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RESEARCH REACH

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EDITORIAL

This issue of Research reach brings together papers covering several research areas and exemplifies the diversity in the Home Science domain. While the paper by Alka Goel and others highlights the training needs of textile traders in Uttarakhand, the paper by Anju Bhatia and Hardeep Kaur examines the factors motivating women entrepreneurs and attempts to quantify the entrepreneurial role stress among women entrepreneurs in Bikaner city of Rajasthan. Jackfruit is the largest but an under-utilized fruit in the plant kingdom. The paper by Dushyantha et al indicates the possibility of use of native yeast strains isolated from this fruit for wine production. Maternal health is of utmost importance for the welfare of the new born. The energy balance in pregnancy, a function of both energy expenditure and energy intake becomes a critical determinant of the health of a pregnant woman. The paper by Vijayalaxmi and Asna presents this data among a group of pregnant woman from urban Bangalore. Soft drink consumption is becoming increasingly common among the adolescents today. The paper by Esthelydia and Sheila John examines the influence of psychosocial factors such as peer / parental influence and TV viewing on the soft drink consumption pattern among college students in Chennai.

Chief Editor,
Dr. Malathi Sivaramakrishnan.

INSTRUCTIONS TO THE AUTHORS

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1. Review paper on specific topics of current trends pertaining to Home Science. It should be a mini review with around 15-18 typed pages.
2. Research papers with a maximum of 7-14 pages
3. Research notes limited to a maximum of 2-6 typed pages
4. Paper / Book Review of not more than 1 typed page each.

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The article should cover:
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RESEARCH REACH

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SOFT DRINKS CONSUMPTION BEHAVIOUR AMONG COLLEGE STUDENTS: INFLUENCE OF PSYCHOSOCIAL FACTORS

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Soft drinks are widely consumed today and this has fuelled several conflicting opinions about the effect of their increased consumption on health. Research has focused on the mechanisms through which soft drink preferences are created in humans and the contributions of particular developmental forces such as genetics, parental influence, peer influence, and the media on consumption patterns. This can help plan interventions that can change the faulty dietary and life style practices among adolescents. This study aims to ascertain the psychosocial factors that influence soft drink consumption among adolescents. Five hundred subjects (250 boys and 250 girls) aged 17 – 23 years studying in two colleges in Chennai city were selected.. The impact of television viewing and peer and parental influence on soft drink consumption were studied using a questionnaire. Frequency tables and cross tabulations were generated. Data was subjected to statistical analysis like t-test, standard deviation and chi-square. The results of the study revealed that higher percent of consumers were high television viewers compared to non-consumers both during weekdays and weekends. Television viewing, peer influence and parental influence were factors affecting soft drink consumption and the differences between consumers and non consumers was statistically significant($P<0.001$). Adolescents and their parents should be educated about the ill-effects of increased soft drink consumption. Adolescent's exposure to television should also be minimized.

Soft drink consumption has increased dramatically among adolescents today. This increase in the consumption of soft drinks has been associated with several adverse health effects (Schulze et al., 2004). Mechanisms through which soft drink preferences are created in humans or the contributions of particular developmental forces such as genetics, parental influence, peer influence, and the media on soft drink consumption patterns need to be examined.

Television viewing and soft drink consumption may both be indicators of increased calorie intake. Television viewing can readily be accompanied by eating, and the frequent food-related advertisements that are designed to invoke feelings of hunger may result in an associated higher food intake in those who regularly watch more television. Thus it is necessary to test the hypothesis whether television viewing increases soft drink consumption among adolescents and to suggest how shifting attention from television stimulus can influence food cues.

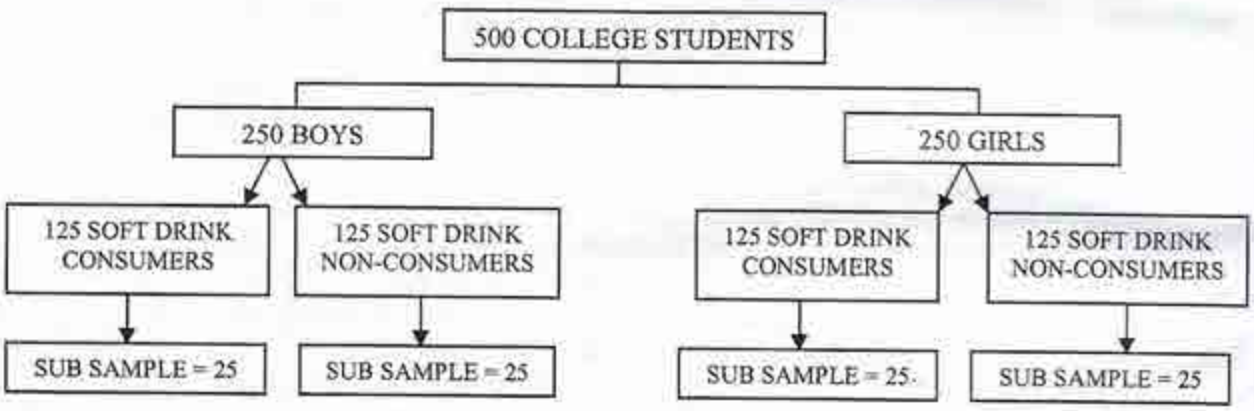
Social and environmental influences contribute to the imbalance of energy intake and energy expenditure. Consequences of the identified role of habits of peer and parental norms in the interplay between sedentary behaviour and consumption of sugar-sweetened beverages among adolescents are also of great concern.

The present study, therefore examines the relationship between adolescent screen-viewing behaviour (i.e., television viewing) and the consumption of sugar-sweetened beverages. The

study also looks at whether perceived parenting practices and parenting style dimensions (strictness and involvement) and peer influences are associated with adolescent's consumption of sugar-sweetened beverages. The findings of the study can aid in the prevention, control and treatment of non-communicable diseases among adolescents and adults that have been associated with increase in soft drink consumption.

MATERIAL AND METHODS

The study aims to ascertain the influence of psychosocial factors on soft drink consumption among adolescents and suggests the need to reduce the potential adverse health effects due to soft drinks consumption by educating the subjects. Five hundred subjects (250 boys and 250 girls) aged 17 – 23 years studying in two colleges in Chennai city were selected. Subjects were categorized into two most relevant categories according to their soft drink consumption. Subjects who had roughly nil consumption (0g) of soft drinks per week were categorized as non-consumers and subjects who drank one serving or more soft drinks per week were categorized as consumers. Subjects were selected in such a way that there were 125 consumers and 125 non-consumers within each gender.



Design of the study

The purpose of the study was explained to all the 500 subjects by the investigator prior to the commencement of the study. Doubts and queries regarding the study were also clarified. Data pertaining to the subject's age, gender, educational status, family type and family income was collected using a questionnaire.

The questionnaire administered to the subjects also included questions on the number of hours they watched television during weekdays and weekends and snacking habits while watching television. Parental and peer influence on soft drink consumption of the subjects were also assessed using the questionnaire.

SPSS was used to conduct the statistical analyses. For all the statistical analysis a binomial variable was created for soft drink consumption (non-consumers (0g/day) and consumers), in which exactly 125 subjects were under each group varied by gender. Frequency tables and cross tabulations were generated. Pearson Chi-square tests and t-test were calculated. A P value of <0.05 was considered statistically significant for all statistical tests conducted.

RESULTS AND DISCUSSION

Demographic characteristics include subject's age, type of family, family's annual income status based on the classification of National Council of Applied Economic Research (NCAER, 2007) and educational status. A high percent of female subjects (58%) were in the age group of 17 – 18 years, while a higher percent of male subjects (86%) were in the age group of 19 – 23 years. About 80 percent of the female subjects and 60 percent of the male subjects belong to the nuclear family. Greater percentages of subjects from both the gender groups belong to the upper middle income group/consumer class according to the classification given by NCAER, (2007). More than 86 % of the subjects were under graduates with majority of female consumers (64 %) in arts group and majority of male consumers (82 %) in science group. With regard to non-consumers it was found that a majority of the subjects belong to science groups.

Soft drink consumption pattern

Majority of the subjects prefer drinking regular sugar sweetened beverages and only few female consumers (5%) and male consumers (14 %) prefer drinking diet beverages. Sixty five percent of female consumers prefer drinking soft drinks without caffeine while a higher percent of male consumers (54%) prefer drinking soft drinks with caffeine.

Television viewing behaviour

Table 1 presents the relationship between television viewing and soft drink consumption among consumers and non-consumers of soft drinks.

Table 1: Relationship between Television Viewing and Soft Drink Consumption

Television viewing		Consumption		Chi-square	Level of significance
		Consumers (%)	Non-consumers (%)		
Weekday	< 1 hour	22.4	43.2	32.425	1 %
	1- 2 hours	39.2	32.0		
	> 2 – 3 hours	16.0	14.8		
	> 3 – 4 hours	10.8	5.2		
	> 4 hours	11.6	4.8		
Weekends	< 1 hour	19.6	44.4	53.395	1 %
	1- 2 hours	16.8	22.4		
	> 2 – 3 hours	16.0	11.2		
	> 3 – 4 hours	18.0	12.0		
	> 4 hours	29.6	10		

1% - significant at 0.001 % level

From the results of the chi square it is evident that a greater percentage of consumers view television for longer hours than non consumers and the difference is significant at 1 % level. Both weekday television viewing and weekend television viewing habits are factors influencing soft drink consumption patterns among consumers. Scully et al., (2008) in their study on the relationship between commercial television exposure and fast-food consumption among adults found that forty-one per cent of respondents estimated watching commercial television for </=1

h/d (low viewers); 29 % watched for 2 h/d (moderate viewers); 30 % watched for >/=3 h/d (high viewers). Television exposure among the subjects was classified according to Scully et al., (2008) as low viewers (< 1 hour/day), moderate viewers (> 1 - < 3 hours/day) and high viewers (> 3 hours/day).

Table 1 data examined with a sex-split revealed that 19.2 % female consumers and 25.4 % male consumers were high television (> 3 hours/day) viewers during weekdays compared to only 4.8 % of female non-consumers and 14.4 % male non-consumers. A higher percent of female consumers (36.8 %) and male consumers (58.4 %) were high television viewers (> 3 hours/day) during weekends compared to a lower percent of non-consumers. Also during both weekdays and weekends a greater percent of males (56.8 %) consume soft drinks and snacks while watching television.

Relationship between snacking, television viewing and soft drink consumption of consumers and non-consumers is presented in Table 2

Table 2: Relationship between snacking during television viewing and soft drink consumption among consumers and non-consumers

Snacking during TV viewing	Consumption (%)		Chi-square	Level of significance
	Consumers	Non-consumers		
No	48.4	70.3	31.342	1 %
Yes	51.6	29.7		

1% - significant at 0.001 % level

From the result of the chi-square it is evident that consumers had frequent snacking pattern while viewing television and the differences between the 2 groups was statistically significant ($p<0.01$). This shows that television viewing increases the snacking pattern of the adolescents. Longer duration of TV watching (thus, more frequent exposure to advertising) influences the frequency of consumption of soft drinks, some sweets and snacks, and some fast foods among children and young adolescents. Efforts to curtail the amount of time children spend watching TV may result in better dietary habits and weight control for children and adolescents.

About 47.2 % male consumers and 22 % of the female consumers felt that advertisements do have an impact on their soft drink consumption while greater percent of non-consumers had an indifferent opinion on the impact of advertisements on soft drink consumption. This finding is consistent with the results that suggest a strong relationship between soft drinks consumed and soft drink advertisements that the children could remember, people who are exposed to the commercials are more likely to drink excess soft drinks (Coon et al., 2001). Thus, limiting adolescent's exposure to television may be an effective avenue for improving adolescent's beverage choices.

Peer Influence on Soft Drink Consumption

The relationship between peer influence and soft drink consumption among consumers and non-consumers of soft drinks is presented in Table 3

Table 3: Relationship between Peer Influence and Soft Drink Consumption among Consumers and Non-Consumers

Peer influence		Consumption (%)		Chi-square	Level of significance
		Consumers	Non-consumers		
Soft drink preferences by friends	Disagree	22.4	32.4	9.875	5 %
	Agree	77.6	67.6		
Regular Soft drink consumption by friends	None	12.4	32.4	58.464	1 %
	Few	50	56		
	All	37.6	11.6		
Peer pressure to consume soft drinks	No	1.6	2.8	48.498	1 %
	Rarely	52.8	79.6		
	Weekly once	20.4	10.8		
	Twice a week	12.8	4.0		
	Alternate days	6.0	1.2		
	Everyday	6.4	1.6		

1% - significant at 0.001 % level

Results of the study indicate that there is a relationship between soft drink preference by the friends and soft drink consumption by the subjects of the study. A significantly greater percentage of consumers state that their peers also prefer soft drinks. (P<.005). It is also evident from the table that the proportion of adolescents who reported that most of their friends consume soft drinks on a regular basis (Figure1) and the proportion of adolescents who reported that they are encouraged by their friends to consume soft drinks are more likely to be soft drink consumers and the difference is significant (P<.001). This shows that soft drink consumption pattern of the friends were strongly influencing the soft drink consumption reported by study subjects.

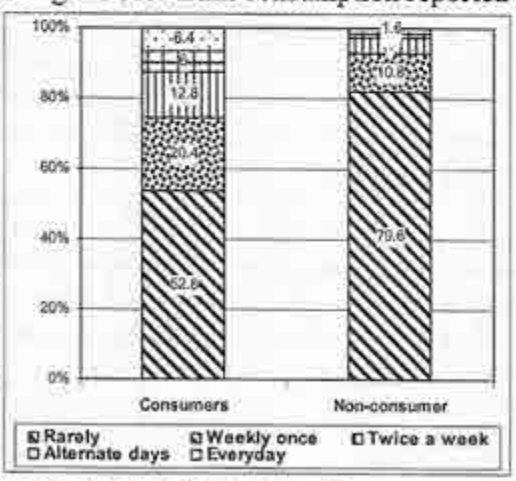


Figure 1: peer influence and soft drink consumption among consumers and non-consumers

The same data when examined with a sex split revealed that approximately 80 % of the male consumers report that their friends like soft drinks, more than 52% of male consumers and non-consumers reported that few of their friends consume soft drinks regularly. Four percent of the female consumers and 8.8 percent of the male consumers reported that they are encouraged by their friends to drink soft drinks everyday. 4 percent of the female consumers and 8 percent of male consumers report that they are encouraged by their friends to drink soft drinks on alternate days. Approximately 20 percent of the consumers report that they are encouraged by their friends at least weekly once. Majority of adolescents reported that they are rarely encouraged by their friends to drink soft drinks. Soft drink consumption among consumers may also be due to other factors like television viewing and advertisements which play a role in influencing soft drink consumption pattern

The practice of healthy eating in the social context of adolescents and their peers appears to be having a somewhat negative trend. It appears that peer pressure may hinder some adolescents from choosing healthy foods over unhealthy foods. Healthy food choices may evoke disapproval from friends in certain social settings. (Croll et al., 2001)

Parental influence on soft drink consumption

Parental influences have a marked effect on food selection. Parents play a pivotal role in the development of their child's food preferences and energy intake. Figure 2 show that most of the respondents reported that their parents (both mother and father) consume soft drink rarely. Results of the study, however, indicate that a higher percentage of mothers and fathers of the consumers consume soft drinks twice a week compared to non-consumers Relationship between parental influence and soft drink consumption among consumers and non-consumers is presented in Table 4

Table 4: Relationship between Parental Consumption and Soft Drink Consumption among Consumers and Non-Consumers

Parental influence		Consumption		Chi-square	Level of significance
		Consumers (%)	Non-consumers (%)		
Mother	No	2.0	0.8	31.533	1 %
	Rarely	64.4	85.2		
	Weekly once	15.2	8.4		
	Twice a week	11.6	3.2		
	Alternate days	5.6	2.4		
	Everyday	1.2	0		
Father	No	2.0	0.8	53.079	1 %
	Rarely	62.0	89.6		
	Weekly once	16.4	5.6		
	Twice a week	11.6	2.0		
	Alternate days	6.0	1.6		
	Everyday	2.0	0.4		

1% - significant at 0.001 % level

From Table 4, Figure 2 it is evident that there is a relationship between parental soft drink consumption and soft drink consumption of the adolescents in the study with parental consumption being significantly more among the soft drink consuming adolescents($P<.001$). Parents influence their children's sugar-sweetened beverage consumption and should therefore be involved in interventions aimed at changing dietary behaviors. Parental soft drink consumption may influence children because parents serve as role models, both positively and negatively. Also those parents who consume soft drinks on a regular basis may be less apt to restrict or have rules regarding their children's soft drink consumption. In a recent study, researchers found that parental soft drink intake has a stronger influence than children's peers. Parents who consume soft drinks on a regular basis may relax soft drink consumption rules and restrictions for their children (Grimm et al., 2004).

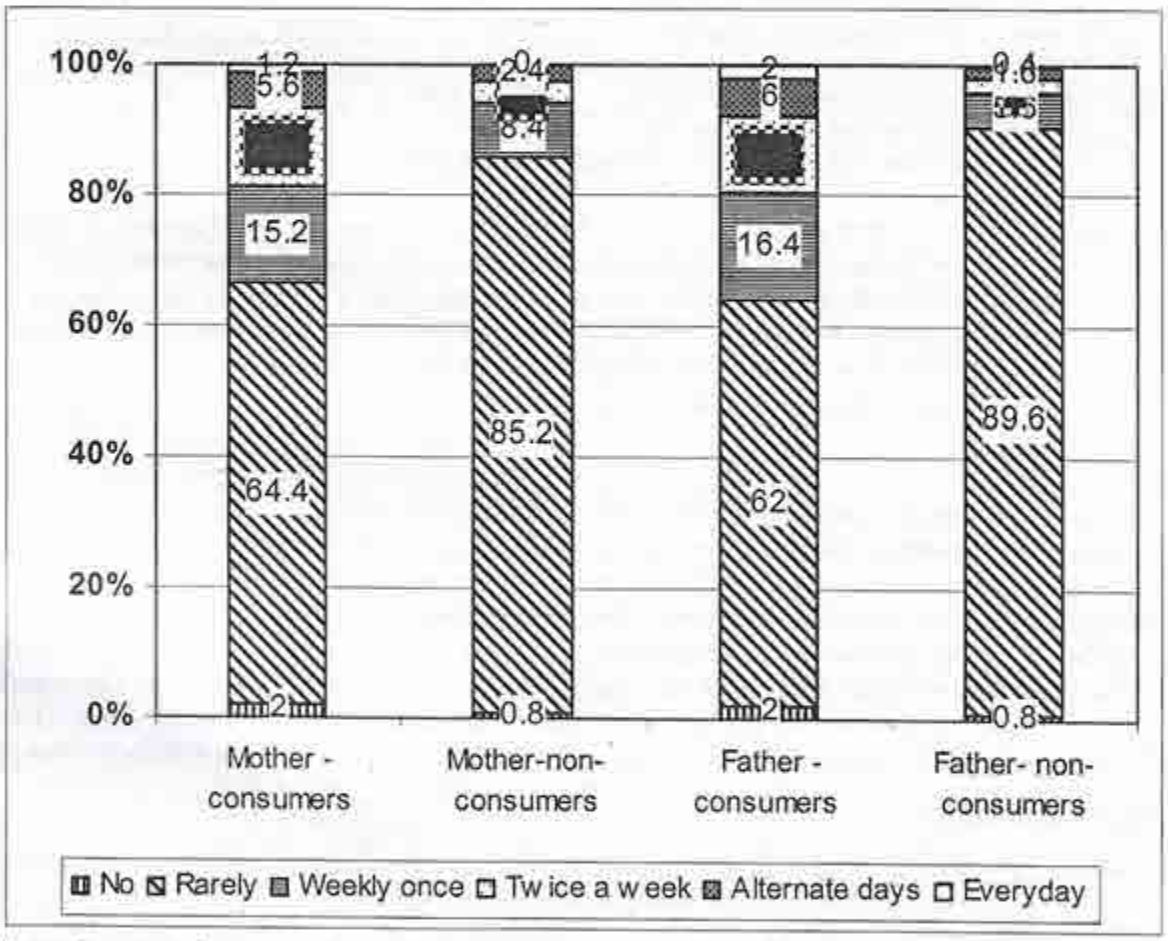


Figure 2: parental consumption and soft drink consumption among consumers and non-consumers

Nutrition Education Programme

The nutrition education sessions were designed so that common nutrition topics such as food groups could address beverage choices along with improving intake of nutrient dense foods. The nutrition knowledge and nutrition awareness of the subjects was assessed before and after the nutrition education programme using a checklist.

Table 5: Nutrition knowledge and awareness of the subjects before and after the nutrition education programme

Nutrition education programme	n	Mean	SD	't' Value	Level of significance
Nutrition knowledge					
Before (both consumers and non-consumers)	100	5.80	1.82	18.277	1 %
After (both consumers and non-consumers)	100	9.42	0.78		
Nutrition awareness					
Before (both consumers and non-consumers)	100	5.58	1.19	26.13	1 %
After (both consumers and non-consumers)	100	9.28	0.77		

1% - significant at 0.01 % level, 5% - significant at 0.05 % level, NS- Not significant

Results of the test of significance reveal that there is a significant difference in nutrition knowledge and nutrition awareness among the subjects before and after the nutrition education programme ($P<0.01$). Both consumers and non-consumers had a significant difference in their nutrition knowledge and nutrition awareness before and after the nutrition education programme ($P<0.01$). This shows that nutrition knowledge and nutrition awareness can be improved among both consumers and non-consumers by appropriate nutrition education.

CONCLUSION

Addressing the psychosocial factors identified in the study can aid in the prevention as well as the treatment of adolescent health hazards due to faulty eating habits. Parents can be empowered by increasing their awareness of unhealthful lifestyle behaviors and help them gain control of their family's eating and entertainment habits. Discussing healthful beverage options and limiting TV viewing can help adolescents achieve better nutritional behaviour and opt for active life style. Advising teenagers about the caloric consequences of soft drinks consumption and the impact of these calories on their weight can aid in weight management. Thus addressing some of these factors and health implications among adolescents can lead to better health and lifestyle changes.

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PHYSICAL ACTIVITY AND ENERGY EXPENDITURE PATTERN AMONG PREGNANT WOMEN

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The present investigation was taken to assess the time allocation and energy expenditure pattern among pregnant women. A total of 350 subjects belonging to both normal and high risk pregnant groups aged between 16 to 35 years coming under low, medium and high income categories were selected. The subjects were found to be involved either in sedentary or moderate activities and did not engage in any heavy physical activities. A higher energy deficit was seen among women belonging to 16 to 20 years age group (819 Kcal), adolescent (824 Kcal) and low income group (826 Kcal). Energy balance as compared to the somatic status showed that the energy deficit though did not affect the BMI, reflected in low protein status.

In recent decades, women's role in society has changed dramatically. Girls today are more likely than their mothers to pursue formal education and work outside the home. Employment is a right for all women and for most who work it is also an economic necessity. Many women continue to work, while pregnant and to work longer into their pregnancies. The increased prevalence of women employed during pregnancy, particularly through late gestation has heightened interest in the possible effects of work factors, including long hours, stress and fatigue on the course and outcome of pregnancy.

Many researchers have studied the relationship between physical activity during pregnancy and its impact on pregnancy outcome. Sedentary occupation was found to be in no way harmful to the outcome according to many studies (Mark et al., 1990: Jun Zhang et al., 1992: Ellen et al 2002). Adverse outcomes were observed only with prolonged standing, long working hours and lifting of heavy objects (Joe, 1993). Research findings on the effect of physical activity during pregnancy on preterm delivery and fetal growth has been controversial (Mark et al., 1990). Excessive physical activity is said to result in uterine contractions and hence premature effacement and dilation, leading to premature birth. During pregnancy the amount of maternal glucose available for feto-placental uptake varies directly with maternal levels. Maternal hypoglycemic response to regular recreational exercise during pregnancy potentially could restrict fetal glucose availability and result in some degree of fetal growth restriction (Jame & Eleanor, 1991).

Hence, the present investigation was taken up to assess the time allocation for physical activity and the energy expenditure pattern among pregnant women of Bangalore Urban.

METHODOLOGY

The study was carried out at private and government hospitals of Bangalore city. A total of 350 subjects belonging to both normal and high risk pregnant groups aged between 16 to 35 years from low, middle and high income categories were selected on the basis of their willingness to participate in the study. The high risk groups under the present study were pregnancy induced hypertension (PIH), gestational diabetes (GDM), anemia and adolescent pregnancies. The medical records available at the hospitals were used for classification.

ranging between Rs.4,000-10,000/- and high income group having a total family income of >Rs.10,000/- per month.

The anthropometric measurements of women such as height and weight were taken using standard procedures (Jellieffee,1966) during their first or second ANC visit after confirmation of pregnancy and within eight weeks to calculate body mass index (BMI) an index of nutritional status of adults.

Energy & protein intake: The women were interviewed with the help of a questionnaire for assessing the individuals' 24 h food intake by recall for 3 days during 1st, 2nd and 3rd trimester on their regular ANC visit. The reference for recall on food intake was the day preceding the day of the interview. Food consumed by each woman was converted to its raw weights. Food group intake data was translated into energy and protein intake by using food composition tables.(Gopalan etal,1996). RDI of energy was calculated based on the ideal body weight. The protein requirement was also calculated based on the ideal body weight.

Determination of energy cost of physical activities: The subjects were asked to record the daily physical activities in terms of type and duration (hours & minutes) for 3 consecutive days in case of non working subjects and two consecutive working days and one Sunday in case of working subjects. From the data obtained, similar activities performed in 24 hours were grouped. For each group, energy cost of activity available from the literature [WHO, 1985] was recorded. The time spent on each group of activity [K cal/ kg body weight/hour] was computed. The energy cost of physical activities in a day was then totaled up. The same procedure was adopted for calculating the energy cost of physical activities for each of the three days. To adhere to the normal practice of presenting the energy cost of physical activities per day, the average of three consecutive days was calculated and the data was utilized for the study.

The midpoint of normal BMI (18.5 to 20) was taken into account to derive the ideal body weight of the study group. Resting metabolic rate (RMR) predictable of women was computed using ICMR equations.14.0 x Body weight (kg) +471 (ICMR, 1990)

Energy Balance: Energy balance measurement among 350 pregnant women was calculated by the factorial method (Acheson et al, 1980) using the equation.

Energy Intake-Energy Expenditure=Energy Balance

RESULTS AND DISCUSSION

The working pattern of the pregnant women could be termed as sedentary to moderate as it involves either only household work or combined job, work & household work. Few women were advised bed rest for some complications. Some of the pregnant women irrespective of age group or income in joint families were also on total rest just for the reason that they are pregnant.

Table 1 presents the time allocation for different activities and the energy expenditure pattern of women classified according to normal/different high risk pregnancy groups. The adolescent pregnancy groups were observed to spend more time for office work (92.7 min), recreation (285 min) and rest & sleep (635 min). This may be because their parents/ in laws may have not assigned any work to them as they are young girls. The anemic and normal groups were engaged more with child care (99 min & 64.6 min) compared to others and this may be because these groups may be having women with a small child. The energy and time expenditure pattern among different groups varied significantly ($p< 0.05$) for activities like commuting and child care while it was non-significant for other activities.

Table 1: Time allocation and energy expenditure pattern of risk groups (Mean± SD)

Activity	Normal		PIH		Sample GDM		Adolescent		Anemia		F Value
	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	
Household	315± 124	537± 201	318± 120	535± 196	326± 144	567± 216	273± 121	442± 197	332± 137	542± 221	0.75^{NS}
Personal	129± 34	168± 44	122± 22	159± 29	131± 32	170± 42	113± 13	147± 16	124± 29	161± 37	1.65^{NS}
Commuting	22± 28.7	65± 86	29± 30.4	86± 91	30± 28.4	91± 85	9± 21.2	28± 64	12± 17.5	35± 52	4.89*
Office work	82± 12.5	139± 213	58± 13.3	98± 226	50± 10.4	86± 176	93± 22.0	158± 373	46± 11.9	78± 203	1.38^{NS}
Recreation	237± 110	497± 231	247± 102	520± 214	255± 92	536± 194	285± 137	599± 287	234± 110	492± 230	0.92^{NS}
Rest & sleep	592± 90	651± 99	626± 134	689± 134	574± 83	631± 92	635± 102	699± 113	593± 95	653± 104	2.23^{NS}
Child care	65± 104	142± 229	40± 74	87± 163	74± 86	161± 190	32± 71	70± 157	99± 125	218± 275	5.14*
Combined		2199		2174		2242		2143		2179	

*Significant at 5% level NS: Non-significant

Table 2 depicts the time allocation for different activities and the energy expenditure of the women, grouped age wise. The younger group seemed to be engaged more in recreation (255 min), rest and sleep (631 min). The older age-group women were spending more time for household (350 min), personal (129 min) and child care (106 min).This may be due to the fact that younger mothers are more likely to be primegravidae or likely to have elders with them. The energy expenditure of the age-group 26-30 years was higher (2240 K cal) compared to others.

Table 2: Time allocation and energy expenditure pattern of age groups (Mean± SD)

Activity	16-20years		21-25years		26-30years		30+years		F Value
	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	
Household	311±120	527±208	322±135	561±195	304±123	490±209	350±116	509±209	1.34^{NS}
Personal	118±20	163±41	128±34	157±35	127±31	188±39	129±30	164±40	1.69^{NS}
Commuting	13±26.0	54±74	19±23.6	53±77	28±33.0	105±119	18±18.7	115±107	4.77*
Office work	85±19.7	111±235	55±10.6	98±183	83±12.3	185±203	55±11.3	119±176	1.43^{NS}
Recreation	255±129	523±239	246±109	510±243	235±99	451±197	222±102	475±206	0.91^{NS}
Rest & sleep	632±105	673±112	600±95	646±84	593±105	628±77	560±84	688±140	4.03^{NS}
Child care	26±65.7	120±215	70±109	184±281	70±106	193±248	106±103	103±190	4.63*
Combined		2171		2209		2240		2173	

*Significant at 5% level NS: Non-significant

Classification of data according to income indicated that subjects belonging to low income group spend more time in activities such as household (347 min), rest and sleep (604 min) and childcare (73 min) while the high income group spent more time in personal care (137 min), commuting (78 min)

and office work (157 min). It is obvious that high income group included more of working women and they could not spare more time for household, childcare, recreation and other activities. The subjects belonging to middle income group were found to spend time for recreation (261 min). The total energy spent for the physical activities was highest among the middle income group (2213 K cal) (Table 3).

Table 3: Time allocation and energy expenditure pattern of income groups (Mean± SD)

Activity	Low Income		Middle Income		High Income		F Value
	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	Time (min)	Energy (K cal)	
Household	347±130	565±208	322±118	550±198	279±125	488±203	2.20^{NS}
Personal	120±31	156±40	124±28	161±37	137±30	179±39	0.74^{NS}
Commuting	15±24	45±71	22±29	67±87	26±28	78±85	4.15*
Office work	62±152	106±259	54±102	91±173	92±124	157±211	1.32^{NS}
Recreation	219±111	460±234	261±101	549±212	246±109	516±229	1.56^{NS}
Rest& sleep	604±105	664±115	591±97	650±106	598±99	658±108	2.12^{NS}
Child care	73±112	161±246	66±94	145±206	62±105	135±231	5.14*
Combined		2157		2213		2211	

*Significant at 5% level NS: Non-significant

The computed energy balance (K cal expended in physical activities Vs energy intake) of the subjects in the different risk, age and income groups is presented in Fig 1. It was interesting to note that irrespective of the group a mean energy deficit of 651 K cal ±151 was observed. A higher energy deficit was seen among women belonging to 16-20 years age-group (819 K cal), adolescent pregnancies (824 K cal) and low income group (826 K cal) as shown in Figure 1, 2 and 3.

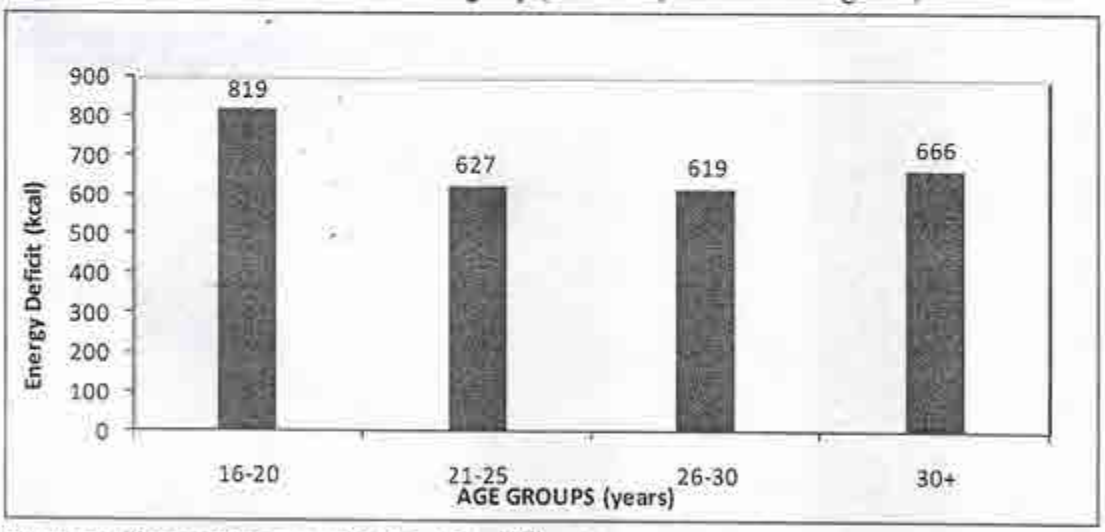

Figure 1: Energy Balance of Subjects in different age groups

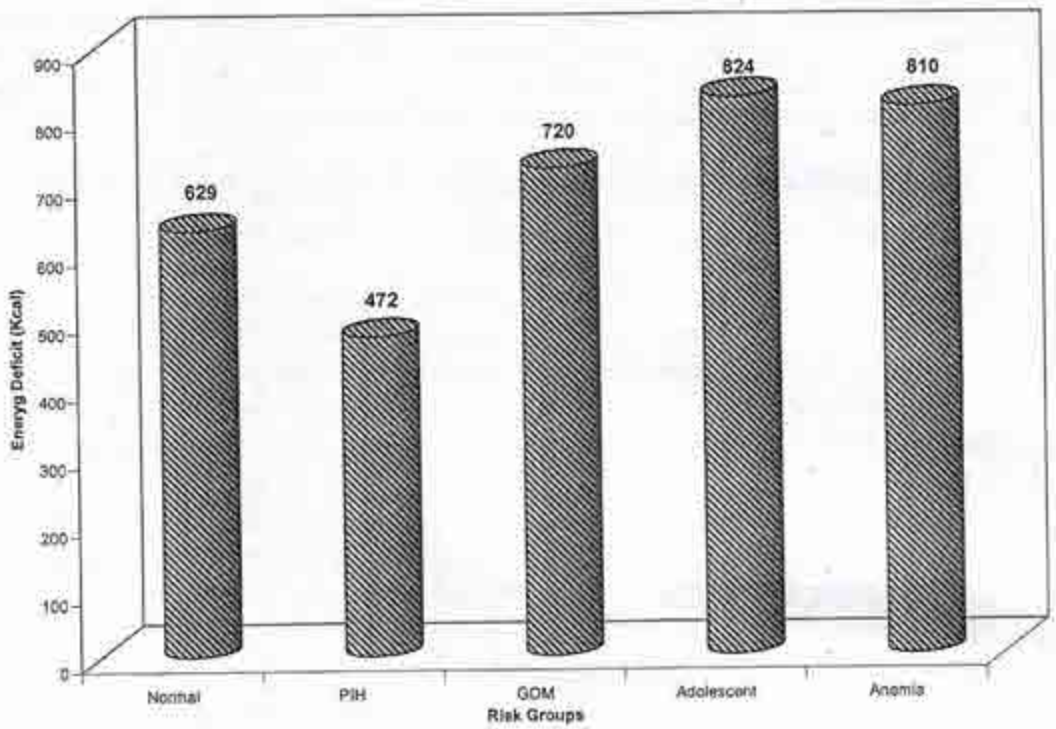

Figure 2: Energy Balance of Subjects in different groups

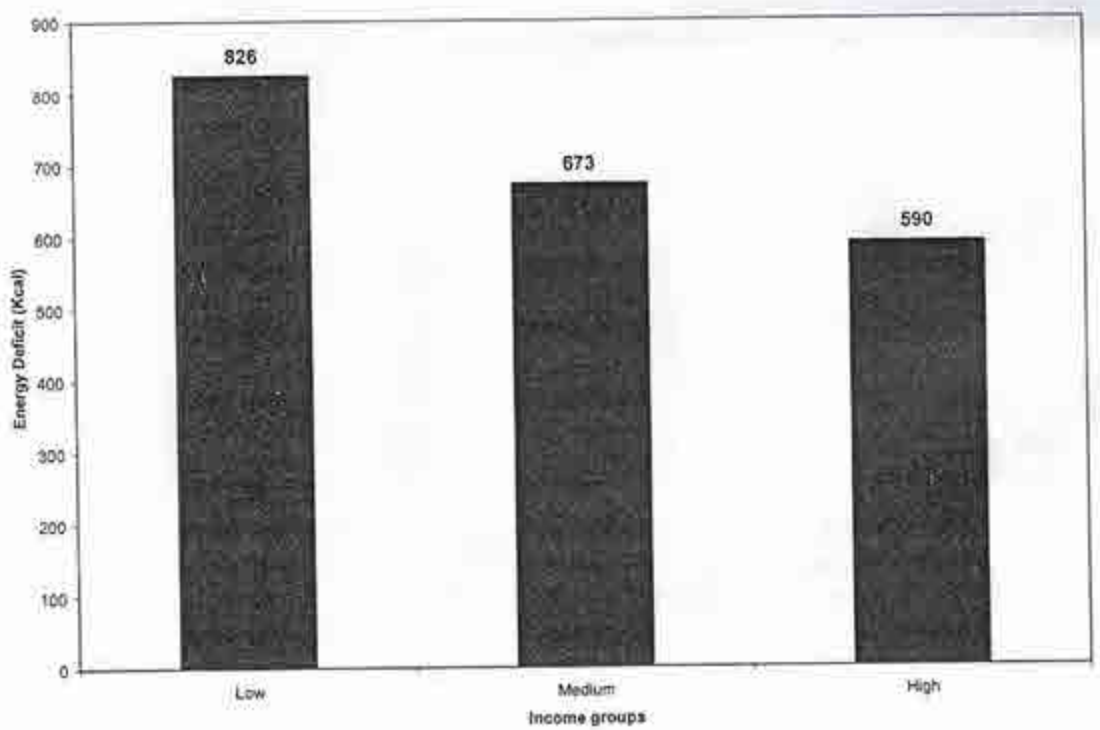

Figure 3: Energy Balance of Subjects in different income groups

Case studies from Uttar Pradesh showed that mothers of poor communities continued doing heavy work right through pregnancy. A study in Andra Pradesh showed that pregnant mothers were not given any extra rest throughout their pregnancy (Gopalan & Suminder, 1989). However, in the present study the working pattern of the women involved either sedentary or moderate type activities. It was also observed that the subjects did not engage in any heavy activities. This was probably due to their current physiological state and also due to increased awareness of the negative effects of heavy physical exertion. However, data on knowledge awareness was not specifically generated as a part of this study.

The energy and protein intake of the women by their age-group as compared to the recommended intake is presented in Table 4. Caloric intake per day was less as compared to RDI among all age-groups. The data of calorie and protein intake is the average of three re calls in three trimesters. The average values were compared against the RDI. However, the energy intake was more than sufficient to meet the resting energy needs. The protein intake was lower than the RDI in all age-groups. Although the energy and protein intake, when compared to RDI of Indians was inadequate in all age-groups, it did not reflect in their body weight as BMI was within the normal range for majority of the subjects.

Table 4: Energy and protein intake of the subjects in comparison with RDI (Mean±SD)

Age groups (years)	n	BMI	Energy				Resting Energy (kcal)*		Protein			
			Intake (kcal)		RDI (kcal)				Intake (g)		RDI (g)	
			(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
16-20	51	23.1± 5.5	1367 ±538	24.6 ±8.4	2283 ±159	43.79 ±0.5	1202 ±58	23.5 ±2.1	37.2± 16.3	1.10± 0.9	57.1± 4.0	1.1± 0.01
21-25	149	22.0± 4.6	1568± 655	29.7 ±10.9	2347 ±177	43.61 ±0.5	1227 ±66	22.5 ±2.1	44.9± 19.3	1.09± 0.9	58.7± 4.4	1.1± 0.01
26-30	112	21.6± 4.0	1563± 553	29.2 ±12.7	2359 ±162	43.57 ±0.4	1230 ±59	23.0 ±2.0	46.8± 16.6	1.08± 0.9	59.0± 4.0	1.1± 0.01
30+	38	21.8± 4.6	1547± 654	29.6 ±11.7	2355 ±154	43.58 ±0.4	1228 ±57	23.4 ±1.9	45.9± 21.5	1.08± 0.8	58.9± 3.9	1.1± 0.01
Combined	350	22.0± 4.6	1541± 613	28.8 ±11.4	2343 ±169	43.62 ±0.5	1224 ±62	22.9 ±2.1	44.8± 18.6	1.08± 0.8	58.6± 4.2	1.1± 0.01

(1): Calories per day, (2): Calories per day per kg body weight

* Resting energy computed,

RDI: Recommended dietary intake n=Total number of subjects

Findings on the energy balance as compared to the somatic status showed that although the energy deficit did not affect the BMI, it was reflected in low protein status. More number of subjects belonging to younger age group (16-20 y) had a low protein and fat status as depicted by MUAC (Mid upper arm circumference which was measured as per standard procedures (Jellieffe, 1966), MUAMC (MUAMC=MUAC- ∏ (TSF) and TSF values (Triceps skin fold thickness) This could be attributed to the fact that with low energy intakes, protein will naturally be utilized for energy, resulting in a protein deficient state.

CONCLUSION

During pregnancy there is an increased tendency for women to work less. It is either due to physiological conditioning or the awareness about the adverse consequences of strenuous physical exercise during pregnancy. In the present study, the subjects were found to be involved either in sedentary or moderate activities as revealed by the records of working pattern/ activities. It was observed that the pregnant subjects did not engage in any heavy physical activity. Though the energy deficit was seen among all the groups, higher energy deficits were more among younger age group and low income group which is probably due to poor nutritional knowledge. The results strongly recommend the need for nutrition education during pregnancy by health professionals involved in obstetric practice.

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ISOLATION, CHARACTERIZATION AND SCREENING OF NATIVE YEAST STRAINS OF JACKFRUIT (*Artocarpus heterophyllus* L.) FOR WINE PRODUCTION

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Yeast isolated from jackfruit phyllosphere; perianth lobes and juice were characterized and compared with standard yeast strain *Saccharomyces ellipsoideus* No. 101 for different parameters. Among the isolated strains, the yeast strain JFY_1 was found to be superior to other isolates with respect to ethanol tolerance and alcohol production. Wine was prepared from jackfruit juice. The results of chemical analysis indicated that wine produced using *Saccharomyces ellipsoideus* No.101 was found to be superior to other yeast strains with respect to characteristics like TSS, acidity, sugar level and alcohol content.

KEY WORDS: Fermentation, Native yeasts, Standard strains, Phyllosphere, Alcohol

Jackfruit (*Artocarpus heterophyllus*. L) is one of the underutilized fruits, belongs to the family Moraceae, is the largest edible fruit in the plant kingdom and occupies the top most rank with respect to quantity of food produced per unit area. The tree is valued for its money earning capacity and there are instances in which a single tree is reported to have generated an income of thousand rupees in one season alone. Hence, its cultivation is gaining popularity in the farming community.

The ripe jackfruit bulbs are rich in sugars with a calorific value of about 90 calories for 100 g fresh weight. Jackfruit is nutritious, rich in vitamins (A and B), minerals (Ca, K and Fe) and contains considerable amounts of carotene and vitamin C. It is a rich source of pectin and protein. Jackfruits are being valued by the processor to make the best use of enormous production and glut in the market during the season. (Anon, 2000).

MATERIAL AND METHODS

Jackfruits were collected from Regional Research Station, GKVK, Bangalore. Yeasts were isolated from the perianth lobes, phyllosphere and juice of jackfruit by standard plate count technique using Davis agar medium. The isolated yeasts were further purified. These pure cultures were observed under the microscope after staining with cotton blue for yeasts and tests were conducted for identification and characterization of these isolates. Yeast isolates were identified by studying their morphological characters. *Saccharomyces ellipsoideus* No. 101. was used as a reference strain. Budding of yeast isolates was tested by keeping a drop of one hour old culture on a slide and observed. Yeasts formed characteristic colonies on different media, which was a tool for preliminary identification. The characterization of yeast was done based on growth on Davis broth, assimilation of different carbon sources, ethanol tolerance and fermentation of carbohydrate.

Preparation of wines

The juice brix value was adjusted to 18^0 by adding 200 g cane sugar per litre of juice. The acidity was maintained at 0.5 per cent by adding citric acid. Potassium metabisulphite @ 200 ppm was

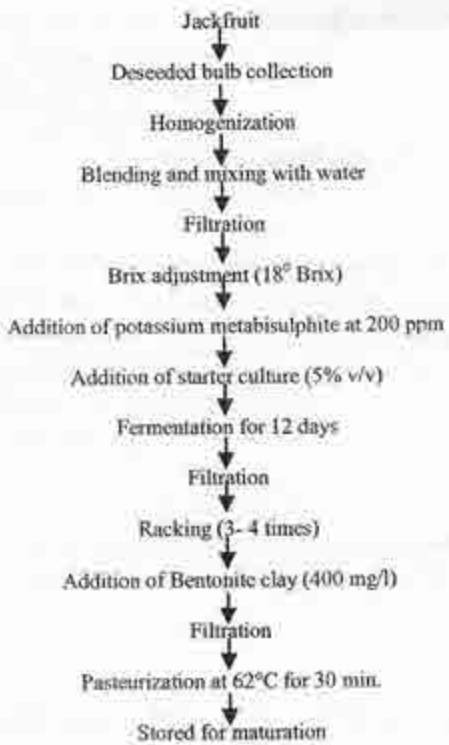
added to suppress wild yeast present in the juice. The juice was inoculated with yeast starter cultures at the rate of 5 per cent (v/v) for fermentation under anaerobic conditions. Fermentation was carried out with occasional mixing of the juice and the fermentation was stopped by fall in T.S.S (^{0}Brix). The wine was filtered using cheese cloth and filled in bottles for completion of slow fermentation. Finally, wines were clarified by adding 0.4 per cent bentonite clay. Further, clear wines were siphoned into clean pasteurized bottles and tightly corked. These samples were used for further analysis and evaluation. Further, the efficient yeast isolate was tested along with standard culture for its performance under nutritional amendments like addition of casein, soy protein and combination of both.

Treatment details

There were 8 treatments consisting of one reference strain, efficient yeast isolates along with soy protein and casein and details of the treatment are as follows:

A_1: S. *ellipsoideus* No. 101
A_2: S. *ellipsoideus* No. 101 + 1 % casein
A_3: *S. ellipsoideus* No. 101 + 1 % soy protein
A_4: *S. ellipsoideus* No. 101 + 1 % casein +1 % soy protein
B_1: Jackfruit yeast$_1$
B_2: Jackfruit yeast$_1$ + 1 % casein
B_3: Jackfruit yeast$_1$ + 1 % soy protein
B_4: Jackfruit yeast$_1$ + 1 % casein + 1 % soy protein

Flow diagram illustrating wine preparation from Jackfruit



Estimation of total soluble solids (^{0} Brix), pH, titrable acidity (%), reducing sugars, total sugars, ethanol, Nitrogen content

The total soluble solids of the wine were determined with the help of "ERMA" hand refractometer having a range of 0 to 32^0 Brix at room temperature. The pH of the wine was measured using digital pH meter of analog model (Corin research USA). Standard buffer solution of pH 4.0, 7.0 and 9.0 was used as reference to calibrate. Titrable acidity was estimated by the method given by Srivastava and Kumar, 1993. The reducing sugar was estimated by following the method as given by Shaffer-Somogyi micro method (A.O.A.C., 1980). The ethanol was estimated by using alcohol meter. The nitrogen estimation was carried out by Micro-Kjeldahl method (A.O.A.C., 1980).

According to the sensory evaluation by the expert panel members the wine was matured for 90 days after active end of the fermentation. The matured wine was used for all the biochemical and organoleptic evaluation as during storage as the wine matured it scored better in terms of its aroma , taste , bouquet and alcohol content and was readily accepted by the selected panel members for consumption. The wines were clarified by adding 0.4 per cent bentonite clay. Further, clear wines were siphoned into clean pasteurized bottles for maturation without disturbing and kept for long term storage.

RESULTS AND DISCUSSION

The microflora of perianth lobes, juice and phyllosphere of jackfruit was analyzed. The results pertaining to microflora from jackfruit is present in table 1.

Table 1: Yeast and lactic acid bacterial population in phyllosphere, perianth lobes and juice of jackfruit

Jackfruit source	Population (x 10^2 CFU)
	Yeast
Phyllosphere	20.3 (cm^2)
Perianth lobes	25.3 (g)
Juice	32.3 (ml)

Note: CFU: Colony forming unit

Yeast population recorded from jackfruit perianth lobes, juice and phyllosphere varied from 20.3 to 32.3 x 10^2cfu / cm^2. The highest yeast population was recorded in juice (32.3 x 10^2 cfu / ml) and lowest population was recorded in phyllosphere (20.3 x 10^2cfu / cm^2) followed by (25.3 x 10^2cfu / g) in perianth lobes of jackfruit. There were significant differences in the yeast population of perianth lobes, phyllosphere and juice of jackfruit. The highest yeast population was recorded in juice compared to perianth lobes and phyllosphere of jackfruit. This might be due to the availability of acidic pH, nutrients or due to excess handling during juice preparation which favoured the better growth and development of yeast and lactic acid bacteria. Table 2 shows the biochemical properties of the jackfruit juice.

Table 2: Biochemical properties of jackfruit juice

SL.No.	Particulars	Values
1	pH	3.95
2	TSS (^{0}Brix)	18.0
3	Titrable acidity (%)	0.52
4	Reducing sugars (%)	5.87
5	Non reducing sugars (%)	13.38
6	Total sugars (%)	18.45
7	Protein (%)	1.67

Yeasts were isolated using Davis agar medium from perianth lobes, juice and phyllosphere of jackfruit. All the isolates were subjected to various morphological and biochemical tests to confirm their identity. A standard strain of *Saccharomyces ellipsoideus* No. 101 was used as a reference culture. The test isolates including standard strain *Saccharomyces ellipsoideus* No. 101, formed characteristic white, smooth, wrinkled and flat colonies on Davis agar medium. The results on the growth of standard yeast and isolates on Davis broth are presented in table 3.

Table 3: Growth of yeast isolates in Davis broth

Sl.No	Strains	OD values at 600 nm			
		12 hrs	24 hrs	36 hrs	48 hrs
1	RY	0.388	0.791	1.605	1.870
2	JFY_1	0.301	0.612	1.354	1.680
3	JFY_2	0.292	0.598	1.234	1.480
4	JFY_3	0.233	0.450	0.961	1.283

Note:
RY: Reference yeast (*Saccharomyces ellipsoideus* No. 101)
JFY_1: Jack fruit $yeast_1$, JFY_2: Jack fruit $yeast_2$, JFY_3: Jack fruit $yeast_3$

The highest OD value was recorded by *Saccharomyces ellipsoideus* No. 101 (0.388, 0.791, 1.605 and 1.870 at 12, 24, 36 and 48 hrs respectively) followed by JFY1 (0.301, 0.612, 1.354 and 1.680 at 12, 24, 36 and 48 hrs respectively) and JFY_2 (0.292, 0.598, 1.23 and 1.600 at 12, 24, 36 and 48 hrs respectively). Least OD value was observed in case of JFY_3 (0.233, 0.450, 0.961 and 1.283 at 12, 24, 36 and 48 hrs respectively).

Organisms were inoculated in a test tube containing Durham's tube for detection of gas production. The fermentation broth contained ingredients of nutrient broth, a specific carbohydrate (glucose) and a pH indicator (phenol red which is red at neutral pH and turns yellow at or below a pH of 6.8 due to the production of organic acid. The results on assimilation of different carbon sources by *Saccharomyces ellipsoideus* No. 101 and jackfruit isolates are presented in table 4.

Table 4: Utilization of carbon sources by yeast isolateas

Sl.No	Strains	Glucose	Sucrose	Fructose	Lactose
1	RY	++	++	++	–
2	JFY_1	++	++	++	–
3	JFY_2	++	+	++	–
4	JFY_3	++	++	+	–

Note: RY: Reference yeast (*Saccharomyces ellipsoideus* No. 101)
JFY_1: Jack fruit $yeast_1$,
JFY_2: Jack fruit $yeast_2$,
JFY_3: Jack fruit $yeast_3$
Good growth: + +
Medium growth: +
No growth: -

The data revealed that all yeast isolates assimilated glucose. Weak assimilation of sucrose and fructose was observed in JFY_2 and JFY_3, whereas assimilation of lactose was negligible by all the strains.

The ethanol tolerance by jackfruit isolates and *Saccharomyces ellipsoideus* No. 101 are presented in table 5.

Table 5: Growth of yeast isolates at different ethanol levels

Sl.No	Strains	OD values at 600 nm					
		2.5 % ethanol		5.0 % ethanol		7.5 % ethanol	
		24 hrs	48 hrs	24 hrs	48 hrs	24 hrs	48 hrs
1	RY	0.480	0.956	0.471	0.931	0.222	0.468
2	$JFWY_1$	0.470	0.928	0.448	0.894	0.220	0.446
3	$JFWY_2$	0.442	0.890	0.426	0.870	0.218	0.430
4	$JFWY_3$	0.426	0.870	0.420	0.854	0.200	0.416

Note:
RY: Reference yeast (*Saccharomyces ellipsoideus* No. 101)
JFY_1: Jack fruit $yeast_1$, JFY2: Jack fruit $yeast_2$, JFY_3: Jack fruit yeast

The experiment was conducted to evaluate the effect of initial added ethanol concentration at 2.5, 5.0 and 7.5 per cent (v / v) on biomass production by these strains. The results showed that all the strains showed good growth at 2.5 per cent ethanol concentration, whereas at 5.0 per cent, highest OD (600 nm) was recorded by *Saccharomyces ellipsoideus* No. 101 (0.471 and 0.931 at 24hrs and 48 hrs respectively) followed by JFY_1 (0.470 and 0.928 at 24 hrs and 48 hrs respectively) and JFY_2 (0.448 and 0.894 at 24 hrs and 48 hrs). However lowest was by JFY_3 (0.402 and 0.854 at 24 hrs and 48 hrs respectively). Similarly at 7.5 per cent also highest OD was recorded by *Saccharomyces ellipsoideus* No. 101 (0.222 and 0.468 at 24 hrs and 48 hrs respectively), followed by JFY_1 (0.220 and 0.446 at 24 hrs and 48 hrs respectively). The least OD was recorded in JFY_3 (0.200 and 0.416 at 24 hrs and 48 hrs respectively).

All the strains were screened for alcohol production from jackfruit juice. The alcohol production was highest in case of *Saccharomyces ellipsoideus* No. 101 (6.2%) followed by JFY_1 (6.0 %). On the other hand all other isolates produced alcohol in the range of 5.2 % to 5.6 %. The protein content of jackfruit juice was 1.67 percent.

The quality of wine mainly depends upon the growth and activity of yeast and differs with genera and species of yeast strains. The highest growth on Davis broth was noticed with *Saccharomyces ellipsoideus* No. 101. and JFY_3 showed least growth. These results are in concurrence with the findings of Deepak (1994) who reported that growth and activity varied with isolates. Yeasts can assimilate different carbon sources like glucose, sucrose, fructose and lactose. All the yeasts strains in this study showed good assimilation of glucose. Glucose is a favoured carbon source which is an indication of glycolysis, a major carbon utilizing pathway by the yeast. The isolates JFY_1, JFY_2, and JFY_3 utilized sucrose and fructose that could be due to the presence of enzymes which convert sucrose into glucose but, lactose assimilation was nil in all the strains.

Yeast strains with higher ethanol tolerance are preferred for wine making. High concentration of ethanol inhibits the growth and activity of yeast. All the strains showed good growth in presence of 2.5 per cent ethanol. The highest growth was recorded by standard yeast *Saccharomyces ellipsoideus* No. 101 and lowest OD was recorded by JFY_3 at 5 per cent ethanol. Further, in the presence of 7.5 per cent ethanol, the highest growth was noticed in standard yeast *Saccharomyces ellipsoideus* No. 101 followed by JFY_1 but, least OD was recorded in JFY_3. The ethanol tolerance capacity of yeast mainly depends upon its unsaturated fatty acid content and also heat shock proteins produced in yeast cells. Ethanol inhibition is also linked to denaturation and inhibition of glycolytic and fermentative enzymes and modification of cell membranes.

Alcohol production is one of the parameters to test the efficiency of strains, since alcohol is a major solvent in wine. Among the isolates of yeasts tested, the highest alcohol (6.20 %) was observed in *Saccharomyces ellipsoideus* No. 101 inoculated treatment followed by JFY_1 (6.00 %). The variation in alcohol production by different yeast strains may be due to the variation in their rate of sugar utilization in fermentation medium and alcohol tolerance limits. Protein is one of the nutrient components essential to cell growth. The Amount of protein content of wine depends on total amount of nitrogen content of fruits and supplemented nitrogen sources. The results revealed in this study that the wine treated with combination of casein and soy protein recorded maximum amount of protein. Metabolism of these amino acids in proteins varies from yeast strain to strain. Therefore, differences in the protein content were observed. Table 6 presents the effect of nutrient amendments and isolates on alcohol (%) of jackfruit wine.

Table 6: Effect of nutrient amendments and isolates on alcohol (%) of jackfruit wine

	Alcohol (%)		
	Yeast strains		
Treatments	RY	JFY_1	Mean
control	5.80	5.60	5.70
casein	6.00	5.90	5.95
Soy protein	6.30	6.10	6.20
Casein + SP	6.20	6.00	6.10
Mean	6.07	5.90	5.98
Source	S Em ±	CD at 1%	
Strains (S)	0.434	0.122	
Treatments(T)	0.349	0.086	
Interaction (SxT)	0.049	0.173	

Note:

RY: Reference yeast (*Saccharomyces ellipsoideus* No. 101)
JFY_1: Jack fruit yeast$_1$
SP: Soy protein

CONCLUSION:

It is generally said that good wines are prepared from quality fruits, though quality can be improved during processing. Wine being used for human consumption, it is quite natural that they should be evaluated by organoleptic procedures. Taste of wine varies with person to person. Some people may like dry wine, some may like sweet wine. Based on that, taste of wine prepared

from jackfruit was analyzed for organoleptic evaluation based on different parameters. The wine produced from juice inoculated with *Saccharomyces ellipsoideus* No. 101 supplemented with casein was found to be superior in characteristics like appearance, colour, aroma, flavour and general quality and by microbial processing of jackfruit into value added beverage. By this post harvest loss of jackfruit can be prevented and it can thus be recommended to the farmers as an additional income generating activity.

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TRAINING NEED ASSESSMENT OF THE TEXTILE TRADERS OF UTTARAKHAND: A TOOL FOR CAPACITY BUILDING

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The main aim of the present investigation was to assess the training need of the textile traders of Uttarakhand on different aspects of textile manufacturing i.e. its processing, designing and manufacturing etc. Uttarakhand being the one of the richest regions in terms of bio-resources, have a great potential in providing employment to rural peoples. The International border of Uttarakhand with Tibet and Nepal is known as Bhotia region. Uttarakhand textile trade is dominated by Bhotia community. Traditionally Bhotia people use to raise sheep, wool spinning and weaving is a part of every day routine in Bhotia family and all members of the family participate in spinning. But it was observed during the pilot study that most of the unorganized sectors of Uttarakhand dealing in the manufacturing of textile products for income generation were not aware about the latest trends in textile trade required for increased profitability. Therefore they required training on different aspects related to textile processing and designing. Training is an important mechanism for transfer of technology and upgrading the human resources at all levels. A planned intervention is needed for the development of textile trade in Uttarakhand at various levels by analyzing the training need of the textile traders. Therefore the need based trainings was organized, which will entails in skill up gradation of workers already practicing the activity by developing vocational skills among them.

KEY WORDS: Uttarakhand Consumers, Training, Natural dye, Designing, Fiber processing

Uttarakhand the 27th state of India, is one of the richest regions in terms of bio-resources, so the livelihood of these people depends mainly on natural resources. In Uttarakhand, the textile sector comprises of organized and unorganized sectors, where many private organizations, government organizations, non government organizations, self help groups and traders etc. are working on natural textile fibres. Occupations like sheep rearing, goat rearing and sericulture provide the people of Uttarakhand their occupation and source of income, as there is no cash crop cultivation. Wool and woollen goods i.e. dun, asan, durrie, chutka, namda and thulma occupy a prominent place in their cottage industries. Silk and silk products have been declared as thrust industries of Uttarakhand. Thus it is very clear from the above discussion that rural areas of Uttarakhand are greatly blessed by the different natural resources and skillful artisans, who are engaged in different employment generating activities. But it was found out during the preliminary survey that due to the lack of knowledge about new advanced technology related with manufacturing and development of textile trade, the work of handloom artisan is not getting recognition in the global market. Expanding world population; variable availability of different natural fibres and fashion conscious customers are constantly demanding new varieties of textile products. Therefore it is very important to provide training to the artisans on various aspects related to their work i.e. fiber processing, spinning, weaving and designing. In this way the inherent skills of

local artisans along with the best utilization of natural resources can be used for generating employment for the livelihood security of rural people. However before organizing training their need assessment is a must, in order to tackle their problems. Thus the present survey research was planned to judge the training needs of the rural people in the related fields of their work. This study will help in developing entrepreneurial skills for the people in Uttarakhand and for the rural people engaged in such skills all over India.

MATERIALS AND METHODS

The present study involved assessment of the training needs of the textile traders of Uttarakhand on different aspects of textiles starting from fiber processing, product manufacturing and marketing of products. A survey was carried out and data was analyzed.

Locale of the Study

The study was carried out in the Uttarakhand state which is divided into three distinct geographical areas: High mountain region, mid mountain region and Tarai region (plain area).Uttarakhand state was purposely selected because Uttarakhand is a newly formed state in the year 2000. Till date the status as well as the training need assessment of Uttarakhand textile traders on different aspects of textiles has not been documented. Therefore on the basis of results of the present study, the need / requirement of the respondents would be identified. The survey in Uttarakhand will provide latest information regarding the present status of textiles trade and training requirement of the people engaged in textile trade. Survey analysis report may prove to be beneficial for policy makers also. On the basis of information collected need based modern textile technology would be developed and training would be planned accordingly.

Selection of respondents

The target population contacted was private organizations, government organizations, non government organizations (NGO), self help groups(SHG) and traders etc. who were working on production of textile products made with locally available natural textile fibers. Simple random sampling was done to select the respondents. The total sample size consisted of 220 respondents.

Tool preparation, techniques used and procedure of data collection

In the present research, primary sources to get first hand information were group members of government organizations, private organizations, SHG's, NGO's, and traders etc. To gather information from respondents' a tool was prepared in the form of an interview schedule. The interview schedule was divided into two parts namely-general information and specific information of the respondents. Under general information portion of interview schedule general questions were asked such as the name of owner/ NGOs/SHG/ year of establishment of organization etc. whereas in the specific information part, questions related to the present status of textiles trade and training requirement of the people engaged in textile trade were framed. Two techniques used in the study for collection of data were: Interview Schedule-cum-observation and Interpersonal discussion with respondents

Interview Schedule:

The structured interview schedule was initially pre-tested on thirty respondents. On the basis of experience gained through pre-testing, necessary modifications were made in the interview

schedule and sequencing was done accordingly. The finalized schedule was used for data collection.

Observation and interpersonal discussion with respondents:
Interpersonal discussion with respondents was carried out by researcher to gain correct and in-depth understanding of group structure as well as its functioning.

Procedure of data collection:
The data or information regarding the above variables was collected through observation-cum-interview schedule method by the investigator. Thus the data was first hand and factual.

Statistical analysis of data
Data obtained with the help of interview schedule-cum-observation method was tabulated for further analysis.

RESULTS AND DISCUSSION

It was found out during survey that all the respondents gave a positive response for the continuation of their work, the reason behind this being that this textile work is their sources of livelihood. Moreover the respondents were emotionally involved with their ancestral work. Respondents performed their job with deep interest and nobody wanted to divert to any other job, although it was also observed that at some places respondents were not getting due profits, so some of them were forced to change their occupation. These respondents were from high hill region (Bhotia people) as well as from Tarai region (weavers of Kashipur area). It was noticed that profit margin per piece of product was very nominal i.e. 5 - 10% profit was earned by 36.36% of respondents. 20.09% respondents used to take about 10 - 15% profit only. It may be due to the fact that respondents used to sell their products in the local market, or from their own homes directly. However, they were satisfied with whatever they earned as profit. Some of the respondents (10.45%) also answered that they sell their products at no profit, no loss basis. Some of the respondents (74%) had proper knowledge and skill in spinning & weaving but in the traditional manner only. Few of them (17 %) were lacking in one field or the other.

It is clear from Figure 1 that a greater no. of respondents i.e. 91.80% were interested to attend training related to the processing of fibers and production of textile articles. They wanted to introduce new ideas in processing of materials and new designs in the articles, to improve their quality which will result in an increase in demand for their products in the market. Some respondents (65%) were also interested in increasing their rate of production by using latest but simple machineries as increased production will also help to increase their profit margins.

8.2% respondents were not interested in attending any training. They were the respondents from the high hill region. They emphasized that they produce their traditional articles only, which they can sell as soon as it was produced manually at home without any extra efforts. At high hill region warmth of textile products was the main criteria which they obtain by using the Tibetan wool. This wool is medium coarse and is bulky. Hence these Bhotia people living at high altitudes such as Pitoragarh, Munsyari ,Dharchula etc wanted no

change in their ancestral products. Their mind set was such that they were not willing to accept any change, through training or likewise.

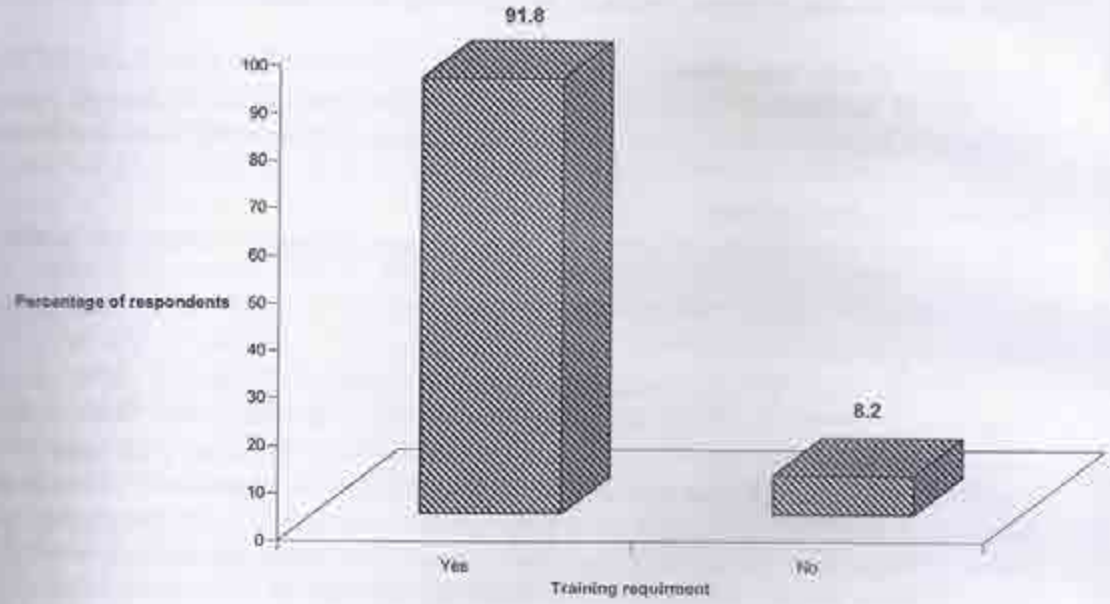

Fig. 1. Percentage of respondents having further training need

Table No. 2– The preferences of desired topics for training:

Topics	Frequency (no. of respondents)	Percentage
Designing	82	37.3
Spinning	15	6.8
Weaving	13	5.9
Processing	9	4.09
Natural dye	20	9.09
Product finishing	26	11.8
Dyeing + designing	18	8.2
Designing + processing	3	1.4
Designing + to improve colour fastness of dyeing	9	4.1
Spinning + dyeing	1	0.45
Marketing skills	4	1.8
Up gradation of loom	2	0.9
No need of training	18	8.2
Total	**220**	**100**

It is clear from Table 2 that 37.3% respondents wanted to attend training on designing, 6.8%, 5.9%, 4.09%, 9.09%, 11.8% respondents desired to be trained on spinning, weaving, processing, natural dye and product finishing respectively.

There were 8.2%, 1.4%, 4.1%, 0.45%,1.8% and 0.9% respondents respectively who wanted to receive training on more than one topic i.e. dyeing & designing; designing and process to improve colour fastness; spinning and dyeing; marketing and upgradation of loom respectively. Only 8.2% respondents did not want to attend any training.

Respondents at upper hills had indicated more interest in dyeing with natural dyes. They have lot of natural dye sources. They were already having some basic knowledge of natural dyes, so they wanted to know better extraction methods and use of mordents to develop a variety of colours using the same dye source.

It was observed that respondents from all areas of Uttarakhand were very keen to learn designing of textile products, as customers demanded unique and appealing designs.

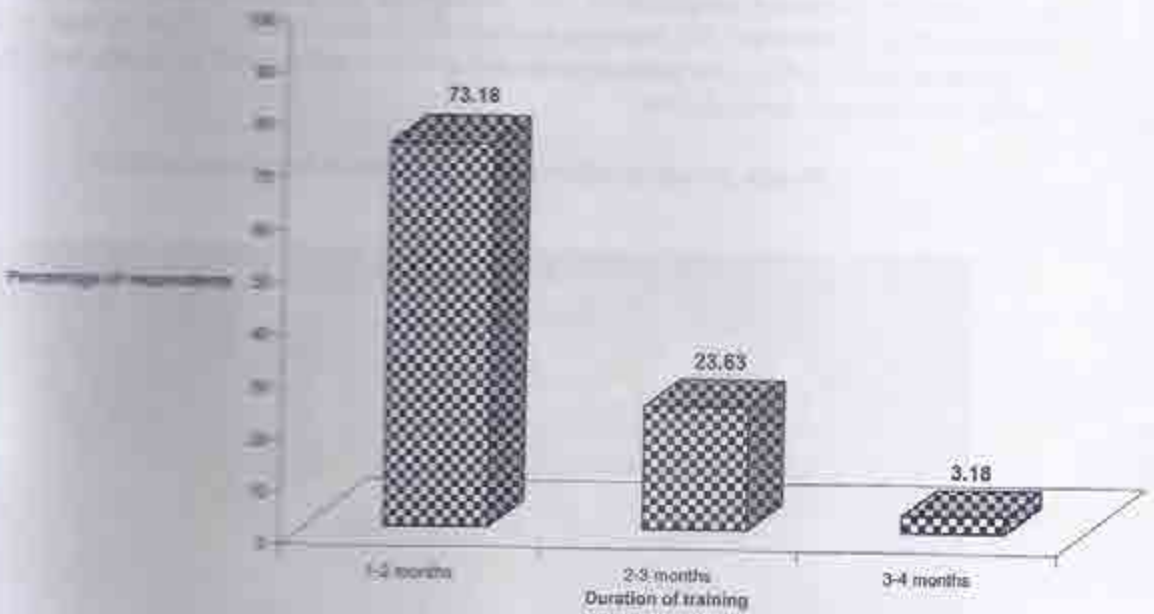

Figure 2: Suitable duration of training

It is clear from Figure 2 that 73.18% respondents preferred the duration of training to be 1 to 2 months and wanted training related to spinning, dyeing, processing etc. 23.63% respondents wanted to attend training for 2 to 3 months period, on the topic of weaving and designing etc. Only 3.18% of the respondents wanted training for 3 to 4 months duration and specifically on weaving. In general it was seen that most of the respondents found 1-2 months training duration comfortable.

CONCLUSION

The results of the present investigation revealed that the rural people of Uttarakhand dealing with the different aspects of textile manufacturing are having immense skill in making different textile articles but they are having very little knowledge about new techniques of fiber processing, spinning and designing etc. The survey findings show an urgent need for planned, strategic and systematic efforts to promote their existing trade and also to develop self employment or entrepreneurship avenues through skill up gradation. Most of the respondents were willing to either expand their enterprises or own it with training in new skills or upgradation of their existing skills ranging from fiber processing to product development. The planned training can be imparted to SHGs and NGOs as they are in direct contact with rural people or many are themselves made up of of rural people. Kaushik, *et.al.*(2007) stated that the self-help group is a viable alternative to achieve the objectives of rural development and get community participation in all rural development programmes. The findings of the present study would be of immense importance in developing the training module for textile traders. This in turn will help the progressive textile artisans to emerge as an entrepreneur in the field of textile, and also instigate social and economic development.

Bhotia people exhibiting the traditional handloom articles

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ENTREPRENEURIAL ROLE STRESS AMONG WOMEN ENTREPRENEURS OF BIKANER CITY OF RAJASTHAN

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A woman entrepreneur has to perform the dual roles of managing her enterprise as well as running the house, which have different sets of legitimate expectations to be fulfilled satisfactorily. It is a very challenging job for her. Failure in this regard puts her in a very stressful situation, which is detrimental for her well being as well as for the family. This paper aims to assess the entrepreneurial role stress among the women entrepreneurs and measure the significant difference in its level due to selected independent variables, namely, age, education, family structure and size and economic status of the family. The study was carried out in Bikaner city of Rajasthan. The data were generated through a semi-structured questionnaire from 131 women entrepreneurs. The data were analysed using percentages, mean scores and t-test. Findings revealed that while high level of role stress was experienced by nearly one-fourth of the women entrepreneurs, half of them experienced medium level of role stress. There was no statistically significant difference in the level of entrepreneurial role stress observed due to age and educational level of women entrepreneurs. However, statistically significant difference was found in the level of entrepreneurial role stress due to family structure, family size and family income. Entrepreneurs from nuclear families, families with size up to four members and family incomes of up to Rs 8,000 were found to have more role stress as compared to their counterparts from joint families, families with size over four members and families with monthly incomes over Rs 8,000. The implications of the study for reducing entrepreneurial role stress among women entrepreneurs have been highlighted.

KEY WORDS: Entrepreneurship, Role stress, Women, Women entrepreneurs

In India, women have traditionally been engaged primarily in domestic work. However, during the recent decades, with the increase in education of women and the increasing economic pressures, more and more women have been leaving the confines of their homes to take up employment outside. This phenomenon has particularly been visible in the cities, of late. As the employment market is very tight and there is cut throat competition, getting a job has become very difficult for women. A new trend emerging in the recent decades has been the emergence of women entrepreneurs. More and more women are now setting up their own ventures and are, in addition to getting employed, becoming employers and providing employment to others.

Schumpeter (1961) defined entrepreneur as an agent for change – an innovator. A woman entrepreneur is an individual who takes up a challenging role in which she constantly interacts and adjusts herself with social, resource and support spheres in a society (Pareek, 1992). However, in spite of running their own ventures, the primary responsibility of the household continues to be the domain of the women. In this context, the working women are required to

perform dual roles of managing the households as well as the enterprises. Role is the position one occupies in a social system, and is defined by the functions one performs in response to the expectations of significant members of a social system, and one's own expectations from that position (Parnak, 1997). This situation creates a certain amount of stress in the women.

Stress is an inevitable consequence of socio-economic complexity and, to some extent, its stimulant as well. It is an individual's psycho-mental and psycho-emotional response to the challenging surroundings and its overload of demands in excess of his capacity to cope with the same. Excessive or prolonged stress is capable of producing confusion, disturbed thinking and distorted perceptions. There is considerable evidence suggesting that our cognitive abilities are significantly impaired by stress. Physical reactions to stressful work conditions include fatigue, headache, sweating and various types of psychological disorders such as ulcers and high blood pressure.

Role stress is the stress experienced by the persons because of their role in the organisation. They assume a role based on the expectations of self and others at the workplace. Women entrepreneurs, being responsible both for their households and their entrepreneurial ventures, are naturally subjected to stresses caused from both these areas. In the context of entrepreneurship, role stress may have a number of direct and indirect effects on creation of sustainable ventures, including the propensity to withdrawal and low organizational commitment (Vincent and Ortqvist, 2006). Work-family or work-home conflict is another common outcome of role stress (Babin and Boles, 1998).

Hence, the study was carried out to (i) find out the socio-economic status of women entrepreneurs; (ii) to find out the motivational factors among women entrepreneurs to take up the enterprises; (iii) to assess the entrepreneurial role stress among the women entrepreneurs; and (iv) to measure the significant difference in its level due to selected independent variables, namely, age, education, type of family, size of family and family income.

METHODOLOGY

The study was undertaken in Bikaner city, which lies in the north western part of Rajasthan. The sample was based on the list of women entrepreneurs procured from the office of District Industries Centre, Bikaner, which contained details of 200 women entrepreneurs. However, during data collection, it was found that there were actually only 131 women entrepreneurs, all of whom were selected for the study. The research design of the study was exploratory in nature.

For data collection, a semi-structured questionnaire was used. It consisted of three sections. Section 1 comprised questions relating to the socio-economic status such as age, education and training, family income, family size, family structure, etc of the respondents. Section 2 consisted of questions to explore the sources of motivation of respondents and the factors which motivated them to set up the enterprises.

The role stress was measured in Section 3. For this, a standardized five-point scale developed by Udai Pareek (1997) was used. The scale comprised of nine dimensions of role stress, namely, self-role distance, inter-role distance, role isolation, challenge stress, role overload, result inadequacy, role irrelevance, resource inadequacy and role inadequacy. In Section 3, there were 27 items in all, three from each of the above mentioned dimensions. The responses were rated on a five point Likert scale ranging from 1 to 5 that indicated how descriptive a particular statement was for the respondent. The scores ranged from a minimum of 3 to a maximum of 15 for each dimension. The range for the total score was from 27 to 135. The level of entrepreneurial role stress of women was categorized into low, medium and high with the help of quartile measurements. While respondents who secured entrepreneurial role stress score up to 56 were grouped under low level of stress, those scoring between 57 and 71 were grouped under medium level of stress and those scoring 72 and above were grouped under high level of stress.

The differences in the level of entrepreneurial role stress due to independent variables, namely, age, education, family structure, family size were analysed by computing mean scores and the significance of the differences was assessed using the t-test. The contribution of each of the nine dimensions to the overall stress score was assessed by correlation.

RESULTS AND DISCUSSION

Background profile

The data revealed that about three-fourth (73.3 per cent) of the study sample constituted of young adults in the age group of 20-40 years and the remaining were above 40 years of age.

It was observed that all the women entrepreneurs had moderate levels of education. A sizeable majority (79.3 per cent) was educated up to the school level i.e. middle/ secondary/senior secondary and rest were educated up to graduation /post-graduation.
A majority of the women entrepreneurs (58 per cent) included in the sample were married. A sizeable chunk (20.6 per cent) of the entrepreneurs was either divorced or widowed. The rest were unmarried.

As far as the family structure is concerned, 41.2 per cent of women entrepreneurs were from nuclear families and the remaining from joint families. As far as the family size is concerned, it was observed that 44.3 per cent of the sample had family of 1-4 members while the remaining had more than 4 members in their families.

Data further revealed that 41.2 per cent of the respondents had family income of up to Rs 8,000 per month while the remaining 58.8 per cent had incomes of Rs 8,000 and above per month.

Women entrepreneurs were engaged in in enterprises that belonged to three sectors, namely, service sector, business sector and industry sector,.While the industry sector refers to manufacturing activities, the business sector concerns the trading and retailing activities. The service sector deals with provision of various types of services to the clients. While nearly half

(45.8 per cent) of the women were engaged in the service sector, 31.3 per cent were engaged in industry and the remaining 22.9 per cent were in the business sector. The most popular enterprises under the industry sector were *papad/ bhujia* making units and manufacturing of wooden furniture. Under the business sector, general/ medical stores were most common. The popular service enterprises included tailoring and embroidery units, running hobby classes, STD/ PCOs and data processing centres.

The selected enterprises had been established one to 12 years ago. While over half of them (53.4 per cent) were above six years old, about one fifth (19.9 per cent) were 4-6 years old and the remaining were between 1-4 years old.

Motivational factors

The term motivation refers to a state that mobilizes a selective or directive activity with respect to the environment. Motivation results from an unfulfilled need. It is the response of a person who is affected by an internal or external stimulus, and usually results from a drive. In another view, motivation is the willingness to exert high levels of effort towards achieving organizational goals (Vijaya and Kamalanabhan, 1998).

The study revealed that the family members of women entrepreneurs were their main source of motivation. While the male family members (father/husband) were reported as main motivators by nearly two thirds (65.6 per cent) of the respondents, female family members (mother) were reported by 19.1 per cent. Deivasenapathy (1986), Anna (1990), Bhawani (1990) and Rajani and Sarada (2008) also found in their studies that family plays a key role in motivating as well as supporting women entrepreneurs.

Table 1 gives the ranking of various factors which motivated women entrepreneurs to establish their enterprises.

Table 1: Motivational factors for establishing an enterprise (Multiple responses)

N=131

S.No	Motives	Frequency/ (Percentage)	Rank order
1	Improve the economic status of family	91 (69.5)	I
2	Use leisure time	73 (55.7)	II
3	Utilise their in-built potentials	70 (53.4)	III
4	Inspired by other women entrepreneurs	62 (47.3)	IV
5	Make use of education	60 (45.8)	V
6	Satisfy some personality needs	60 (45.8)	V
7	Become economically independent	58 (44.3)	VI
8	Continue family business	49 (37.4)	VII
9	Prove themselves in society	48 (36.6)	VIII

The main motivational factors reported for establishing the enterprises were, namely, to improve economic status (69.5 per cent), to use leisure time (55.7 per cent) and to use their in-built potential (53.4 per cent). The economic reasons acted as a springboard for most of the women to start enterprises (Schwartz 1979, Rajani and Sarada 2008).

Entrepreneurial role stress

Table 2 shows the entrepreneurial role stress experienced by women entrepreneurs belonging to different categories according to their enterprises. It is worthwhile to note that high level of stress was experienced by nearly one-fourth (23.7 per cent) of the women entrepreneurs. Medium level of stress was more common and experienced by approximately half (49.6 per cent) of the study sample and the remaining 26.7 per cent entrepreneurs had low level of stress. In their study of 100 women professionals from the state of Punjab, Khetarpal and Kochar (2006) found that 40 per cent of the women were under moderately low level of stress followed by 36 per cent, who reported moderately high level of stress.

Data on the differences in the levels of entrepreneurial role stress among the three sectors reveals that the percentage of entrepreneurs reporting low levels of stress was highest in the industry sector (34.3 per cent) followed by business and service sectors (30 and 20 per cent respectively). Further, the percentage of entrepreneurs reporting high levels of stress under service sector (28.3 per cent) was nearly twice that under the industry sector (14.7 per cent).

Table 2: Entrepreneurial role stress among women entrepreneurs (N=131)

Level of stress	Service sector	Business sector	Industry sector	Total
Low	12 (20.0)	9 (30.0)	14 (34.3)	35 (26.7)
Medium	31 (51.7)	13 (43.3)	21 (51.0)	65 (49.6)
High	17 (28.3)	8 (26.7)	6 (14.7)	31 (23.7)
Total	60 (100)	30 (100)	41 (100)	131 (100)

(Figures in parenthesis show percentages)

Furthermore, in order to evaluate the contribution of each of the nine dimensions assessed to the total score, the correlation between total entrepreneurial role stress and its nine dimensions was calculated and is depicted in Table 3.

Table 3: Correlation between total entrepreneurial role stress and its dimensions

N=131

Sr No	Dimension of entrepreneurial role stress	Value of coefficient of correlation between total entrepreneurial role stress to its dimension
1	Self role distance	.4776*
2	Inter role distance	.4691*
3	Role isolation	.5524*
4	Challenge stress	.5754*
5	Role overload	.5460*
6	Result inadequacy	.4943*
7	Role irrelevance	.4099*
8	Resource inadequacy	.5142*
9	Role inadequacy	.4118*

*Level of significance 0.001

It may be seen that all the dimensions were significantly correlated to total entrepreneurial role stress at 0.001 level of significance. It shows that all the dimensions contributed positively to the total entrepreneurial role stress.

Difference in the level of entrepreneurial role stress due to selected variables

The difference between level of entrepreneurial role stress among women entrepreneurs due to selected independent variables, namely, age, level of education, type of family, family size and family income is shown in Tables 4 to 8.

Table 4: Difference between level of entrepreneurial role stress due to age

N=131

Age group	Number of cases	Mean score	Standard Deviation	Degree of freedom	t value
Below 40 years	96	64.76	11	129	0.46 NS
40 years and above	35	63.68	7.9		

Significant at 0.05 level, df 129 at 0.05= 1.645

Table 5: Difference between level of entrepreneurial role stress due to education

N=131

Education	Number of cases	Mean score	Standard Deviation	Degree of freedom	t value
School education	104	63.56	9.8	129	0.96 NS
Graduation and above	27	65.70	11.7		

Significant at 0.05 level, df 129 at 0.05= 1.645

Table 6: Difference between level of entrepreneurial role stress due to type of family

N=131

Family type	Number of cases	Mean score	Standard Deviation	Degree of freedom	t value
Nuclear family	54	65.29	9.4	129	1.93
Joint family	77	63.10	10.7		

Significant at 0.05 level, df 129 at 0.05= 1.645

Table 7: Difference between level of entrepreneurial role stress due to family size

N=131

Family size	Number of cases	Mean score	Standard Deviation	Degree of freedom	t value
1-4 members	58	65.39	9.1	129	1.95
Above 4 members	73	62.9	11		

Significant at 0.05 level; df 129 at 0.05= 1.645

Table 8: Difference between level of entrepreneurial role stress due to family income

N=131

Family income pm	Number of cases	Mean score	Standard Deviation	Degree of freedom	t value
Below Rs 8000	58	66.37	9.4	129	2.40
Rs 8000 and above	73	62.12	10.5		

Significant at 0.01 level; df 129 at 0.05= 2.326

There was no statistically significant difference in the level of entrepreneurial role stress observed due to difference in age and educational level of women entrepreneurs. This could be due to the reason that while the younger entrepreneurs were very enthusiastic about their enterprises, the others were fairly stabilised in their ventures and must have learnt to cope with the stress. The ventures established were also of a fairly basic nature which did not require much formal education.

However, statistically significant difference was found in the level of entrepreneurial role stress due to family structure, family size and family income of women entrepreneurs. Entrepreneurs from nuclear families, families with size up to four-members and family incomes of up to Rs 8,000 were found to have more role stress as compared to their counterparts from joint families, families with size over four members and families with monthly incomes over Rs 8,000. There could, however, be confounding effects due to multiple variations among the independent variables which a simple t test will not capture. It is obvious from these results that support of family members goes a long way in reducing entrepreneurial role stress of women.

CONCLUSION

Women entrepreneurship is a new tool for women empowerment. Not only does it help women to share the family financial burden but it also provides an opportunity for them to use their leisure time constructively. It offers an excellent way for widowed/divorced women to earn their livelihood and support family needs. Hence, it ensures their pride and dignity in the male dominated society. Besides, it is a positive feature for the economy of a nation.

It is noteworthy that the male family members are motivating women (wife, daughter and daughter in law) to establish their enterprises. It shows that the men have started accepting the new role of women outside the confines of their homes and are encouraging them in this direction. This could be due to economic pressures in the family or the social change affecting values in the society and would definitely lead to improved status of women.

Women entrepreneurs have to cope with the dual responsibility of looking after the household chores and running their own ventures. This, no doubt, becomes too taxing for their wellbeing and contributes to stress. It is more so in the case of women from nuclear families. There being no escape from stress in today's world, we need to find ways of using stress productively, and reducing dysfunctional stress. Therefore, the need of the hour is that all the family members should share the responsibility of running the household affairs. Second, there should be a good support system for women in the form of crèches, day care centres, outlets/ places for reasonably priced and hygienically cooked food. Third, all entrepreneurial training programmes should have stress-coping strategy as an integral part of the programme.

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AJRAKH – IMPRESSIONS & EXPRESSIONS

Dr. Ela Dedhia & Dr. Manju Hundekar.
Color publications pvt. Ltd., Mumbai. 2008

A compilation of six letters, not to be found in the OXFORD concise dictionary.....

Google search takes one straight to the KUTCH area of GUJARAT and parts of Rajasthan.

In the heading of VANISHING TRADES OF INDIA more detailed mention of AJRAKH is visible.

The link connecting AJRAKH talks of the KHATRI community and the printing style maintained over generations.

Simply put, AJRAKH means AJ RAKH, giving the meaning "KEEP IT FOR THE DAY", some slogan.....

AJRAKH is a resist style of printing with natural colours and incorporating these concepts to come out with excellent motifs obtained by BLOCK PRINTING, with or without mordants.

Dr ELA & Dr MEGHMALA have done a wonderful job of bringing this dying art to the notice of textile print enthusiast and have brought a meaningful focus by penning down a book and getting it released at the hands of our dynamic TEXTILE COMMISSIONER, making sure that AJRAKH is NOT lost in oblivion.

What impressed me most is the technique followed by the artisans and the use of relevant technologies. The mention of BIO-REDUCTION and the use of the OIL-DYE complex to arrive at some of the motifs is quite scientific and advanced.

AJRAKH is NOT some old wine in a new bottle, it is the same genuine art brought to light with its complete original fragrance.

To get an AJRAKH, at least 13 to 20 processing sequences have to be followed and look how the colouration techniques are practised.....

For colours, the complete spectrum is made available by RED, YELLOW and BLUE. INDIGO to give BLUES, YELLOW from TURMERICS and ANNARS and REDS from IMLI, etc. GREEN is quite visible in AJRAKHS, confirming the fact that colour blending tools are available with the artisans.

Printing with BLOCKS is made possible with wooden blocks, natural GLUE has been generously used as thickener in printing, LIME for RESISTS, GURRH for reduction and even BAJARE KA ATTA for print paste consistency and rheology control.

All in all, a RESIST style of BLOCK printing with EK PASI and both side colouration is AJRAKH, as is visible today.

The substrates are mainly natural fibres, predominantly cottons and the AJRAKHS which were only available for men's head gear are now covering the complete range of furnishings, ladies dress-materials including sarees.

Finally some personal thoughts and what does the future hold for AJRAKHS??????

A little blend of old with the modern day tools available can give wonder results, viz

AJRAKHS on synthetic, say polyesters and acrylics....

AJRAKHS with better lustre and higher brilliancy.

AJRARKS with UV absorbers for better light fastness properties.

AJRAKHS with anti-bacterial and/or silicone softening finishes.

I congratulate the authors for this lovely compilation on AJRAKH, which is not just Impressions and Expressions but a complete journey of patience and perseverance.

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