non-industrial nations, where most cases are analysed late. Mammography remains the best symptomatic advance from a treatment standpoint, despite widespread use and investigation of these images. The objective of this paper is to predict and classify the breast cancer using deep learning techniques. The extensive experiments are conducted on Wisconsin Demonstrative Bosom malignant growth (WDBC) dataset extricated from digitized pictures of Random MRI. Deep learning techniques such as deep neural network (DNN), recurrent neural network (RNN) and local linear radial basis function neural network (LLRBFNN) are used for experimental investigation. The performance of the proposed approach is experimented through various metrics such as accuracy, Jaccard index, precision, recall and F1 score.

Keywords Breast cancer classification · Mammography · Malignant · Deep neural network (DNN) · Recurrent neural network (RNN) · Local linear radial basis function neural network (LLRBFNN) · Segmentation

1 Introduction

Cancer is a main source of the unexpected passing in the overall, which is assessed as 2.09 million passing's of individuals for every year in 2018 (Witten et al. 2011; Tsiligaridis 2013). Mammography is one of the most effective contemporary methods for detecting malignant development in the breast. It has been estimated that it can lower mortality by as much as 30%. Mammography has a false negative rate ranging from 10 to 30% and a false positive rate of 10%. Mammography might detect more than 90% of malignant growth in the breast. The purpose of

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the screening mammography is to detect the harmful tumour early and eliminate it before it spreads. Different elements influence exactness of mammography is bosom thickness, radiologist experience and body habitués. Nonetheless, the essential finishes paperwork for bosom malignant growth testing isolated variations from the norm scene because of differentiation bosom tissue. Due to differences, bosom tissue mammograms have been confined to women under the age of 40 and pregnant women who conceal a tumour. There are a few strategies offered in the writing for detecting and classifying the breast illness. Be that as it may, obviously discovery and characterization of the bosom malignancy there are incredible test. Persuaded by this, the advancement of new calculations for neighbourhood direct outspread premise practical neural system technique is significant for clear recognizable proof to generous and threatening bosom malignant growth identification. This paper used various deep learning techniques, ultrasound and blood investigation to gather data from 10 different bosom malignant growths images. A bosom mass is generally imperceptible by mammography (Costaridou 2011).

Multi-model expectation utilizes a hereditary calculation-based weighted averaging technique that incorporates hybrids and transformations. Ultrasound elements of bosom mass (Thulin 2007) composed by a proposed framework observed that specialists know and have experience that bosom disease happens when certain bosom cells start to develop strangely. These cells partition and scatter quicker than sound cells and keep on developing, framing a protuberance or lump that can begin to cause torment. The cells can immediately spread through the bosom to the lymph hubs or different pieces of the body.

Furthermore, Project (Tsiligaridis 2013) groups datasets as harmless or threatening utilizing different strategies like GRUSVM, NN, multilayer perceptron (MLP), and Softmax relapse. The undertaking shows an examination of insignificantly intrusive advances like classification and regression trees (CART), random forest, nearest neighbour and boosted trees. These four models have been chosen to remove the most dependable models for anticipating malignant growth endurance. One more researcher (Mojarad et al. 2010) utilizes UCI's blood investigation dataset. Plot the outcomes acquired from strategies like extreme learning machine (ELM), ANN and so on (Mishra et al. 2017; Online and 10 Female Cancer in Addis Ababa, Membership, membership-list, 100-0addisababa). The objective of this work is to present a new productive paradigm for characterization of bosom malignant development.

2 Literature review

Computer Aided Design (CAD) frameworks assume a significant part in primer illness location steps. Different Machine Learning methods can be utilized independently or hybrid manner to identify this illness in effective manner. The specialized determination relies upon the accessible information, its equivocalness and the capacity to pick valuable highlights (Akande et al. 2015; Xin 2016). CAD framework is the framework to distinguish or determine bosom malignant growth to have PC innovation to identify all anomalies in this bosom indictment (Karamizadeh et al. 2014). Unused Detection framework arranges surprising or limitations or location and characterization of uncommon classes (Mann and Ranjan Nayak 1349). The CAD framework is a fundamental option in contrast to biopsy on account of the potential effects of biopsy, for example, uneasiness for patients, contaminations, draining and time expected to accomplish results after dissecting the lab (Porembka et al. 2022). The precision of the understanding by the X-beam specialist of mammograms relies upon various elements. X photovoltaic has been remembered for CAD frameworks.

The underlying mammography quick pre-handling removes the noise from the mammogram (Olson 2008; Balafar et al. 2008). Sifting, division, highlights extraction, highlights choice, and characterization are examples of changes that rely on form highlights to increase the complexity of images in both positive and negative ways. The typical highlights are also known as morphological shape features, and they depict highlights in this categorization in great detail. Precision was measured at several scale levels, and it was determined that the smallest scale had double the precision as the largest. Because the scale generates a lot of extra data, computer-aided diagnosis has been recommended for clinical study. Using a dark level co-event network to divide mass districts and figure out surface highlights (GLCM).

A few women might be at expanded risk for bosom disease because of family ancestry, way of life, heftiness, radiation, and regenerative variables (Online and 10 Female Cancer in Addis Ababa, Membership, membership-list, 100-addisababa). On account of disease, whenever analysed rapidly, the patient can be saved in light of the fact that there have been propels in malignant growth treatment. In this review, we utilize four AI classifiers specifically naive Bayesian classifier, nearest neighbour, support vector machine, artificial neural network and random forest. Fit imaging and constant organization have been displayed to further develop picture goal and sore portrayal (Thulin 2007). Breast Elastography provides information on breast lesions in addition to conventional

ultrasonography (US) and mammography. It gives a non-invasive evaluation of the stiffness of a lesion. The main outcomes recommend that it can work on the particularity and positive prescient worth of USG in describing bosom masses. The explanation any injury is noticeable on a mammogram or USG is the overall contrast in thickness and echogenicity of the sore comparative with the encompassing bosom tissue. Breast disease expectation by hereditary calculation-based manufactured approach (Olson 2008) proposed a framework where they observed that bosom malignant growth forecast is an open exploration region. In this article, different AI calculations are utilized for prescient location of bosom disease. Choice trees, irregular woods, support vector machines, brain organizations, direct models, Adaboost, innocent Bayesian strategies are utilized for forecast. An engineered approach is utilized to increment exactness in foreseeing bosom disease. A recently evolved strategy is the GA-based weighted normal total technique for the straight-out informational collection, which defeats the restrictions of the old style weighted normal technique. Weighted normal technique in view of hereditary calculation is utilized to foresee a few models. Particle swarm optimization (PSO), rule-driven development and hereditary calculations presumed that the hereditary calculation is superior to the weighted normal strategies. One more correlation between the traditional conglomeration strategy and the weighted normal technique in light of GA and the end that the weighted normal strategy in view of GA performs much better.

Wisconsin diagnostic dataset is analysed by various machine learning algorithms such as SVM, MLP and NN (Olatunji 2017; Akande et al. 2015). The GRU SVM model was utilized for GRU SVM Breast Cancer Diagnosis, linear regression, multilayer perceptron (MLP), nearest neighbour search (NN), Softmax Regression, and support machine (SVM) on the set, Wisconsin Diagnostics of Breast Cancer (WDBC) information by estimating the exactness of the organizing test, as well as their responsiveness and explicitness values. The previously mentioned dataset incorporates highlights determined from sweeps of FNA tests on a bosom growth. To execute ML calculations, the informational index is separated as follows: 70% for preparing stage and 30% for testing stage (Balafar et al. 2008). Their outcomes were that all the introduced ML calculations showed superior execution on the twofold order of carcinomas, for example, deciding if it is a harmless growth or a dangerous cancer. In this way, the factual measures on the arrangement issue are additionally palatable. To additionally certify the after effects of this review, it is prescribed to utilize a CV procedure, for example, K-fold cross-validation. Incrementing in this manner would not just give a more exact proportion of model expectation execution, however will likewise assist with distinguishing the main ideal hyper parameters for ML calculations. In this article, ML strategies are investigated to work on indicative precision. Techniques like CART, random forest, and K-nearest neighbours were thought about. The dataset utilized was acquired from the UC Irvine AI storehouse. It tends to be seen that the KNN calculation has much preferred execution over different strategies utilized in correlation. The most reliable model is the K-nearest neighbour. Grouping models, for example, random forest and boost tree, show comparative precision. Consequently, the most dependable classifier can be utilized to recognize growths with the goal that a fix can be found at a beginning phase. (Hazlina 2004) Diagnosis of bosom disease by different AI techniques utilizes blood test information for early conclusion of carcinoma. In this article, four different AI calculations are utilized for early identification of carcinoma.

To decrease the number of false positives generated by shape analysis near the end of FP segments, a BPNN classifier is designed to classify the images. Local binary pattern (LBP) is used to improve the majority of the textural qualities. The deleted highlights should be able to distinguish between respectful and unsafe crowds. Sifting, DWT (improvement), thresholding (including extraction), and SVM classifier are used to distinguish the locations of malignant development tissues. For this purpose, MIAS database (75 images) was used, with an accuracy of 88.75 per cent. To determine volumetric attributes, the force highlights are separated and figured. With the MIAS db dataset, 99 per cent accuracy is achieved by using the Gabor channel (highlight extraction) and histogram balance (improvement) by k-implies bunching computation. In the component space, KNN orders items based on the nearest preparatory tests. The characterization is also done using Successive Skimming Forward (SFFS) as a highlight option and the PNN approach. Wavelet neural system and molecular swarm streamlined neural system (PSOWNN) with MIAS DB achieved 93.67 per cent accuracy in tissue location and order from mammographic images (Hazlina 2004; Cheng and Shi 2006). Four indicators (DNA ploidy, stage part (SPF), and cell cycle conveyance) were used to determine the MLP neural system. Numerous counterfeit neural systems models, such as the spiral premise work neural network (RBFNN), convolution neural system, general relapse neural system (GRNN), probabilistic neural system (PNN), strong back engendering neural system, and half and half with fluffy rationale, have been used in the techniques. According to a false neural system that was administered, the exactness of the prepared neural system was 82.21 per cent. GLDM + SVM, Gabor Filter + KNN, and PNN techniques achieve precision of 95.83 per cent, 71.83 per cent and 92.5 per cent, respectively (Mishra et al.

2017; Mann and Ranjan Nayak 1349). To demonstrate the magnitude of the proposed LLRBFNN model, this work shows division based on FCM and order based on AI model (Porembka et al. 2022).

3 Experimental results

Figure 1 depicts the block diagram of the proposed approach. It consists of two phases, namely training and test phase. Training phase includes various sub tasks such as image acquisition, pre-processing, image segmentation, feature extraction and feature selection. During test phase also the same tasks from image acquisition to feature selection of the steps are executed and the extracted features are compared against the training feature stored in the database using deep learning techniques such as LLRBFNN, RNN and DNN. The detailed explanation about each task is given below.

3.1 Image acquisition

Breast cancers are discovered and classified using a variety of ways. In this work, prediction model is developed from 6006 patients' records by splitting the dataset as 70% for training, 10% for validation and 20% for test. This experiment uses tenfold cross-validation principle in order to enhance the classification accuracy. To assess the exhibition of these models, two generally utilized test datasets were utilized, the Wisconsin Breast Cancer Database (1991) and the Breast Cancer Diagnostic Database of Wisconsin (1995). The justification behind the better consequence of principal component analysis (PCA) pre-processing is that the foremost parts address just an enormous piece of the data in the full information space, this can somewhat decrease the information commotion, accordingly, the space of highlights is enhanced (first class impact). Figure 1 shows the training and test phase of the algorithm. Breast cancer is identified, and the specific point of scheme was exhibited using new fuzzy mean segmentation, and the cancer was classified as benign or malignant based on the stages shown in Fig. 1.

3.2 Pre-processing

Pre-processing step is used to remove the noise from an image. It can be achieved through various filters such as mean filter, median filter and adaptive mean filters. Figure 2 shows the input images and the output images after applying through noise removal techniques. The process is called as morphological process of binary images. It removes the inner pixels to reveal the objects' outline in order to build a noise picture using an average and display the outcomes of the methods.

3.3 Image segmentation

This research work uses three different types of segmentation techniques for experimental analysis (Halder and Pathak 2011). The worldwide thresholding technique (Otsu's technique) was used for separating brilliant objective items from dim foundation and determining a maximum edge value to measure the separation of area by a given maximum value. p(i, j) is the likelihood of pixels having a certain number of dark levels within a fragmented sore.

$$H = \sum_{i,j}^{M} \frac{P(i,j)}{1 + |i = j|} \tag{1}$$

Deep learning-based segmentation techniques, convolutional neural network and U-net also used in this work.

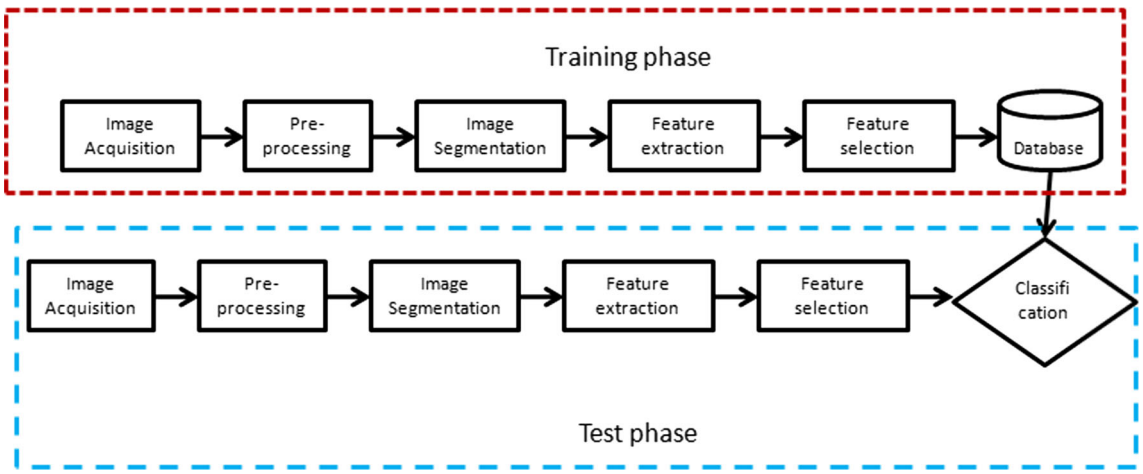
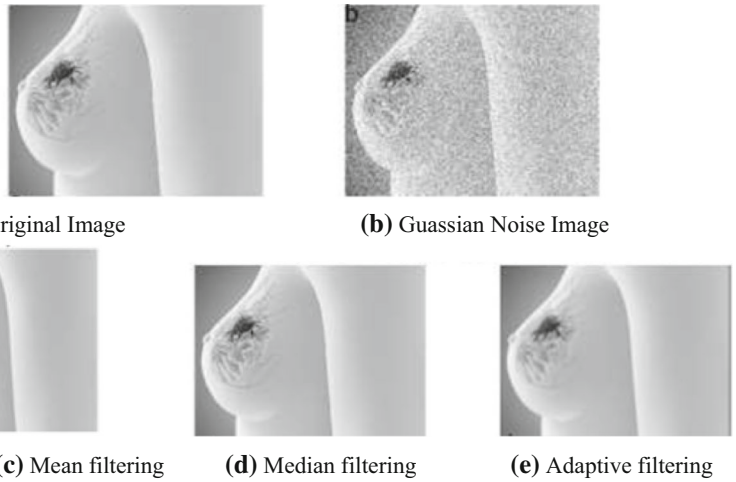


Fig. 1 Block diagram of the proposed approach



(a) Original Image **(b)** Guassian Noise Image

Noise removal through **(c)** Mean filtering **(d)** Median filtering **(e)** Adaptive filtering

Fig. 2 Mammograms images before (**a**, **b**) and after pre-processing (**c**–**e**)

Figures 3, 4 and 5 show the segmentation results of Ostu, CNN and U-Net, respectively.

Table 1 shows the accuracy and computational time achieved using the segmentation techniques Ostu, CNN and U-Net.

From Table 1, it is observed that U-net segmentation techniques yield 96% accuracy; hence, all the experiments are conducted in this research paper by using U-Net-based segmentation techniques.

3.4 Feature selection

In this exploration work, the dimensional decrease of MIAS dataset is accomplished by utilizing head part examination (PCA) strategy. Breast cancer image datasets are usually large and complex, which makes the interpretation as a difficult task. The dimensionality reduction is one of the widely used techniques to handle the above-mentioned issues, thereby reducing the effect of noise, spatial instability, etc. Principal component analysis (PCA) is a technique for reducing the dimension of such datasets, increasing interpretability with less information loss. It can be achieved by creating new uncorrelated variables that successively maximize variance. Finding such new variables is called principal components and reduces to solve an eigenvalue/eigenvector problem. The new variables are defined by the dataset at hand, not a priori, hence making PCA an adaptive data analysis technique. Choosing highlight diminished the reality unpredictability just as increment the exactness of order and grouping for regulated learning (Labuda et al. 2017).

3.5 Feature extraction

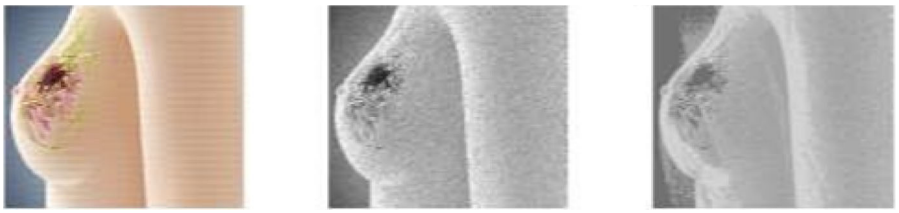
Figure 6 depicts a research flow chart for detecting and classifying breast cancer disease. In training phase, the input image is segmented using FCM methods, and then in the second phase, the GLCM methodology is utilized to extract features from the pre-processed images. (iii) Deep learning models such as LLRBFNN, RNN and DNN were used to train the healthy and non-healthy tumours.

3.6 Performance metrics

The performance of the system is evaluated through various metrics such as accuracy, precision, recall, F1 score and Jaccard coefficient.

$$\text{Accuracy} = \frac{\text{Number of samples identified correctly}}{\text{Total number of samples}} \tag{2}$$

$$\text{Precision} = \frac{\text{True Positive}}{\text{True positive} + \text{False Positive}} \tag{3}$$



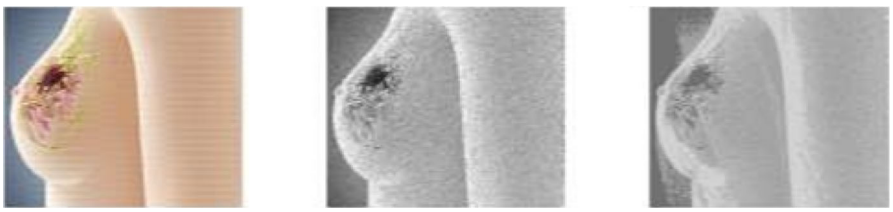
(a) Original Image **(b)** Noisy image **(c)** Segmentation by OSTU

Fig. 3 **a** Original image, **b** Noisy image, **c** Segmentation by Ostu

Fig. 4 **a** Original image, **b** Noisy image, **c** Segmentation by CNN

(a) Original Image **(b)** Noisy image **(c)** Segmentation by CNN

Fig. 5 **a** Original image, **b** Noisy image, **c** Segmentation by U-NET



(a) Original Image **(b)** Noisy image **(c)** Segmentation by U-NET

Table 1 Accuracy and computational time of various segmentation techniques

Segmentation method	Accuracy (%)	Computational time (ms)
Ostu Threshold	87	8.9
CNN	94	7.4
U-Net	96	4.6

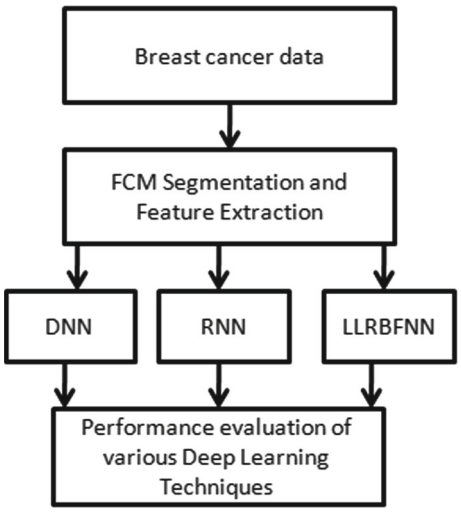


Fig. 6 Feature extraction method

$$\text{Recall} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}} \tag{4}$$

$$F1\text{score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}} \tag{5}$$

$$\text{Jaccard Index} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative} + \text{False positive}} \tag{6}$$

Table 2 shows the confusion metric calculated from the proposed techniques by considering the number of test images as 300.

RNN techniques produce the maximum true positive and true negative samples compared to other two methods used for experimental analysis. Table 3 shows the performance of various classifiers such as RNN, DNN and LLRBFNN with the performance metrics accuracy, precision, recall, F1-score and Jaccard co-efficient.

From Table 3, it is observed that performance of RNN technique is better compared to DNN and LLRBFNN.

4 Conclusion

Bosom malignant growth, whenever distinguished early, can save the existences of thousands of ladies. Breast cancer detection and classification is a challenging and time-consuming task. These activities assist true patients and specialists with gathering; however, much data as could be expected. By investigating, we had the option to gather information on the proposed research work. It is observed that U-Net segmentation techniques yield 96% accuracy on segmentation on mammogram images from WDBC dataset. One of the strategies to increase classification accuracy is to use appropriate parameters in the neural network. Optimistic features selection is achieved through PCA. Deep learning-based classifiers such as RNN, DNN and LLRBFNN are used to calculate the classification accuracy on WDBC images. It is concluded

Table 2 Confusion metrics calculation

Proposed methods	Total number of images	True positive	False positive	True negative	False negative
RNN	300	283	3	10	4
DNN	300	276	5	12	7
LLRBFNN	300	268	8	16	8

Table 3 Performance metrics calculation

Proposed methods	Accuracy (%)	Precision	Recall	F1 score	Jaccard coefficient
RNN	97.6	0.989	0.986	0.987	0.9758
DNN	96	0.982	0.975	0.978	0.95833
LLRBFNN	95.3	0.971	0.971	0.971	0.9436

that RNN provides better accuracy, precision, recall and F1 score value as 97.6%, 0.989, 0.986 and 0.987, respectively.

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Data availability The datasets generated during and/or analyzed during the current study are not publicly available due to [REASON(S) WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The Authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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APPLICATION OF SOFT COMPUTING

A novel method for prediction of skin disease through supervised classification techniques

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Abstract
Skin diseases are the most important worrying problems in societies because it affects the patients both physically and psychologically. Skin disease is one of the highly prone to risk with an association of climatic factors around the world. Predicting the skin disease cases associated with influencing factors is the most crucial task. It is very difficult task to identify the appropriate and optimal features for skin disease from the large volume of health sector data available in the world. Previous researchers applied different types of ensemble features selection techniques for the appropriate selection of features which gives highest accuracy with minimum computation time. Classification rate of any algorithm depends on feature extraction techniques and classifier used for classification purpose. Data availability is one of the most significant drawbacks in the health sector if data are available that might be in raw format. Filling missing value and type conversion almost takes 70% of the time. The missing value can be addressed by statistical parameters such as mean, average and median with stand mechanism in machine learning. The objective of this paper is the selection of significant attributes and removes irrelevant features that affect model performance. The performance of skin disease data can be experimented through K-nearest neighbor, support vector machine and random forest classifier. The entire research is carried out on the real-time dataset. The efficiency of the proposed approach is measured through confusion matrix, accuracy, F-measure, precision and recall.

Keywords Skin disease · Feature selection · Supervised classification · KNN · SVM · Random forest

1 Introduction

Climate change and global warning are the notable events for the cause of skin diseases. The earth's atmosphere is the combination of inwards solar radiation and outwards thermal radiation. Some of the factors influencing warming of the planet and climate change are greenhouse gases, radiation, carbon dioxide, wind patterns, methane, fossil fuels and ocean currents. Fossil fuel contributes more to climate change, and few reports suggest population can be one of the main influencing factors (Amuakwa-mensah et al. 2017; Kimaro et al. 2017; Li et al. 2018; Liang and Gong 2017). In previous studies, environmental science collective state from some years change of climate drastically increases (Azimi et al. 2017; Dayrit et al. 2018). One of the active group IPCC reports that CO_2 huge increases 300 to 400 PPM which accordingly increases in ocean 25%, and global average temperature increases 0.18 to

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0.22 M. All the influencing factors lead to the change of climate which causes most of the infectious diseases such as dengue, chikungunya, malaria, heart stock and skin-related cases which rapidly increase in previous studies. In this work, we have considered skin disease cases associated with climate factors ("Global and Local Environmental Changes as Drivers of Buruli Ulcer Emergence" 2017). Ultraviolet rays damage the inner and outer pigments of the cell directly, which can lead to various types of skin diseases (Pinault et al. 2017; Pinault and Fioletov 2017).

Skin diseases are highly vulnerable when exposing to a long time to UV rays. It can be through the distributed age group in the dataset; according to the report, nearly 30 to 45 aged male groups are prone to higher risk than women (Chen et al. 2020; Figueroa 2011). The international classification of diseases based on IPCC reports indicates 30% of skin diseases which are register because of illness. Skin diseases arise because of burns on the body surface, globally and nationally, only less critical given for prevention and control when compared with other infectious. Skin diseases are classified into 15 types of subcategories: abscess, enzyme, fungal, psoriasis, scabies acne vulgaris, urticaria, alopecia arete, priorities and deceits ulcer. In previous studies, many authors attempted to address this issue by applying traditional and analytical methods (Cao et al. 2018; Cecchi et al. 2018; Pinault et al. 2017).

Supervised classification algorithm has been developed to predict the diseases in earlier stages from real-time medical data (Sangaiah et al. 2020). Even in real-time medical data consisting of many missing values and some hidden patterns, every data should be properly preprocessed and select feature before the start of disease analysis ("Ecological Niche Modeling Predicting the Potential Distribution of Leishmania Vectors in the Mediterranean Basin : Impact of Climate Change". 2018; Khalifian and Rosenbach 2018; "How Will Climate Change Pathways and Mitigation Options Alter Incidence of Vector- Borne Diseases A Framework for Leishmaniasis in 2017). Medical data available in real time cannot be used directly for clinical analysis. Eighty percentage of the medical data require preprocessing before applying feature extraction techniques. Preprocessing steps such as filling the missing values convert the constant value to categorical, and changing of column names for fundamental understandings is highly recommended for medical data analysis. One of the first steps is, have to fill the missing value; few stoical techniques help by applying machine learning mean and the average of the missing column. By using type conversation process, change of continuous value to absolute values (vice versa) and column change function are used for renaming the column name. Once all the above steps are executed, then the dataset is ready for analysis; we have considered the next phases to be more critical and complex (Jain and Rao 2022; Bacanin et al. 2021; Jain et al. 2021). As medical data comprise the number of attributes, even some irrelative qualities can affect the performance of the model. Machine learning models have a unique process called feature selection. As our data are supervised, we will be using only a supervised feature selection technique. The aim of the paper is as follows: (I) preprocess the raw data and (II) selecting appropriate features by combination technique.

2 Literature survey

Several researchers have proposed various machine learning based on the detection of the type of skin diseases. Here we briefly review some of the techniques as reported in the literature. Usually, in other studies first they will apply feature selection than rating. The execution time of the model recorded is high. Ahn and Hur (Ahn and Hur 2020) proposed genetic algorithm where they first classify and select the feature set and proposed a filter base selection in the local region. The proposed model search is used for local neighbors sample and correlated with each other (Kasthurirathne et al. 2016; Khanadar et al. 2016; Wang and Li 2019). Antimicrobial resistance is a critical problem globally. The proposed method uses a time series technique explicitly to forecast the outbreak of diseases. They use the wrapper method for feature selection technique. The author proposed the artificial neural network-based feature selection technique to reduce and remove irrelative characteristics. In the unstructured text, clinical data increase in all health departments, and availability of such data is free. The author applied the dictionary-based technique. It is the hybrid approach which handles missing value and other data issue. The author proposed a two-step approach: (I) to compress high-dimensional data and (ii) to express different categorical and numeric value data with the missing value. The multi-label selection is always a complex problem because labeling is done one by one. The author proposed discriminative and relevant feature selection. The author suggested the X variance feature section approach in gene selection (Kasthurirathne et al. 2016; Links 2012; Muhammad et al. 2020; The et al. 2015).

3 Real-time data collection and analysis

The real-time skin diseases data are collected from popular private hospital in Chennai, and it is always crowded with patients with various illnesses. According to the in-patient records, an average of 2000 to 6000 patients visit the hospital per day in multiple departments. Among that, 200 to 250 patients are found to be visiting the dermatology department

with skin-related ailments. The inflow of the patients to the dermatology department explodes with the increase in the temperature. The dataset comprises data collected from year 2000 to 2018 (temperature, rainfall, humidity and precipitation) with daily and monthly readings. We have carried out this research in two phases: In first phase, we have collected the hospital data and experimented. In the second phase, we have received the climatic dataset from the National Data Center, India. This work aims to find the association between climate data and hospital data, and we have mentioned the female as 0 and the male as 1. From the experimental results, we found out that males have been more affected when compared with the females. The reason we found out is that it exposes them to the sun for a longer time than the females. With the results, we have plotted a graph, and it is visible that 69.5% of male and 31.5% of females are affected by skin disease. Figure 1 shows the skin disease classification based on gender.

We have proposed a framework to address this issue. The proposed framework is a trial and error combination. Machine learning models are used to measure sensitivity and accuracy of the disease's outbreak. The output values are used for better forecasting and applying ensemble feature selection.

Table 1 represents the 15 attributes, its data types and feature label assigned for experimental investigation.

Figure 2 represents the architecture diagram of the proposed approach. It consists of two phases, namely training phase and testing phase. During training pahse, real-time data collected from patients are propcessed and stored in database. During test phase also, the same procedure is used for preprocessing and feature extarction. The test feature extracted during this phase is compared against the training feature stored in the dataset by using KNN, SVM and random forest algorithm.

3.1 Preprocessing step

The data collected from hospital consist of various formats such as videos, structure, audio and image. During preprocessing, the data are converted in to machine-readable format, i.e., 0's and 1's. Machine learning mechanism has a single process call preprocessing by which a machine can read it. The dataset is the combination of sample, entities, points, cases, patterns and observation. The data object refers to the number of attributes or variables; data are classified into two types categorical and numerical.

Categorical is the Boolean set, which is constant [yes, no]. The numeric is continuous, and the value is dynamic (temperature, age, etc.). Quality of data is archived by applying the preprocessing technique, as the data generated from the different source are raw data, which can affect model accuracy. It forms the missing value gaps during data collection, either machine or human-made, a mistake at recording time. Eliminating rows and columns are a few methods, but this won't be useful because it reduces the sensitivity of data. The most commonly used plan for addressing missing value in rows and columns is by mean, mode and the median value of the relative feature.

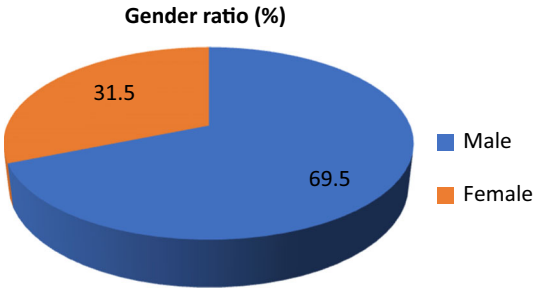

Fig. 1 Skin diseases patients ratio based on gender

Table 1 Representation of all feature names with data types

Feature	Data type	Feature label
Year_week	Int64	F1
Recorded_year	Int64	F2
Recorded_month	Int64	F3
Air_temp	Float64	F4
Humidity	Float64	F5
Surface_water3	Float64	F6
Total_vegetation	Float64	F7
Min_air_temp	Float64	F8
Surface_water5	Float64	F9
Total_precipitation	Float64	F10
Max_air_temp	Float64	F11
Total_precipitaion in KG	Float64	F12
Northeast_NVDI	Float64	F13
Mean_duepoint	Float64	F14
Mean_humidity	Float64	F15

3.2 Feature selection step

Feature selection is a process of automatic selection of variables in the dataset, which are more relevant for forecasting methods. As medical data consist of irrelative attributes that may affect model performance, not all attributes are useful. Numbers of features always change the model and lead to complex. Any feature selection technique aims to improve the model performance and to provide a cost-effective and faster understanding of the hidden patterns. Feature selection has three types of methods. The various feature selection methods existing for data analysis are represented in Fig. 3

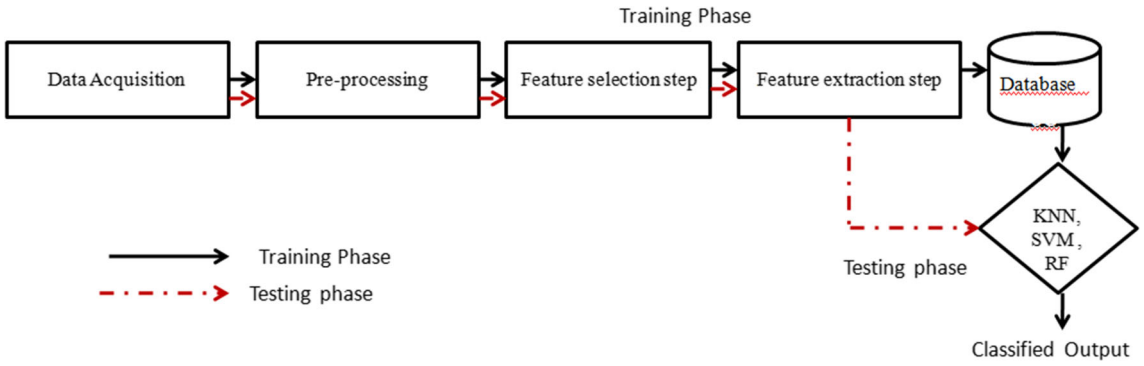

Fig. 2 Architecture diagram of the proposed approach

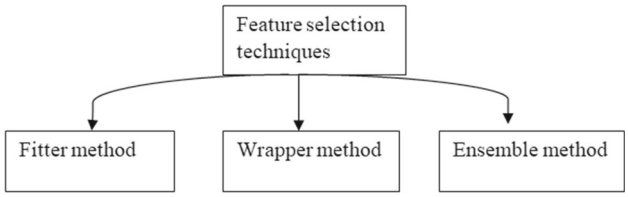

Fig. 3 Types of features selection techniques

It ranks filter method that is applied by a statistical technique to assign a score to each variable depending upon score variable which is selected. Wrapper method is used for selecting features on different features combination and compares with other combination. Ensemble methods like regularization technique are used to penalize the data to reduce coefficients to zero.

3.3 Classification by supervised learning model

In this paper, supervised learning methods such as KNN, SVM and random forest are considered for classification. Machine learning algorithm performance is measured by statically test: precision, accuracy and F-measure. Precision defines as a percentage of exact forecast accuracy class; accuracy defines as a percentage of correct forecast cases between all cases, and F-measure defines as the weighted mean of recall and precision. These 3 performance metrics have used to select significant attributes; typically, most of the machine learning model uses some performance metrics. The performance metrics play an essential role in considerable selection attributes. The different combination set of the variable is applied. The main idea is to remove irrelative characteristics that are influencing the performance of the model. All three metrics performance is calculated and recorded in different tables below.

$$\text{Accuracy} = \frac{(\text{TP} + \text{TN})}{(\text{TP} + \text{TN} + \text{FP} + \text{FN})} \quad (1)$$

$$\text{F} - \text{Measure} = \frac{(2 * \text{Precision} * \text{Recall})}{(\text{Precision} + \text{Recall})} \quad (2)$$

$$\text{Precision} = \frac{\text{True Positives}}{(\text{True Positives} + \text{False Positives})} \quad (3)$$

4 Experimental analysis

The dataset comprising of 15 features with 1500 instances is investigated through three different machine learning algorithms for analysis of hidden patterns. Our experiment is a trial-and-error combination approach by selecting a set of attributes using machine learning pipeline and performance metrics: F-measure, precision, and accuracy, which is applied for model validation (Khamparia et al. 2020). We have analyzed the data and describe the highest accuracy, highest precision and the highest F-measure in respective Tables 3, 4 and 5.

4.1 Identification of appropriate folds (K value)

The experiment is conducted by varying the *K* value from 5, 10, 15 and 20 for the classifiers such as KNN, SVM and random forest, and the results are presented in Table 2.

From Table 2, it is observed that *K*-fold cross-validation with $K = 10$ is giving the better results compared to other *k* values. The increase in values of *K* leads to misclassification of sample because of overfitting problems in the data. Hence, it is decided that the remaining experiment is performed by choosing the *K* value as 10.

4.2 Performance of various classifiers by different metrics such as recognition rate, precision and F-measure

Tables 3, 4 and 5 exhibit the performance metrics: recognition rate, precision and recall values, of the dataset with different machine techniques.

Table 2 Recognition rate of various classifiers with different K-fold

K-Fold	Classifier	Recognition rate (%)
5	KNN	76
	SVM	81
	Random forest	84
10	KNN	83
	SVM	89
	Random forest	97
15	KNN	82
	SVM	86
	Random forest	89
20	KNN	81
	SVM	83
	Random forest	90

Table 3 Recognition rate and optimal features of skin disease data through various classifiers

Classifier	Recognition rate (%)	Feature set
KNN	83	1,3,5,7,9
SVM	89	1,2,5,9,11
Random forest	97	1,2,4,6,8

Table 4 Precision and optimal features of skin disease data through various classifiers

Classifier	Precision	Feature set
KNN	0.86	1,2,5,7,11
SVM	0.90	1,2,7,9,13
Random forest	0.93	1,2,5,6,9

Table 5 F-measure and optimal features of skin disease data through various classifiers

Classifier	F-measure (%)	Feature set
KNN	85	1,2,5,7,9
SVM	87	1,5,7,9,11
Random forest	94	1,2,6,7,8

From Table 3, it is observed that random forest yields the highest accuracy compared to other models considered for experimental investigation. All the three models include feature 1 for the computation of accuracy. Hence, it is considered as highly important feature for further analysis.

From Table 4, it is concluded that random forest gives accuracy as 0.93%. All the three models include features 1 and 2 for the computation of precision.

From Table 5, it is experienced as random forest which produces the highest F-measure value compared to other models considered for experimental investigation. All the three models include features 1 and 7 for the computation of accuracy. Hence, it is considered as highly important feature for further analysis.

The significant feature selection has achieved by adapting the above methods, and in the table, each attribute count is recorded in three different performance metrics. At the final phases of feature, counts exhibit occurrence rate. Depending upon the count of elements, they are ranked and given the importance that helps for better forecasting (Cao et al. 2018). The significant variables further analyze to forecast skin disease occurrence of selecting significant variables with a different combination. Our experiment exhibits feature count increase specific variable and by applying machine learning models with their respective performance metrics to list of feature importance. Scikit-learn pipeline is used to examine the model and select features with the help of python language. The machine learning model performances are validated by considering feature pre and post (Jovanovic et al. 2016). Before feature selection, accuracy rate is quite lower when compared to after applying feature selection technique.

5 Discussion

Machine learning algorithms, KNN, SVM and random forest, attempted to find the significant attributes among dataset with the different combination (Jovanovic et al. 2016; Links 2012). The final accuracy result shows an increase in accuracy rate with a new feature set. These features set to provide a significant contribution to forecast skin diseases associated with climatic factors. Out of 15 elements, 12 are climatic features that are collected from IMD, and the gender of patient attributes is related to demographic. Our detailed analysis states that the characteristics of climatic factors have more influence on skin diseases. According to our result, the proposed framework achieved 97% with the minimal feature set. Table 6 represents the evaluation of classification accuracy and computational time for various classifiers. Table 7 presents the salient features considered for experimental investigation.

Final feature set considers Year_week, Recorded_year, Recorded_month, Air_temp, Humidity, Surface_water3, Total_vegetation, Min_air_temp, Surface_water5, Total_precipitation and Southeast_NDVI. The proposed

Table 6 Evaluation of classification accuracy and computational time for various classifiers

Algorithm	Accuracy (%) with all features	Computation time (sec)	Accuracy (%) with optimal feature	Computational time in sec
KNN	78	8.13	83	4.28
SVM	82	9.55	89	5.71
Random forest	90	5.12	97	3.83

Table 7 List of features importance with weights

Number	Features	New_feature_name	Feature_weights
1	Year_week	F1	0.0899
2	Recorded_year	F2	0.0612
3	Recorded_month	F3	0.0394
4	Air_temp	F4	0.0174
5	Humidity	F5	0.0167
6	Surface_water3	F6	0.0152
7	Total_vegetation	F7	0.0301
8	Min_air_temp	F8	0.0069
9	Surface_water5	F9	0.0058
10	Total_precipitation	F10	0.0013
11	Max_air_temp	F11	0.0003
12	Total_precipitaion in KG	F12	0.0002
13	Northeast_NVDI	F13	0
14	Mean_duepoint	F14	− 0.0002
15	Mean_humidity	F15	− 0.0046

framework helps to find out diseases outbreak. Our study exhibits by applying tail-and-error combination accuracy which achieved good accuracy and then validated by performance metrics with accuracy, F-measure and precision.

6 Conclusion

The amount of data generated from the industry has increased exponentially. One of the substantial sector increases in data generated in the health sector. All the data recorded with the pre-install sensor and quality of data are a raw format that is not ready for analysis. Some machine learning methods are used to preprocess and feature selection. The dataset comprises a missing value and unformatted unsigned value as which machine unable to read this. Nearly 70% of the time spent on preprocessing and feature selection. To forecast any disease data, considering the critical factor, easy availability and readable format help to predict the outbreak. We have applied three machine learning models with different features combination set. To validate the model, three performance matrices have used to measure the performance. Random forest model produces the highest accuracy of 97% with the new feature set when compared with other models. As our dataset is the only benchmark data, we have not compared it with other existing studies. From the experimental results, it is concluded that Year_week, Recorded_year, Recorded_-month, Total_vegetation and Air_temp are considered as important features for the causes of skin disease. This research work can be extended using quantum machine learning because it reduces the time and space complexity of the data and also produces very accurate results.

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Availability of data and material Not applicable.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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Impact of Nutritional Status Among School Going Adolescent Girls in Thoothukudi District

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Abstract

Adolescence is the transition period between childhood and adulthood. It is an important stage of growth and development in the lifespan of human beings. Nutritional health during adolescence is important for supporting the growing body and for preventing future health problems. The present study is a survey to find out the nutritional status of the school going adolescent girls and to improve their nutritional status. The consumption of Green leafy vegetables was found to be only 34 per cent occasionally and 27 per cent never consumed. the experimental group had sufficient amount of energy, and fat. However the intake of protein, calcium, iron, ascorbic acid and folic acid was found to be less than the RDA in both the groups. Nutrition education could be effective tool to improve the nutrition knowledge. It would not only improve the health of adolescent girls, but future generation also, as adolescent girls are would be mothers.

Keywords :

Adolescent Girls, Nutritional Status, Food Behaviour.

Introduction :

Adolescence is the transition period between childhood and adulthood. It is an important stage of growth and development in the lifespan of human beings. Obesity is a public health problem that has raised concern worldwide including India. A high prevalence of anaemia among adolescent girls was found due to iron deficiency. It is higher in the lower economic strata due to various factors such as poverty, inadequate diet, pregnancy lactation, and poor access to health services, etc. (WHO, 2009).Underweight is an impairment of health resulting from deficiency, or imbalances of nutrition. Underweight can be caused by eating too little, or eating an unbalanced diet that lacks necessary nutrients. They have adequate amount of food but make poor choices. (Gupta *et al.,* 2009). Healthy eating during adolescence is important as the body changes during this time and affects an individual's nutritional and dietary needs. Adolescents are becoming more independent and making many food choices

on their own. The researcher believes that focusing on the needy adolescent girls, especially the adolescence with felt-need would be more viable for this field study. Hence the study entitled "Impact of nutritional status among school going Adolescent Girls in Thoothukudi district"

Objective :

- ❖ To assess the nutritional status of the selected adolescent girls.

Methodology :

The present study is a survey to find out the nutritional status of the school going adolescent girls and to improve their nutritional status. Food behaviour frequency of use of different food groups would give an indication about the adequacy of family diet pattern. Hence food behaviour frequency was found out. The individuals were asked a systematic series of questions to ensure recollection and description of all foods and drinks consumed in the past 24 hour (ICMR, 2004).

Result and Discussion :

1. Distribution of the food frequency intake of various foods of the respondents before the nutrition education

Table 1 Food frequency intake of various foods of the respondents

Food Groups	Percentage Frequency of food intake (n=530)				
	Daily	Weekly	Fortnightly	Occasionally	Never
Cereals and millets	100	-	-	-	-
Pulses and legumes	14	32	32	22	-
Green leafy vegetables	0	17	22	34	27
Roots and tubers	29	38	30	-	3
Other vegetables	24	26	26	20	4
Fruits	-	30	27	43	-
Milk and milk products	27	40	33	-	-
Fats and oils	86	14	-	-	-
Sugar and jaggery	100	-	-	-	-
Flesh foods	0	48	47	5	-
Junk/ Fast foods	55	45	-	-	-
Carbonated beverages	68	32	-	-	-
Chocolates and baked sweets	79	21	-	-	-

*Multiple responses

The table 1 shows the frequency of consumption of different food stuff by the respondents.

Cereals and millets : All the respondents were consuming cereals and millets based on the products on daily basis.

Pulses and legumes : About 14per cent had consumed pulses and legumes on a daily basis, one third (32%) of the respondents reported weekly and fortnightly.

Green leafy vegetables : The consumption of Green leafy vegetables was found to be only 34 per cent occasionally and 27 per cent never consumed. It was very alarming because adolescent girls need more iron, calcium and folic acid.

Roots and tubers : Twenty nine per cent consumed roots and tubers on daily basis and 38 per cent and 30 per cent consumed weekly and fortnightly and only 3 per cent of the respondents reported that they never took roots and tubers.

Other vegetables : Twenty four per cent of the respondents consumed on daily basis and twenty six per cent of them reported that they ate weekly and fortnightly.

Fruits : The consumption of the fruits was about one third (30%) of the respondents on weekly basis and 43 per cent of the respondents reported that fruits were taken occasionally and twenty seven per cent were consumed fortnightly.

Milk and Milk products : Consumption of milk was consumed on daily basis about 27 per cent others were consumed about 40 per cent on weekly and 33 per cent were consumed fortnightly. Whatever may be the form milk and milk products intake should be increased because they provide protein, calcium, phosphorus and carotene for the respondents.

Fats and oils : Daily intake of oils reported by 86 per cent of the respondents and 14 per cent were consumed weekly basis.

Sugar and Jaggery : Daily sugar intake was reported by 100 per cent of the respondents. The food habits depicted the liking for sweets as well as preference for beverages.

Flesh foods : Consumption of non - vegetarian foods by the respondents on weekly basis was 48 per cent and occasionally 47 per cent.

Junk and fast foods : Consumption of junk food and fast food liked by the respondents on daily basis was 55 per cent and weekly 45 per cent. The use of fast foods for meals or snacks is especially popular with the adolescents.

Carbonated beverages : Beverages were consumed by the respondents about 68 per cent on daily basis and 32 per cent weekly. Synthetic beverages were favoured by the respondents.

2. Distribution of the nutrient intake of the respondents before the nutrition education

Table 2 Nutrient intake of the respondents

Nutrients	Before (n= 265)				
	RDA	Control	Excess / Deficit	Experimental	Excess / Deficit
Energy (Kcal)	2230	2267	+37	2262	+32
Protein (g)	52	33	-19	31	-21
Fat (g)	40	46	+6	45	+5
Calcium (mg)	800	520	-280	560	-240
Iron (mg)	27	17	-10	18	-9
Ascorbic acid (mg)	40	31	-9	29	-11
Folic acid (mg)	150	91	-59	98	-52

Table 2 indicates the nutrient intake of respondents of the control and experimental group. On comparison of respondents' nutrient intake with that of the RDA it is noticed that the respondents in the control and in the experimental group had sufficient amount of energy, and fat. However the intake of protein, calcium, iron, ascorbic acid and folic acid was found to be less than the RDA in both the groups. Daily energy intake of the respondents is less and they derive maximum energy from snack foods. Similar study by Pati (2004) the adolescent girls reported poor intake of all nutrients.

Conclusions :

The researcher pointed out that the selected adolescent girls were having basic ideas about nutrition but they were lacking in scientific concepts related to nutrition. it is conclude from the present nutrition education is an important measure to improve dietary habits, nutrition knowledge, and food choices of the adolescent girls, as poor dietary habits and ignorance are the main reason for poor nutritional status of the adolescent girls. The lack of concentration which can interfere with learning and they have low energy. Future curriculum can focus on some or all of these areas for building a dietary component in childhood obesity prevention programs. Nutrition education could be effective tool to improve the nutrition knowledge. It would not only improve the health of adolescent girls, but future generation also, as adolescent girls are would be mothers.

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Reframing Teacher Education through Personalised Teacher Professional Development

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Abstract

There have been revolutionary changes in the educational sector in the past few years. Change and advancement in every field has redefined teaching and learning in ways we never imagined. Today education is not restricted to classrooms and our digital era learners require something more than rote classroom teaching that is based on the assumption that every learner is alike. Personalisation of learning is one of the main focus of educational programs in the twenty first century. Personalized learning is designed to give learners more involvement and ownership of their learning and aims to produce learner instruction according to individual learner readiness, strengths, needs and interests. Teachers are also lifelong learners. They are professionals who must continually evolve and develop themselves to carry out their professional roles effectively. Just like students, teachers also need personalised and learner centered learning environments. This paper attempts to provide insights into professional development and personalising professional development for teachers.

Keywords : Professional development, Personalisation.

Introduction :

Personalised learning is an evolving and emerging area that focus on learner centered approaches of the twenty first century. The personalised approach provides us with various opportunities that will help to steer our own development. Personalisation is basically talked about in the context of students but with the evolving field of teacher education, the concept of teachers as professionals and teachers as learners who must develop continually and the emerging concerns with teacher professional development, the need to personalise teacher professional development becomes inevitable. The idea behind this is to meet the demands

of every individual and to encourage varied learning environments.

Personalising Professional Development :

The professional development of teachers has attained momentum in the past few years. This has led policymakers, researchers and leaders to make efforts to seek answers to questions of professional development practices that results in enhanced quality of classroom teaching that will have a positive impact on learner outcome also. Continuing Professional development is about improved learning both in the part of the learners and teachers. There is no fixed definition for professional development but the definition by Day captures the broad notion and concept of professional development :

Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct benefit to the individual, group or school and which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purposes of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives. (4)

Effective professional development is an integral part of any profession. In the paper "Effective professional development: Principles and best practice", effective professional is defined as a combination of seven factors. The professional development initiatives in order to be effective must be impactful, needs-based, sustained, peer-collaborative, in-practice, reflective and evaluated. Programs that aim at teacher professional development are deemed to effective when they focus on teacher strengths and helps in identifying the changes that needs to be made for improving learner outcome. So professional development must be impactful and it is only possible through addressing the diverse needs of the teachers. The studies in the field of professional development stresses that fact that like learners, each teacher is also unique and so is their needs. A one fits all traditional approach to teacher education and development has failed to create any effective changes in the field of teacher education and classroom teaching. Therefore, the teachers' voices must be heard and addressed in designing programs and setting professional development goals. The need for sustained efforts is very crucial to teacher professional development. Fragmented, one off sessions or training programs are not sufficient for creating deep and effective changes in teacher performance and cognition. Time is an important factor when it comes to implementation of the changes in the classrooms. Collaboration is crucial as it helps with the sharing of knowledge and experience with peers in a comfortable environment. "Effective peer collaboration has been reported to be amongst the highest indicators of effectiveness in Continuing Professional Development" (Richardson and Maggioli 7). A focus on classroom- based practice that helps teachers to navigate through changes by doing and tackling issues through practice is also crucial for effectiveness. Teachers must be critical thinkers and reflective practitioners and such activities must be promoted. The evaluation factor is also crucial for understanding the effectiveness of professional development