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Journal • **S**ince 20**13**

VOLUME 8

ISSUE 5

September-October 2020

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INDEX

Analysis of Nutritional Status among Scheduled Tribe Women in India
A Study from NFHS-4

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Abstract

Background: The nutritional status of a population has well-established, profound health effects across the lifecycle and is closely connected with cognitive and social development. Tackling malnutrition is a global concern as it is the single largest risk factor affecting the burden of disease estimates worldwide. The tribal population in India is more vulnerable to malnutrition and related health problems under severe socio-economic stress.

Objective: This study determines the prevalence of nutritional status among Schedule Tribe Indian women by states and several background characteristics. It also tries to examine the socio-economic differentials in nutritional status among those women.

Methods: The data is taken from the 4th round of National Family Health Survey (NFHS 4) conducted by the International Institute for Population Sciences, Mumbai (2015-2016). Body Mass Index (BMI) was computed and recoded according to the specification of the World Health Organization (WHO). Bivariate analysis and multinomial logistic regression were used to assess the effects of socio-economic characteristics.

Results: The overall prevalence of underweight among schedule tribe females is 31.7% and the prevalence of overweight/obese is 10.1%. From the west region most of the tribal women are found to be underweight. Scheduled Tribe women belonging to the urban area are found more prone to be overweight. The factors that are protective against being underweight are them being in older ages, having higher years of education, being married and being from households of higher wealth index.

Conclusion: Although the prevalence of underweight is higher among tribal women than the women from the general population, the majority of the study population are found to be of normal BMI. In some of the states like Nagaland, Mizoram and Manipur, the prevalence of overweight tribal women exceeds the number of underweight which slightly indicates towards the dual burden of malnutrition.

Index Terms: **Body mass index, Multinomial logistic regression, Underweight, Overweight, Socio-economic factors, India**

I. INTRODUCTION

Malnutrition in all its forms is a critical challenge for any population. Tackling malnutrition is a global concern as it is the single largest risk factor affecting the burden of disease estimates worldwide. Almost one in every third person suffers from one form of malnutrition or another (WHO and the UN report, 2016). Although adult nutritional status can be examined in many ways, the body mass index (BMI) is widely used because it is inexpensive, non-invasive anthropometric measure and is suitable for large scale surveys (Bhattacharya et al., 2019). Malnutrition suggests not only undernutrition but also over weight and obesity. Underweight (including stunting and wasting), as well as obesity and overweight are various types of unhealthy weight that result in malnutrition. Each type of undesirable weight has distinctive clinical measurement as well as numerous causes and wellbeing results. The situation of malnutrition in India is a matter of concern as India has the highest number of undernourished people in the world (194.6 million during 2014-16, Food and Agricultural Organization). Tribes of India are endogamous population, isolated from general people with physical, cultural and socio-economic characteristics, constituting about 8.6 % of the total population in India (Census of India, 2011). The vast majority of them dwell in rustic zones, for the most part in far off underserved timberland locales with almost no essential community luxuries like vehicle, streets, markets, social insurance, safe drinking water or sanitation. Hence, tribal population in India is more vulnerable to malnutrition and related health problems under severe socio-economic stress. (Ghosh, 2016). The present study is undertaken to assess the nutritional status of Indian tribal women from several socioeconomic and demographic background where malnutrition remains a common health problem.

II. MATERIALS AND METHODS

The data for this study have been drawn from fourth round of National Family Health Survey (NFHS). NFHS 4 was carried out from 20th January, 2015 to 4th December, 2016, in all 29 states and seven Union Territories of India. A two-stage sampling strategy was undertaken. The first stage consisted of selecting 28,586 primary sampling units using Probability Proportional to Size (PPS); the population sizes being determined using the 2011 Census count data. Primary sampling units were mapped completely for all the households located in each of them. After mapping, those which contained less than 40 households were merged with the nearest primary sampling unit and every unit containing more than 300 households were split into two separate units. In the second stage,

22 households were selected in each primary sampling unit using systematic random sampling. Women aged 15–49 years in the selected households were invited to participate in the survey. Height and Weight of those women were measured using the Seca 213 stadiometer and the Seca 874 digital scale respectively. Data on various socio-economic and demographic characteristics like place of residence, caste, religion, education level, wealth index of the respondents were collected in this survey.

For this study, the variables under consideration were height of respondent in cm and weight of respondent in Kg. Body Mass Index was computed with it recoded in underweight (BMI < 18.5), normal weight (BMI between 18.5-24.9) and overweight/obese (BMI≥ 25) according to the specification of the World Health Organization (WHO). With enough backing from literatures, the socio-demographic and economic variables across which levels of BMI was studied were region in which the respondent resides, age of respondent, place of residence, religion, educational attainment, status in wealth quintile, marital status of the respondent, children ever born and whether the respondent drinks alcohol or not. The study excluded pregnant women and women with a birth in the preceding 2 months.

Descriptive statistics were used to understand the characteristics of the sample population. Analysis was done by using appropriate sample weights. Chi square test was performed to identify the variables that had association with BMI levels in ST females. Cross tabulation table is performed for all the independent variables with the dependent variable where the row percentages are obtained to reflect the prevalence in each group. Then to find the determinants of BMI levels, multivariate analysis was performed. Predictive models on the dependent variable was developed using multivariate logistic regression to evaluate the effects of all the independent variables together. The odds ratio and 95% confidence intervals of the odds ratios are also computed to assess the degree of association between the risk factors and the dependent variable.

Multinomial Logistic Regression is the predictive analysis used to conduct a categorical dependent variable with more than two unordered and nominal levels. It is an extension of the binary logistic regression model where the value of dependent variable consists of more than two categories. The logit multinomial model can be written as:

$$\log\left\{\frac{\text{Prob}(\text{Category}_j)}{\text{Prob}(\text{Category}_q)}\right\} = b_0^j + \sum_{i=1}^{k} b_i^j x_i \quad ; j = 1,2,\ldots\ldots,(q-1) \tag{1}$$

Where, b_0^j =intercept for the j-th logit, b_i^j =regression coefficient for i-th predictor x_i in the j-th logit, k=number of predictors in the model. In the above expression, one of the categories is used as reference and is called the baseline category. In our study, the different categories are underweight and overweight/ obesity and the reference category is normal weight.

III. RESULTS

Table 1: Percentage of ST women aged 15-49 with BMI by states, India, NFHS 4

State	Underweight	Normal Weight	Overweight	N
Andaman and Nicobar Islands		76.9	23.1	13
Andhra Pradesh	28.3	49.9	21.8	1541
Arunachal Pradesh	6.3	75.1	18.5	394
Assam	14.4	71.4	14.2	2087
Bihar	30.0	59.7	10.3	1694
Chandigarh	100.0	0.0	0.0	1
Chhattisgarh	34.1	60.9	5.0	4533
Dadra and Nagar Haveli	35.8	54.7	9.4	106
Daman and Diu	14.3	57.1	28.6	7
Goa	26.8	56.3	16.9	71
Gujarat	40.7	48.4	10.8	4473
Haryana	25.0	63.5	11.5	52
Himachal Pradesh	15.9	58.0	26.1	157
Jammu and Kashmir	21.2	63.1	15.7	567
Jharkhand	35.0	60.0	5.0	4201
Karnataka	23.6	58.1	18.3	3244
Kerala	20.2	60.1	19.8	243
Lakshadweep	12.5	47.5	40.0	40
Madhya Pradesh	34.6	59.4	6.0	7836
Maharashtra	38.3	49.9	11.8	7137
Manipur	7.1	73.9	18.9	322
Meghalaya	11.0	77.8	11.2	1255
Mizoram	8.5	70.3	21.2	519
Nagaland	11.5	73.0	15.5	651

Delhi	5.1	70.9	23.9	117
Odisha	36.6	57.9	5.6	5427
Puducherry	0.0	60.0	40.0	5
Punjab	11.1	70.4	18.5	27
Rajasthan	37.5	56.5	6.0	4444
Sikkim	4.3	68.7	27.0	115
Tamil Nadu	18.6	59.9	21.6	867
Tripura	14.0	71.9	14.0	641
Uttar Pradesh	30.4	58.8	10.8	1125
Uttarakhand	22.0	60.4	17.6	245
West Bengal	33.0	60.6	6.3	3179
Telangana	29.9	50.8	19.4	1591
Total	31.7	58.2	10.1	58927

Note: The body mass index (BMI) is expressed as the ratio of weight in kilograms to the square of height in meters (kg/m2). Excludes pregnant women and women with a birth in the preceding 2 months.
Source: Computed from NFHS 4 individual data file.

The states having sample size less than 40 are not interpreted. It has been observed that 31.7% of Indian ST women are underweight and 10.1% of them are overweight. The prevalence of underweight among ST women is highest in Gujarat (40.7%) followed by Maharashtra, Rajasthan and Odisha having 38.3%, 37.5% and 36.6% respectively. In Sikkim, the prevalence of underweight is the lowest (4.3%) and prevalence of overweight is found to be second highest (27%) followed by Himachal Pradesh, Delhi and Andhra Pradesh having 26.1%, 23.9% and 21.8% of overweight tribal women respectively. Along with having large prevalence of overweight, Andhra Pradesh (28.3%) and Himachal Pradesh (15.9%) have a large prevalence of underweight also. While most of the states have large proportion of underweight tribal women, the states like Tamil Nadu, Himachal Pradesh, Nagaland, Mizoram, Manipur, Arunachal Pradesh, Delhi and Sikkim have more percentage of overweight than underweight among tribal women.

Figure 1: Prevalence of underweight and overweight among Schedule Tribe women aged 15-49 in the States/UT of India

Map 1: Prevalence of underweight tribal women aged 15-49 in the States/UT, India
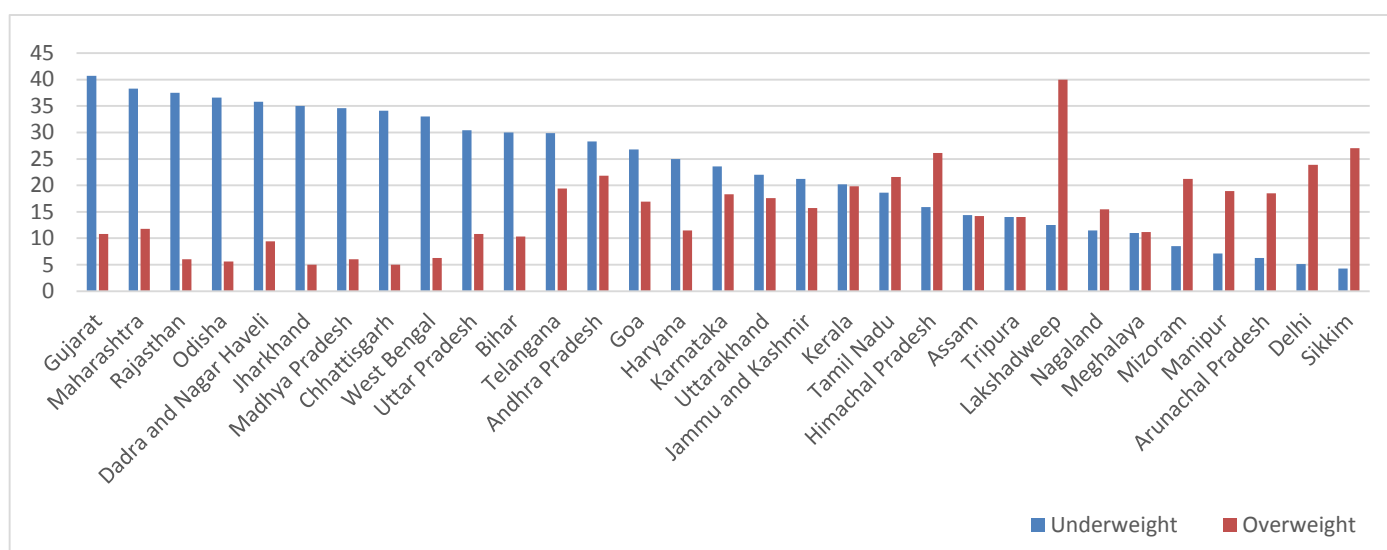
Prevalence of underweight tribal women aged 15-49 in the States/UT, India
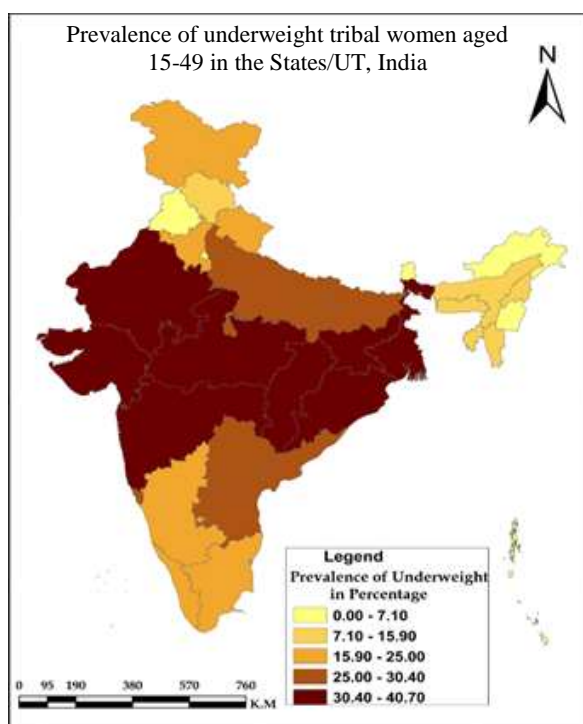
Table 2: Percentage of ST women aged 15-49 with BMI by Background Characteristics, India, NFHS 4

Background Characteristics	Underweight	Normal	Overweight	N
Age				
15-24	40.0	56.4	3.6	20419
25-34	30.0	59.4	10.6	17934
35+	25.1	58.9	16.0	20574
Type of place of residence				
Urban	21.6	56.2	22.1	9234
Rural	33.6	58.6	7.8	49693
Marital Status				
Never Married	39.4	56.9	3.7	13746
Married	29.6	58.6	11.9	41986
Widowed/Divorced/Separated	27.5	58.9	13.6	3194
Children Ever Born				
0	38.0	57.3	4.7	17641
1-2	28.4	58.2	13.4	19860
3+	29.7	59.0	11.4	21425
Highest educational level				
No education	33.3	58.1	8.7	24939
Primary	31.8	58.4	9.8	7999
Secondary	31.3	58.2	10.5	22839
Higher	23.0	58.3	18.7	3151
Religion				
Hindu	33.4	57.0	9.6	50662
Others	21.3	65.7	13.0	8265
Wealth Index				
Poorest	39.2	57.4	3.4	23943
Poorer	32.9	59.4	7.7	15501
Middle	25.5	60.7	13.9	9492
Richer	19.7	57.5	22.8	6241
Richest	15.2	53.4	31.4	3750

Drinks Alcohol				
No	32.0	57.9	10.2	55052
Yes	28.6	62.5	8.9	3876
Total	31.7	58.2	10.1	58927

Note: The body mass index (BMI) is expressed as the ratio of weight in kilograms to the square of height in meters (kg/m2). Excludes pregnant women and women with a birth in the preceding 2 months.
Source: Computed from NFHS 4 individual data file

It is observed from that the prevalence of underweight in ST women is more in lower age groups (40% in 15-24 to 25.1% in 35+), and prevalence of overweight is more in higher age groups (3.6% in 15-24 to 16% in 35+). More urban ST women are found to be overweight (22.1%) than underweight (21.6%) and more rural women are found to be underweight (22.1%) than overweight (7.8%). Prevalence of underweight was more in never married women (39.4%) than married (29.6%) and widowed/ divorced/ separated women (27.5%). Prevalence of underweight is more in women without any child (38%). As educational level increases from no education to higher the percentage of underweight decreases (33.3% to 23%) and percentage of overweight in tribal women increases (8.7% to 18.7%). Similar pattern is observed in the wealth index also. Prevalence of underweight in Hindu women (33.4%) is more than of it in the other religions (21.3%). Women who do not drink alcohol are have more percentage of underweight (32%) and overweight (10.2%) people than in the group of women who drink alcohol (28.6% and 10.9% respectively).

Figure 2: Prevalence of underweight and overweight among ST women aged 15-49 in several background characteristics
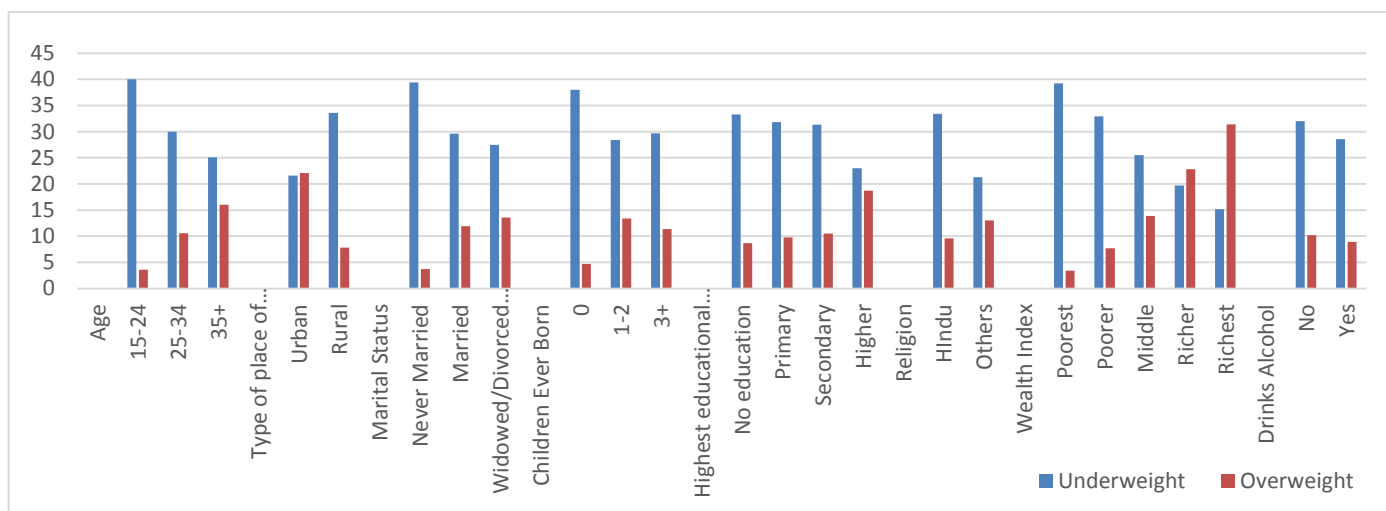

Table 3 contains the output of multinomial logistic regression of BMI levels on several socio-economic characteristics from NHHS-4 individual dataset. The background characteristics do not always have significant association with the BMI levels. To check whether the association is significant or not, the significance is given in the table. The relative risk ratios and their upper and lower bounds of 95% confidence intervals are also shown. Results show that ST women from West and North region are more likely to be underweight and ST women from North east are least likely to be underweight. The relative risk ratio of underweight among '15-24' and '25-34' year age group is 1.752 and 1.277 times significantly higher relatively compared to 35+ years aged women. The relative risk of overweight in urban area is 1.287 times significantly higher than it in rural areas (95% CI =1.190-1.391). The relative risk of underweight is significantly higher in never married women than widowed/ divorced/ separated women (RRR=1.235, 95% CI=1.104-1.382). The relative risk of underweight is significantly lower women with no child or women with 1-2 children compared to the women with 3 children or more. The relative risk ratio of being underweight in people with no education, primary and secondary education is 1.252, 1.149 and 1.093 times significantly higher than people with higher secondary education. Hindu women found to be more likely to be underweight (RRR=1.181) significantly All categories of wealth index are found to be significantly associated with underweight and overweight. The relative risk of underweight is 2.234, 1.892, 1.434 and 1.156 times significantly higher in poorest, poorer, middle and richer group respectively as compared to the richest group.

Table 3: Relative Risk showing the effect of background variables on BMI among ST women in India: Results from Multinomial logistic regression Analysis

Background Characteristics	Underweight vs normal weight			Overweight vs normal weight		
	Exp(B)	95% CI Lower Bound	95% CI Upper Bound	Exp(B)	95% CI Lower Bound	95% CI Upper Bound
Region						
North	1.081*	0.996	1.173	0.578***	0.513	0.652
Central	0.959	0.895	1.028	0.523***	0.472	0.578
East	1.001	0.934	1.073	0.592***	0.534	0.655
North East	0.357***	0.322	0.396	0.676***	0.603	0.759
West	1.64***	1.532	1.756	0.728***	0.666	0.796
South®						
Age						
15-24	1.754***	1.644	1.871	0.291***	0.260	0.326
25-34	1.277***	1.215	1.343	0.619***	0.577	0.664
35+®						
Place of residence						
Urban	0.949	0.889	1.013	1.287***	1.190	1.391
Rural®						
Marital Status						
Never Married	1.235***	1.104	1.382	0.552***	0.458	0.665
Married	0.959	0.880	1.046	1.134**	1.009	1.274
Widowed/Divorced/ Separated®						
Children ever born						
0	0.907**	0.835	0.986	1.052	0.918	1.207
1-2	0.933***	0.888	0.981	1.056	0.984	1.133
3+®						
Education Level						
No education	1.252***	1.127	1.392	0.820***	0.718	0.936
Primary	1.149**	1.030	1.282	0.860**	0.746	0.990
Secondary	1.093*	0.992	1.205	0.899*	0.800	1.010
Higher®						
Religion						
Hindu	1.181***	1.107	1.260	0.962	0.877	1.055
Others®						
Wealth index						
Poorest	2.234***	1.990	2.509	0.136***	0.119	0.156
Poorer	1.892***	1.689	2.120	0.270***	0.239	0.304
Middle	1.434***	1.279	1.608	0.433***	0.387	0.484
Richer	1.156**	1.028	1.301	0.698***	0.630	0.775
Richest®						
Drinks alcohol						
No	0.948	0.876	1.025	1.010	0.890	1.146
Yes®						

Note: ***, ** and *: <1%, <5% and <10% level of significance respectively
Source: Computed from NFHS 4 individual datafile.

IV. DISCUSSION

Prevalence of underweight is more in tribal women than overweight. According to NFHS 4 Report, 22.9 percent of Indian women are underweight and the overall prevalence of underweight among schedule tribe female is found to be 31.7 in this study, which is much higher than the national estimates. From west region most of the tribal women are found to be underweight and the prevalence of underweight is lowest in the North-East region. The factors that are protective against being underweight for ST women are them being in older ages, having higher years of education, being from households of higher wealth index. But females who follow Hinduism, who are never married or have 3 or more children are more prone to be underweight. The overall prevalence of overweight/obesity among them is 10.1. Although place of residence does not have any significant association of being underweight, urban women have significantly higher relative risk of being overweight. Being in older ages and residing in urban area, marriage, having higher education and higher wealth index are generally the factors responsible for being overweight. Children ever born, religion or drinking alcohol did not have significant impact on them being overweight/obese.

V. CONCLUSION

Although the prevalence of underweight is higher among tribal women, the majority of them are found to be of normal BMI. In some of the states the prevalence of overweight tribal women exceeds the number of underweight which slightly indicates towards dual burden of malnutrition. This study population is mostly under-nourished than general population and it is important to come up with interventions and programs that could address the under nutrition among them. Efforts must be made to educate them and enhance their level of economic status so that the prevalence of underweight can be reduced substantially. In future studies, more aspects and variables like physical activity, intake of micronutrients etc. can also be included to assess the effect of those variables on Nutritional Status among this population.

VI. ACKNOWLEDGEMENT

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Assess the awareness concerning stem cells and cord blood banking between antenatal mothers in Prathima Hospital, at Karimnagar, Telangana.

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Abstract

Background: As the new born is distributed and the umbilical cord separated, blood can be composed from the section of cord, still committed to the placenta are known as "umbilical cord blood" stem cell. The blood collected in the umbilical cord is said to be a rich origin of stem .The blood contains stem cells which are also known as hematopoietic cells and these cells can convert into any types of organs in the body .These stem cells collected from the umbilical cord can heal genetic diseases related to blood and immune system like cancer, blood disorders and several life –threatening diseases.

Objectives: Assess the level of knowledge concerning stem cells & cord blood banking between antenatal mothers and find out the association.

Materials and Methods: Descriptive investigation strategy was chosen to assess the knowledge. The sample size was 30 Antenatal mothers. Demographic variables and the level of knowledge among antenatal mother concerning stem cells & cord blood banking were composed by using structured questionnaire.

Results: The current knowledge level of antenatal mother on stem cells and cord blood banking portrays that 22(73.4%) had inadequate knowledge, 8(26.6%) had moderate and no antenatal mothers had adequate knowledge.

Conclusion: The findings revealed that most of the antenatal mothers were present with inadequate knowledge regarding stem cells & cord blood banking

Keywords: Stem cells**,** cord blood banking, antenatal mother,

I INTRODUCTION

"In beginning there is the stem cell it is the origin of an organism's life"

Stewart Cell.

The umbilical cord blood comprises numerous hematopoietic stem cells with the ability to distinguish into other cells & the capability to self-degenerate. Stem cells are well-defined just as cells meeting three basic standards. First, stem cells reintroduce themselves during life, i.e., the cells divide to produce equal offspring cells and thereby preserve the stem cell populace. Second, stem cells have the capacity to undergo distinction to become dedicated offspring cells when stem cells differentiate, they may divide unequally to yield an equal cell and a daughter cell that obtains properties of a specific cell type, for example, detailed morphology, phenotype, and physiological belongings that classify it as a cell belonging to a specific tissue. Stem cells and stem cell research have opened new streets for the treatment of sickness. Stem cells are special cells because they are able to self-replicate and differentiate into other body cells

II RESEARCH METHODOLOGY

Research methodology is a way to methodically resolve the research problem.

Research Design: Descriptive research design was chosen to assess the knowledge.

Settings of the Study: The study was directed in designated hospitals at Karimnagar.

Population; The study population includes of antenatal mothers in designated hospitals at Karimnagar.

Sample size; The sample of 30 antenatal mothers who fulfilled the enclosure standards is considered as sample for this study.

Sampling Technique: Convenient sampling procedure was used for the selection of sample for the study.

Criteria for sample selection

Inclusion criteria

- Antenatal mothers who are willing to contribute in the learning
- Antenatal mothers who are accessible at the time of data gathering.

Exclusion criteria

- Antenatal mothers who   have any hearing and visual problems.
- Antenatal mothers who already registered for cord blood and stem cell therapy.

Description of the tool

It consist of two sections

Section A. It deals with demographic variables such as age, type of family, Number of children, educational status, and religion.

Section B. A structured questionnaire containing 30 multiple choice questions and each question has 4 choices, each correct response carries 1 mark and wrong response carries 0 marks.

PROCEDURE FOR DATA COLLECTION

Data was collected from antenatal mothers after obtaining a formal written permission from the hospital. Each person was assured for data collected from them was utilized only for the purpose of study and will be kept confidential. The investigator uses structured questionnaire to collect data.

PLAN FOR DATA ANALYSIS

Descriptive and inferential figures will be used to investigate the collected data.

Section -1:

The demographic data was analyzed by using frequency and percentage.

Section -2:

Association of knowledge score among antenatal mothers concerning stem cells & cord blood banking with designated demographic variables will be examined by chi-square test

III RESULTS

Frequency and percentage distribution of the demographic variables among antenatal mothers

S.NO	Demographic variables	Frequency	Percentage
1	AGE a)20-25 Years b)26-30 Years c)31-35Years	 7 14 9	 23.3% 46.6% 30%
2	TYPE OF FAMILY a)Joint family b)nuclear family	 12 18	 40% 60%
3	NUMBER OF CHILDREN a)1 child b)2 children c)more than 2 children	 8 19 3	 26.6% 63.3% 10%

4	EDUCATIONAL STATUS		
	a)Illiterate	11	36.66%
	b)Primary school	14	46.6%
	c)High school	5	16.6%
5	RELIGION		
	a)Hindu	17	56.6%
	b)Christians	7	23.3%
	c)Muslim	6	20%
	d)Others	0	0%

In this study out of 30 samples, (23.3%) were in the age group of 20-25years, (46.6%) were in the age group of 26-30years , (30%) were in the age group of 31-35 years., On the basis of type of family (40%) of samples were belongs to joint family and (60%) of samples belong to nuclear family. Based on number of children (26.6%) have 1 child and (63.3%) have 2 children and (10%) have more than 2 children. On the basis of educational qualification (36.6%) samples are illiterate and (46.6%) samples are educated till primary school (16.6%) are educated till high school. With regard to religion, (56.6%) samples are Hindu (23.3%) samples are Christian and (20%) samples are Muslim.

Frequency and percentage distribution to measure the information concerning stem cells & cord blood banking amongst antenatal mothers:

S.No	Level of knowledge score	Frequency	Percentage
1	Inadequate	22	73.4%
2	Moderate	8	26.6%
3	Adequate	0	0

The current knowledge level of antenatal mother on stem cells and cord blood banking portrays that 22(73.4%) had inadequate knowledge, 8(26.6%) had moderate and no antenatal mothers had adequate knowledge.
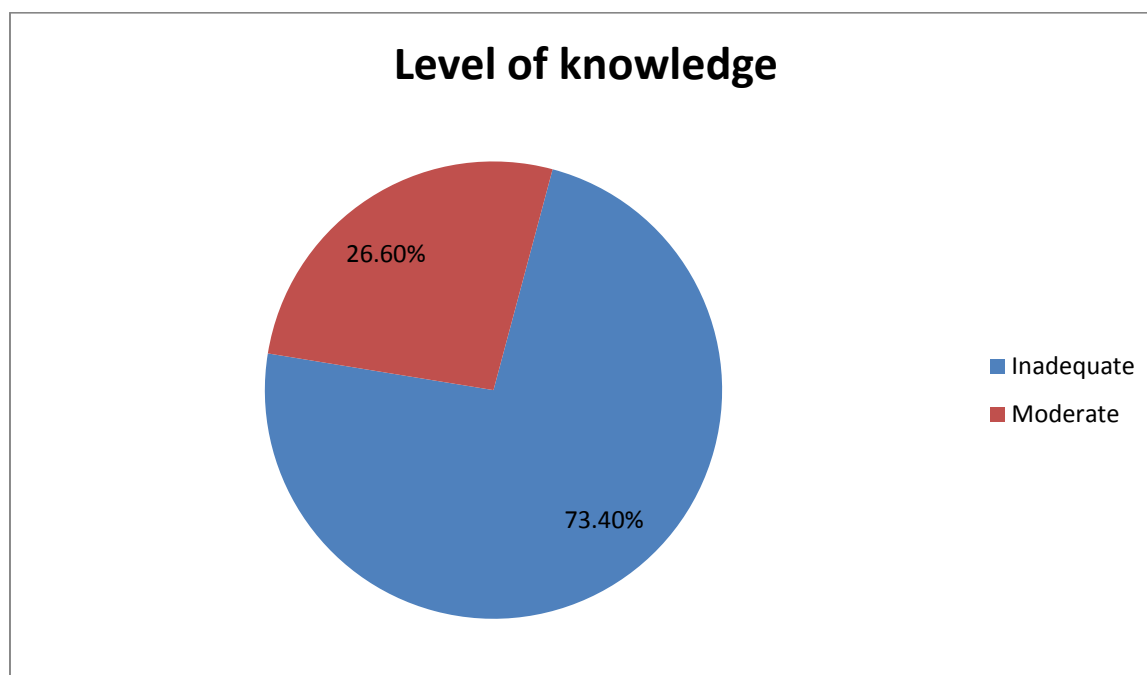
Association between the level of knowledge concerning stem cells & cord blood banking amongst antenatal mothers with their designated demographic variables:

S.NO	Demographic variables	Inadequate	Moderate	Adequate	Chi square	df	Critical value
1	AGE a)20-25 Years b)26-30 Years c)31-35Years	8 15 0	4 3 0	0 0 0	1.21 Not significant	4	9.49
2	TYPE OF FAMILY a)Joint family b)nuclear family	2 21	7 0	0 0	21.29 significant	2	5.99
3	NUMBER OF CHILDREN a)1 child b)2 children c)more than 2 children	17 0 6	3 0 4	0 0 0	2.26 Not significant	4	9.49
4	EDUCATIONAL STATUS a)Illiterate b)Primary school c)High school	8 12 3	2 4 1	0 0 0	0.07 Not significant	4	9.49
5	RELIGION a)Hindu b)Christian c)Muslim d)Others	1 10 10 2	4 1 1 1	0 0 0 0	11.649 significant	3	7.82

In demographic variables types of family and religion had shown significant association in statistics with level of antenatal mothers knowledge in regard to stem cell and cord blood banking at 0.05 level and the other demographic variables had not shown statistically important suggestion with level of information concerning stem cells & umbilical cord blood banking amongst antenatal mothers.

IV DISCUSSION

The greatest responsibility of a parents starts at the time when a child is born. Parents are the basic care takers who play the most important role in upbringing a child. A child life depends greatly upon the decision taken at the time of birth. In this study the current knowledge level of antenatal mother on stem cells and cord blood banking portrays that 22(73.4%) had inadequate knowledge, 8(26.6%) had moderate and no antenatal mothers had adequate knowledge. Contrary study conducted by **Seema Barnabass and Harjit** Findings discovered that majority 28% of the antenatal mothers had average awareness, 72% antenatal mothers had below average.

CONCLUSION

The findings revealed that most of the antenatal mothers were present with inadequate knowledge concerning stem cells & cord blood banking therefore it is significant to create more consciousness among antenatal mothers about stem cells and cord blood banking. Moreover mothers need to recognize about umbilical cord blood banking so that they can deliver accurate information to the people and prevent the child from various diseases.

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Indigenous (Orang Asli) Primary School Mathematics Performance in Selangor, Malaysia

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Abstract: The education performances among the indigenous group in Malaysia are deprived. Although the Government has given serious attention and continuous efforts to improve it, its performance is far behind other groups, especially in mathematics subjects. Hence, this study would like to identify the year six students from indigenous primary school's mathematics performance.   Additionally, we investigated if their perception, interest, and knowledge will influence the performance in mathematics. Eighty-six of the year six primary students from five indigenous schools in Selangor, Malaysia, participated in this study. Statistical techniques such as cross-tabulation, t-test, ANOVA, and Spearman rho correlation uses in detailed analysis. Overall, the result identified that the level of performance is low, even though they have a positive perception of learning mathematics. The result also indicated that those who have a high level of interest performed better. Finally, the study suggested that an intervention initiative at the elementary level is crucial, especially on the delivery system, involving teachers and others responsible for these students' education and welfare.   Moreover, the Government should be given serious consideration in any national transformation program to ensure that indigenous peoples can stand alike with other groups in Malaysia

Keywords: Orang Asli, mathematics, performance, Selangor, Malaysia

1.   INTRODUCTION

In Malaysia, the indigenous refers to natives in Peninsular Malaysia and is called as "Orang Asli." The education opportunity and performance among this indigenous community have been critical issues as they continue to be the most educationally disadvantaged group. The performance gap in Mathematics among Orang Asli students in Malaysia is still the main problem in the Malaysian education system. The performance of Orang Asli children across the country does not meet the minimum efficiency levels. As reported by Azlina and Ma'rof, 2017 that their education achievement averagely is weak, and their performance still far behind other groups Ministry Education, 2015.

The literature indicates that more than fifty percent of Orang Asli primary student does not meet the minimum efficiency levels in Mathematics. This issue widens and affects many aspects of political harmony and low socioeconomic levels among this group. A previous study also shows that instructional or pedagogical factors, parental involvement, and student attitude are among the factors that contribute to this issue. The department of Orang Asli Development or JAKOA, 2011 reported that the percentage of the Orang Asli students who passed the public examinations in primary and secondary schools was small.

Among other issues is that the dropout is very much higher than the national average, Ministry of Education, 2013. The Malaysian Education Blueprint reported that only 30% of Orang Asli students complete secondary school, less than half the national average of 72%. They left the school as early as primary school, for the Year 2000 cohort, Year 6 to 7 had the highest dropout rates, at 47.23 percent, followed by grade 7 to grade 9 (23.26%) and grade 9 to grade 11(24.27%) (Nor, et al., 2011, JHEOA 2008).

The reason is that the fear for public examination drives the Orang Asli students out of school as they feel academically unprepared. Besides, lack of interest in schooling, low academic achievement, poor memory, high absenteeism, lack of parental involvement, poverty, and transportation issues are other reasons for dropping out often cited by their teachers (Nor et al., 2011). Finally, only 61% of Orang Asli students pass the Primary School national examinations' core subjects compared to the national average of 87% (Ministry of Education, 2013).

The Malaysian Government has given serious attention to improving the education level of the Orang Asli people. The Government takes continuous efforts to develop the Orang Asli people by the Malaysian Government since independence in 1957. The total population of the Orang Asli people is nearly 178, 197, or 0.56% of the Malaysian populations (Statistic Department, 2019).

Efforts to improve the level of education among Orang Asli students remain a top agenda of the Government said Prime Minister Tun Dr. Mahathir Mohamad today (Bernama, 2019). Recently, the Government introduces the Prokhas program; it is a special class project to encourage Orang Asli to attend the school. The students under this program will receive the supplementary food plan (RMT) aid, and on top of that, their parents will also be given food aid (Malay Mail, 2019).

In terms of Mathematics achievement, the result of standard six national exams or UPSR 2017 of Orang Asli found most of them were still at a minimum level of grading (D grade) or have not mastered the minimum level (E grade). Ministry of education began

to assist the Orang Asli to ensure that the curriculum is aligned with the Standard Curriculum for Primary Schools. The curriculum will be rebranded and known as the Special Intervention Programmed for the Orang Asli. Hence this study would like to identify the performance of Orang Asli on the core subject, specifically Mathematics, for a first level, which is a primary student.

2.   LITERATURE REVIEW EDUCATION OF ORANG ASLI STUDENT

The number of primary school enrollment figures for Orang Asli throughout peninsular Malaysia stands at 26571 pupils (Kamaruddin, 2018). The number of Orang Asli enrolls in primary and secondary schools is not changes since 2012. Malaysian Education Blueprint revealed a slight increase in their enrollment, especially in 2014, but a decrease in 2017. The detail shows in table 1.0.

Table 1.0 -Education Level of Orang Asli in Malaysia 2012 – 2017

Education Level	2012	2013	2014	2015	2016	2017
Primary Education (Preschool to Year 6)	28,567	28,619	27,978	28,985	27,697	27,557
Secondary Education (Remedial Class till Form 6)	10,304	10,530	13,229	11,691	12,561	11,277
TOTAL	38,871	39,149	41,207	40,676	40,257	38,834

Source: Malaysian Education Blueprint

Orang Asli School Achievement Test results in UPSR 2009 nationwide revealed that more than Sixty percent did not achieve the minimum competency level in the subjects tested, specifically for the English Language, Mathematics and Science. Yong P. C., Jiar J.K., Ahmad Zanzali N. A., 2012 found that Orang Asli students were capable of performing simple reasoning but weak in communicating mathematical ideas. The restructuring of educational programs that appropriate with their culture and thoughts should be shouldered by all those responsible (Afizi Wan et al.,2014).

JAKOA is the development agent to execute the Government's short-term and long-term development plans for orang asli in Malaysia (Zainal Abidin Hj Ali, 2012). Although the initiatives take by JAKOA to improve education among Orang Asli, however, it is still a huge challenge. The problem such as school dropout is critical; JAKOA 2011 reported that the dropout cases in secondary schools were triple compared to the actual enrolment in primary schools. Cindy and Osman, K. 2016 suggested using their culture as the primary science module toward enhancing the intrinsic motivation of Orang Asli learners in mathematics education in Malaysia. The stakeholders blame each other, as parents accused the teacher of not teaching their children well (Wong K. W. Perumal C., 2013). Meanwhile, the teacher claimed that indigenous parents do not take seriously about education, and they do not have clear goals about children's education (Abdul Wahab N et.el. 2016). They also face other problems such as the attitude and commitment from the students and parents and the students learning interest and attendance (Abdullah R. et al., .2013). Finally, students complained that they were having difficulties in learning Mathematics (Abdullah R. et al., 2013) due to teacher's attitude and teaching pedagogy that cannot stimulate students' interest in learning mathematics.

Norlizah and Thava, 2017 found that Orang Asli students are moderately motivated by extrinsic factors such as praises and recognitions. However, the less motivated by their intrinsic factors, such as encouragement. Another motivating factor among them is attitude and culture. Misnaton, Hamidah & Marinah, 2015 said the Aboriginal students Learning commitment and academic achievement showed improved parental commitment and involvement (Misnaton, Hamidah & Marinah, 2015; Hamidah, Norasibah, Khoo, Mahaliza & Maryam 2017).

2.1.   ACADEMIC ACHIEVEMENT AND MOTIVATION OF ORANG ASLI STUDENT

Academic achievement is one of the descriptors of learning motivation. Hassan & Thava, 2017, found out that academic achievement is significantly affected by intrinsic and extrinsic motivation. Orang Asli students have low self-esteem, lack of interest in school, not doing their revision, introvert, and having difficulty mixing with other races in the school (Abdullah R., Mamat, Zal, & Ibrahim, 2013). Nevertheless, a study was done by Salim, & Harun, 2015, result contrarily, as Orang Asli students at Royal Belum Forest perceived themselves as having positive self-belief, goals, and awareness of the importance of education (Salim, & Harun, 2015).

In line with a study by Mat R. A., 2015, Orang Asli students have an optimistic viewpoint and high interest in education. They believe that education is essential for their lives and confidence that they can have a better future through education. Nevertheless,

the study found no significant relationship between academic achievement with Orang Asli Temiar students' attitudes and interests (Abdullah R., Mamat, Zal, & Ibrahim, 2013). A study on Orang Asli at Royal Belum indicated that most students are not even aware of the importance of STEM in their everyday life.

3   METHODOLOGY

This study involved primary year six students of Orang Asli in Selangor. Five national schools of Orang Asli were selected from Hulu Langat, Kuala Langat, and Hulu Selangor, Selangor, Malaysia. Self-administrated questionnaires were used to collect the data from 86 students.   The questionnaire consisted of five sections. The questionnaire is divided into five sections: the demographic profile, perception, interest, knowledge, and performance. The items of perception and interest were adapted from previous studies. Meanwhile, performance derives from the year Six syllabus; additionally, the performance items based trial exam question paper year 6, divided into two types of question, namely paper one – multiple-choice questions and paper two – structured and essay questions. Finally the data were analyzed using descriptive statistics by numerical techniques. Statistical techniques such as cross- tabulation, t-test, and spearman rho correlation are used in detailed analysis.

4.0   RESULT

4.1   RELIABILITY ANALYSIS

Reliability is expressed as a coefficient between 0 and 1.00. The closer the coefficient to 1.00, the more reliable the instrument is. Cronbach's alpha is the most common measure of the internal consistency of the items. This test estimates internal consistency by determining how all items on a test relates to all other items and the total test-internal coherence of data. If the value exceeds 0.60, then the scale is said to have internal consistency; hence a set of items is considered reliable.

Table 4.0: Cronbach's Alpha Coefficient

Variable	Cronbach's Alpha Coefficient	Number of Items
Perception	0.631	8
Interest	0.720	8
Knowledge	0.832	10

Table 4.0 shows Cronbach's alpha coefficient for 26 items from sections II, III, and IV in the questionnaire. Since the Alpha level of all items >0.6, therefore the items are reliable.

4.1   PERFORMANCE

Table 4.1: Performance of Paper one and Paper two

PERFORMANCE	POOR	GOOD	EXCELLENCE
PAPER 1	73 (84.9%)	13 (15.1%)	0 (0%)
PAPER 2	86 (100%)	0 (0%)	0 (0%)
Overall	86 (100%)	0 (0%)	0 (0%)

Base on table 4.1, the performance of Orang Asli as overall is poor (86%). In paper one (15.1%) are good, and none of them under excellence. However, for paper two, all of them poor.

Table 4.2 – Correlation result analysis

Students' Attitude		Overall Performance
Perception	Pearson Correlation	-0.205
	Sig. (2-tailed)	0.058
Interest	Pearson Correlation	-.234[*]
	Sig. (2-tailed)	0.03
Knowledge	Pearson Correlation	-.289[**]
	Sig. (2-tailed)	0.007
	N	86

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

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

Table 4.3: Correlation Analysis

Students' Attitude		Performance of Paper 1	Performance of Paper 2
Perception	Pearson Correlation	-0.054	-.356
	Sig. (2-tailed)	0.756	0.001
Interest	Pearson Correlation	-0.045	-.397[**]
	Sig. (2-tailed)	0.682	0.000
Knowledge	Pearson Correlation	-0.143	-.360[**]
	Sig. (2-tailed)	0.188	0.001
	N	86	86

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

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

The result from correlation analysis shows that, at a 1% level of significance (p-value=0.01), there is a significant negative correlation (r = 0.289) between overall performance and total score for knowledge among the Orang Asli students. Meanwhile, at a 5% level of significance (p- value=0.05), the result also shows a significant negative correlation (r = -0.234) between overall performance and total score for student's interest in Mathematics. This indicates that even though the students claimed that they have knowledge and interest in Mathematics, this does not confirm the students will obtain a good result in Mathematics. In terms of student's performance per paper category, result reveals that there is a significant negative correlation between performance in paper 2 and student's perception (r = -0.356), interest (r = -0.397) and knowledge (r = -0.360) at 1% level of significance (all p-value < 0.01). This revealed that having positive perception, high interest, and good knowledge in Mathematics does not lead to perform well in the subject. The detail is shown in Tables 4.2 and 4.3.

4.4   Cross Tabulation Analysis

The cross-tabulation analysis was done to determine the level of perception, interest, and knowledge in Mathematics of Orang Asli primary students towards their performance in Mathematics subject. The 5-point Likert Scale was divided into three levels: low, moderate, and high.

Table 4.4: Cross Tabulation Analysis Result – Level of Perception

			Level of Performance		Total
			Poor	Good	
Level of Perception	Low	Count	25	14	39
		% within level of perception	64.1%	35.9%	100.0%
	Moderate	Count	26	8	34
		% within level of perception	76.5%	23.5%	100.0%
	High	Count	8	5	13
		% within level of perception	61.5%	38.5%	100.0%
Total		Count	59	27	86
		% within level of perception	68.6%	31.4%	100.0%

The cross-tabulation analysis between perception level and performance level shows that   61.5%   of the   Orang   Asli primary students achieved poor performance in Mathematics subject of Paper 1 even though they highly-perceived towards Mathematics. This result indicates that those with high perception levels towards Mathematics were not well- performed in Mathematics subject of Paper 1.

Table 4.5: Cross Tabulation Analysis Result – Level of Interest

			Level of Performance		Total
			Poor	Good	
Level of Interest	Low	Count	22	12	34
		% within level of interest	64.7%	35.3%	100.0%
	Moderate	Count	35	11	46
		% within level of interest	76.1%	23.9%	100.0%
	High	Count	2	4	6
		% within level of interest	33.3%	66.7%	100.0%
Total		Count	59	27	86
		% within Level of interest	68.6%	51.4%	100%

For cross-tabulation analysis between interest level and performance level, 66.7% of the Orang Asli primary students who have a high level of interest in Mathematics have shown good performance in Mathematics subject of Paper 1. The result reveals that students with a high- interest level achieved good performance in Mathematics subject of Paper 1.

Table 4.6: Cross Tabulation Analysis Result – Level of Knowledge

| | | | Level of Performance | | Total |
			Poor	Good	
	Low	Count	20	11	31
		% within level of knowledge	64.5%	35.5%	100.0%
Level of Knowledge	Moderate	Count	38	14	52
		% within level of knowledge	73.1%	26.9%	100.0%
	High	Count	1	2	3
		% within level of knowledge	33.3%	66.7%	100.0%
Total		Count	59	27	86
		% within level of knowledge	68.6%	31.4%	100.0%

Lastly, for cross-tabulation analysis between knowledge level and performance level, the result shows that 66.7% of the Orang Asli primary students with a high level of knowledge achieved good performance in Mathematics subject of Paper 1. In other words, students with high knowledge levels in Mathematics subjects have performed good in Mathematics subject of Paper 1.

CONCLUSION AND LIMITATION

Base on the above result, it concluded that overall, the performance of Orang Asli Students is average to poor for paper one and poor for poor to paper two. The result also indicated a significant negative correlation between overall performance and total score for knowledge and interest, both paper one and paper two. This indicates that knowledge and interest do not seem sufficient for Orang Ashli students to obtain a good result in Mathematics. The result also shows that even though they highly-perceived towards Mathematics, but they still not performed well in paper 1.

However, this study has some limitations, such as the study's participant only standard six students and only the Selangor area that represents less than twenty percent of Orang Asli as overall. Another limitation that we do not inform earlier to the consent student; there is that they do not make any preparation like other assessments.

Still, the study results can be a sign for stakeholders to look at the policy, syllabus, and facilities to help the students perform more in Mathematics. Furthermore, the result can help the Government to develop a holistic way to overcome this severe issue. The study recommended that future studies look at these issues based on students' perceptions and other stakeholders, such as teachers, parents, and community leaders. To get a clear picture of this issue, it proposes that all Orang Asli schools and students in Malaysia involved in the study.

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The Malaysian Graduate Readiness to be employed in IR 4.0

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Abstract: **Industrial Revolution 4.0 (IR4.0) has become the main issue and gain interest nationally and globally. The most affected of IR 4.0 is employment, particularly to the new graduates. The employment opportunity becomes condensed, and the requirement of the job changes dramatically. Hence, this study aimed to investigate the correlation between the new graduate knowledge, skill, technology, and readiness to be employed in IR 4.0. The core factors that contributed to the readiness for employment in 4.0 are also recognized. This study's participant is 255 students from two universities, one in public and the other from the private university using an online survey. Meanwhile, descriptive statistics, correlation, and multiple regressions use to analyze the data. The result indicated that technology and soft skills contributed to the readiness to employ in IR 4.0. However, the respondents agreed that they were a deficiency in using technology in their study. Additionally, the readiness was parallel in all of the universities. Finally, the result proposed that university and government as policymakers need to embed the IR 4.0 knowledge, skill, and technology used in the teaching and learning to ensure the graduates ready to enter the labor market.**

Keywords: **Malaysian graduate, Readiness, Employment, IR 4.0**

Introduction

Schwab K, (2016), a professor and Executive Chairman of the World Economic Forum, define IR 4.0 is a building on the used electronics and information technology to automate production. It is characterized by a fusion of technologies that blur the lines between the physical, digital, and biological spheres. Marr B. 2016, said it denotes the blend of cyber-physical systems, the IOT, and the Internet of Systems. It is the idea of smart workshops in which machineries are amplified with web connectivity and connected to a system that can envision the entire manufacture chain and make choices on its own.

A study by Nagy, J., Oláh, J., Erdei E., Máté D. Popp J., 2018, claimed Industry 4.0 technologies are crucial for most companies in almost all the sectors. They found out that automation will affect production as well as the company function. They added that most of these technologies affect the organization's entire function; the effect starts with the production, sales, and new product development. The data and information can be shared with suppliers and customer partners.

In Malaysia, the government invested heavily in the research and development and emphasized in IR4.0. The main objective is to streamline the industrial competence and transmute Malaysia's economy from a low-cost industrial country into a high-value competing manufacturer Mottain M. 2019.

Skills in 4IR

4 I.R. characteristic is digital, first on the consumer, who relishes more communicating and modified involvements by using social Media, mobile, analytics, and cloud (SMAC) technologies; Second, enterprise forces to use SMAC technologies to enhance the cost of commercial functions and transform enterprise collaboration for higher productivity. Finally, on the operations wave, the companies revolutionize their business using artificial intelligence, robotics, cognitive computing, and the Industrial IoT (Selamat A, 2017).

It leads to gains in effectiveness and production, transportation and announcement costs will drop, logistics and global supply chains will become more productive. The cost of trade will reduce, opening new markets, and driving economic growth (Schwab K, 2016). The critical features in 4IR use of Mobile Devices, Omni-channel Customer Interaction & Customer, Augmented Reality/Wearable, Cloud Computing, Big Data Analytics, Authentication &Fraud Detection, Location Detection Technologies, Smart Sensors, Advanced Human Machine Interface, Internet of Things, Cyber-Physical System (Selamat A, 2017).

A report from McKinsey Global Institute, 2018 in figure 1 shows the workforce skill model that listed the jobs that more likely to be affected by automation. The report divides the work skills into five categories: physical and manual; basic cognitive; higher cognitive; social and emotional; and technological. The report concluded that physical and manual workers and the job use the basic cognitive skills in the U.S. and Western Europe would be reduced. However, increasing the employees' demands higher cognitive, social, emotional, or so-called "soft skills" and technology. Additionally, higher intellectual skills such as originality, critical intelligent and decision making, and composite information dispensation, grow at growing double-digit rates. The report concluded that automation uses in many functions in the organization, such as marketing, complex information processing, and market trends.

Figure 1: McKinsey Global Institute Workforce Skills Model
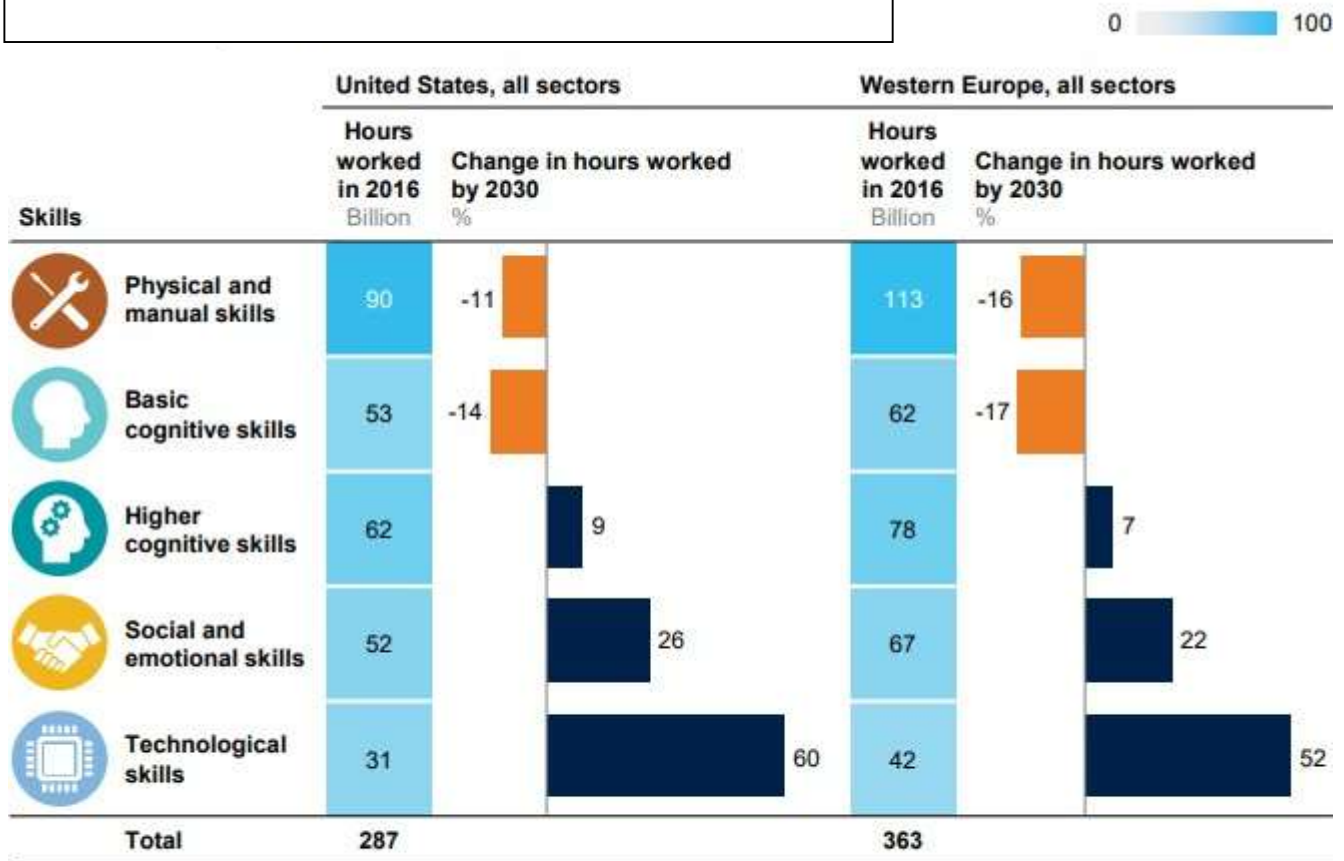
NOTE: Western Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute workforce skills model; McKinsey Global Institute analysis

The opportunity of 4IR, as claimed by Schwab K (2016), is to increase effectiveness and production, as transport and announcement costs will drip, logistics and global supply chains will become livelier. The cost of trade will diminish, and it will open new markets and drive economic growth. On the contrary, economists Erik Brynjolfsson and Andrew McAfee have pointed out; the revolution could increase greater inequality and potentially disrupt labor markets as automation substitutes for labor across the entire economy result in a net increase in safe and rewarding jobs (in Schwab K, 2016).

Employability in 4IR

One of the most affected by 4IR is employability, as the hiring requirement is differed that before. The core skills are looking for by industry are; learning services (self-directed learning, cross-discipline, digital skills), thinking skills (creative, resilience, inquisitive, problem solving); and soft skills (ethics, communication) Mustafa Z (2018). In the meantime, Barakat H (2017) alleged lateral thinking and problem-solving competencies, the team works, communicate effectively and improve information technology knowledge as the crucial skills in 4IR. Finally, the World Economic Forum (2016) described three critical interconnected features that affect talent development deployment. First, technology and globalization increase the pace of Destruction, creation of a new job, and skills churn within existing jobs. Second, education and training systems, for now, reported mainly remained static and inadequate for these new needs. Besides, adult training and skilling systems are poorly developed. Third, outdated but dominant cultural norms and institutional create roadblocks, such as gender discrimination.

It expected that the work environment would change in 4IR. Research done by the McKinsey Global Institute found that approximately 2/3rd of all jobs encompass at least 1/3rd of tasks and actions that could be computerized based on present technology. Another 35% of core skills required by occupations will change or be wholly new in 4IR World Economic Forum, 2017. In IR 4.0, the workforce landscape is dynamic and full of uncertainty. It is increasingly connected with the tech-centered world and demand for non-routine cognitive tasks such as socio-emotional skills (SES) and the interpersonal skills to carry them out (Kattan R.B, 2017).

Student Readiness of Employment in 4IR

Higher learning institutions are responsible for producing their students ready to enter the labor market. They need to transform, including standards and prospectus, to become more vibrant, organic, and be relevant in riding the revolution waves such as cybersecurity, communication, digital competency, programming, entrepreneurship, and marketing Mustafa Z., 2018.

In Malaysia, there is a gap opinion on student or graduate readiness to enter the labor market. Tanius E. 2018 reported that employers and new graduates' perceptions of the primary employability skills urgently required by industry differed. The students claimed that they are ready to enter the workplace market (Tanius E. Susah S. 2015); however, it was denied by the employer. Furthermore, the industry complains that the internship students have a problem with their technical/applied skills (Tanius T., 2015; Erni T., and Che Manisah M.K., 2012). On top of that, they lacked critical/analytical thinking, oral communication, active listening, creativity, and innovation skills (Tanius E, Abdul Rauf R.K., Rosli M.H., and Sharifah Hilmi Syed Abdullah, 2017).

In terms of digital employment readiness, the literature indicates that mainly graduates and young people are not ready yet. Infosys (2016) reported that only those who already have above-average abilities in those skills are interested in upgrading their digital and technological skills. They believe that their education did not prepare them for what to expect from working life. They also said that working with others and communicating effectively are the attributes that make the best employees. Furthermore, they believe that access to new, more flexible, digital tools will enable them to gain new skills far quicker than before. Finally, Mustafa Z (2018) assumed that the industries claimed they ready for technology compensations or ICT employment, but not employees or graduates found are incapable to work these progressive technologies.

METHODOLOGY

This study involved private and public university students in Malaysia. A self-administrated questionnaire was used as the method of data collection. A total sample of 251 students had answered the survey. The questionnaire consists of four sections related to factors contributing to their readiness to employ in IR 4.0; they are I: the demographic profile, Section II: socio-economic characteristics of IR 4.0, Section III: technology (knowledge and used), Section IV: skills (knowledge and used), and Section V: Readiness for employment in IR 4.0. The data analysis from this study was carried out using Statistical Package for the Social Sciences (SPSS) software version 16.0. The analysis of the findings was according to the research objectives.

The first step taken in the data analysis was expressive figures, where it provides background information of the respondents connected to the variables being studied. The distribution of respondents is by gender, race, education level, and university. The summaries of frequency and percentage were provided to give a clear view of the respondents' background. Correlation analysis and multiple regressions are used to identify if there is any significant correlation among variables. Finally, a model of students ready to be employed during IR 4.0 is designed.

RESULT

Table 1 -Summary of respondent

Demographic Variables	Categories	Frequency	Percentage
Gender	Male	99	38.82
	Female	156	61.17
Age	18 - 23 yrs	227	90.40
	24 - 29 yrs	24	9.60
	30 -34 yrs	0	0.00
	35 and above	0	0.00
Education level	Diploma	47	18.43
	Degree	123	48.24
	Foundation	85	33.33
Race	Malay	142	55.69
	Chinese	75	29.41
	Indian	30	11.76
	Others	8	3.14
University	Private	199	78.04
	Public	56	21.96

Based on the above, the respondents are mainly female (61.17%), majority or almost all of the age between 18 to 23 years old. In terms of education level, most (48.24%) degree students with 55.69% are Malay majority from private universities (78.04%). The details, as shown in table 1.

Correlation analysis

Table 2 Correlation analysis for each variable

Variables	1	2	3	4
1. IR 4.0	-	0.352**	0.380**	0.241**
2. KNOWLED.TECHNOLOGY	0.352**	-	0.628**	0.297**
3. KNOWLED.SOFT-SKILL	0.380**	0.628**	-	0.239**
4. READINESS	0.241**	0.297**	0.239**	-

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

The table above shows the correlations among the variables. The results show that IR4.0 was consistently associated with higher soft-skill, more frequent positive effect on technology, and less common effect on readiness. Knowledge of technology was positively associated with soft-skill and less effect on readiness. In summary, IR 4.0 over soft-skill and knowledge in technology was found to be a potent predictor on the employment of IR 4.0
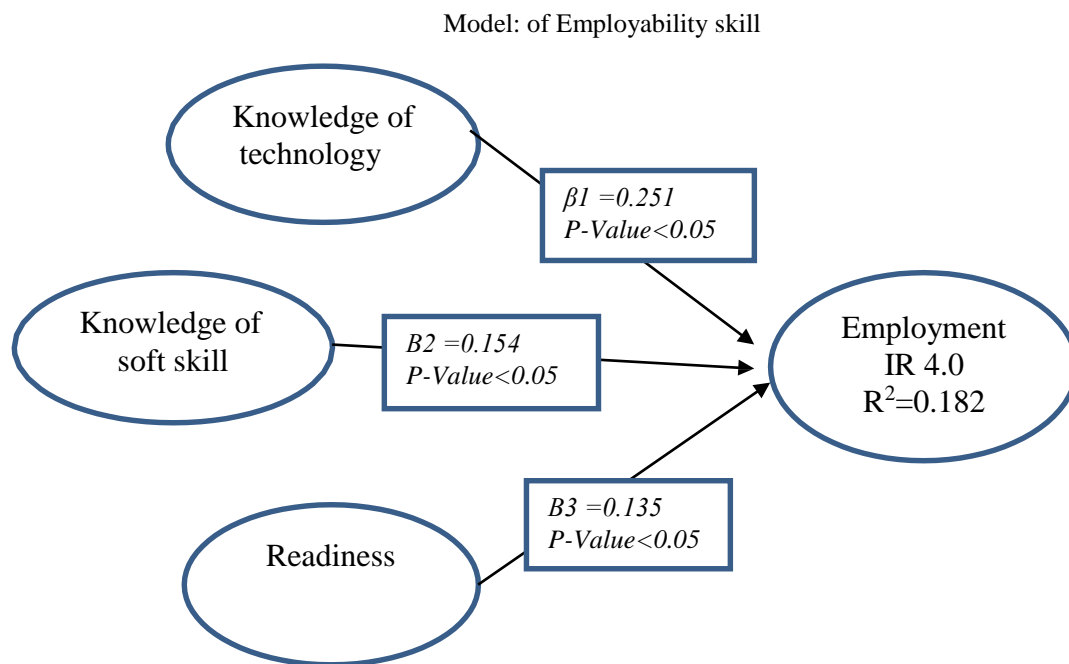
Model: of Employability skill

Table 3 Summary statistics, correlations, and results from the regression analysis

Variables	Mean	StD	Correlation	Multiple regression weight	
				b	β
IR 4.0	3.4578	0.5525			
Knowld. TECH	3.6173	0.6537	0.352*	0.213*	0.251
Knowld.SOFT- SKILL	3.8610	0.6525	0.380*	0.130*	0.154
READINESS	2.1125	0.4733	0.241*	0.158*	0.135

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

Association and numerous reversion analyses were accompanied to observe the association between the new graduate knowledge, skill, technology, and readiness to be employed in I.R. 4. Table 3 summarizes the correlation and analysis results. As can be seen, each of the variables is positively and significantly connected with the IR 4.0, representative that those with higher scores on these variables tend to have a higher effect on employment of IR 4.0.

The multiple regression model with all three predictors produced R^2 = 0.182, $F_{(3, 251)}$ = 18.676, $p < .001$. Knowledge on soft-skill gives a 21.3% effect on the employment of IR 4.0, while readiness gives a 15.8% effect, and knowledge on technology gives a 13% effect on the success of employment IR4.0. However, the results of the analysis show that knowledge in technology give higher effect and significantly predict the successful employment of IR 4.0 (*β1 =0.251P- Value<0.05*) while readiness shows less effect and significantly predict the successful employment of IR 4.0 (*B3 =0.135, P-Value<0.05*)

Conclusion and limitation
In summary, soft skills and knowledge in technology were the primary factors of university students being employed in IR 4.0. The study also found that knowledge has the highest effect on the success of employment in IR 4.0. Meanwhile, readiness shows less effect. However, this study has some limitations, such as the study only involved two universities; the study result may not be representative of all the universities in Malaysia.

Additionally, the variable in this study only three; they are characteristics, technology, and soft skill as factors contributing to the university students ready to be employed in IR 4.0. Therefore, we highly recommend future research to look into holistic studies, involving more students, and it is also suggested that the employer includes in the future study. Finally, it is recommended that in the future, the factors should be added, such as policy or training, so we will able to identify other factors that may contribute to the student's readiness for employment in I.R.
4.0. However, the current study prominently has determined one model to show the association between students' familiarity on features of IR 4.0, technology, soft skills, and students' readiness in employment in IR 4.0. Therefore, this contribution could use as a base for future studies.

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RAPID ASSESSMENT OF MONTHLY VARIATION OF PHYSICOCHEMICAL STATUS IN THE GANGA RIVER, HAJIPUR, BIHAR

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Abstract: **The present research work is an attempt made of to measure water. Quality of Ganga river at hajipur, Bihar. Physico-Chemical status of the Ganga river were conducted during Nov.2017 to Oct 2019. On the basis of present study some parameters like temp., pH, TDS, Turbidity, Conductivity & Do are carried out in present research work. The result revealed well defined monthly variation. The whole river, at hajipur is getting polluted due to intense human activity.**

Keywords: **Physico-Chemical, Ganga river, Present work, Research etc.**

Introduction

Water is most necessary gift of nature for our life but also sustaining all forms of life, food production & economic development (Mane et all, 2005). Fresh water is essential for all living bings. It is the basic medium through which the chemical constituents can pass from the abiotic portion of the ecosystem into the living portion.

River Ganga is the 3rd largest river having a total lenth of approx. 2025 KM. the water of this river is suitable for drinking batheing and all living beings.

Hajipur city is sisituated in Weston central of Bihar. It lies on the bank of Gandak river just north of the Ganga.

Present study carried out in three different sities i.e., (x) Konahara ghat, (y) Muktidham ghat and (z) Terharsiya ghat, Hajipur, Bihar in the Ganga river.

The maintenance of a healthy aquatic system depends on the Physico-Chemical properties of water. Lot of works have been performed on the monthly changes in the Physico-Chemical parameters of rivers, lakes, ponds and streams in India by several workers as.

Materials and Method

The present research work has been done in the Ganga river, hajipur, Bihar. The water samples were collected at the monthly intervals from Nov. 2017 to Oct 2019.

- Most of the parameters at the sampeling sites. Like Temp., pH.
- Water temp. were recorded with the help of a mercury thermometer.
- pH of water was measured by a portable pH meter/ pH stripes.
- TDS was measured by a portable digital TDS meter.
- Turbidity of water was measured by nephelometer or turbidimeter. in NTU(nephelometer turbidity unit)
- The conductivity of water was measured by conductivity meter.
- The analysis of dissolve oxygen was done according to methos of APHA(1975) & Trivedi & Goel(1984)

Result

The monthly fluctuations in the Physico-Chemical properties of the Ganga river at hajipur, Bihar has been depicted in table 1 to Y. Water temperature was vary between 17.1℃ (January 2018, site X) to 29.48℃ (July 2018, site Z). The pH value varied from 6.8 (June 2018, site Y & May 2019, site Y) to 7.9℃ (December 2018, site Z & December 2019 site Z). The TDS value observed 120mg/l (February 2019, site Z) to 158mg/l (September 2018, site X). Water is more turbid during rainy season. The turbidity value ranged from 54 (January 2018, site Y) to 89 (August 2019, site Z). The water is slightly acide in rainy season. it s very rich in conductivity that value ranged from 368 μs/cm(June 2018, site X). In dissolve oxygen control from 4.6(September, site Z) & 7.8 (December 2018, site Y).

Table- 1 : Average monthly variation in Temp. (℃), pH(μs/cm) and TDS (mg/l) of 3 Ganga river at Hajipur, Bihar.
Where as :   X- Konahara ghat
                    Y- Muktidham ghat
                    Z- Tehrasiya ghat

Months	Temp. (˙c)			pH			TDS((mg/l)		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2017	22.1	25.5	24.2	7.3	7.1	7.6	153	142	134
Dec-2017	18.2	19.8	25.4	7.3	6.9	7.8	156	146	131
Jan-2018	17.1	19.5	21.3	7.6	6.9	7.3	148	144	130
Feb-2018	19.6	18.4	19.8	7.5	7.2	7.5	149	138	122
Mar-2018	22.2	21.5	21.9	7.2	7.3	7.7	152	132	126
Apr-2018	28.3	25.6	26.5	7.3	7.4	7.6	156	136	128
May-2018	28.8	27.7	28.2	7.2	6.9	7.5	152	138	132
Jun-2018	27.5	28.5	29.4	7.5	6.8	7.5	155	140	130
Jul-2018	29.6	28.7	29.8	7.6	7	7.4	148	142	126
Aug-2018	29.1	26.8	28.5	7.4	7.1	7.7	155	137	122
Sep-2018	28.8	29.2	25.7	7.6	7.2	7.8	158	138	128
Oct-2018	27.5	28.4	28.2	7.7	7.4	7.6	152	141	126

Table- 2 : Average monthly variation in Temp.(℃), pH(μs/cm) and TDS(mg/l) of 3Ganga river at Hajipur, Bihar.

Months	Temp. (˙c)			pH			TDS((mg/l)		
	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2018	19.8	27.2	26.7	7.6	7.1	7.6	152	140	130
Dec-2018	19.5	29.3	18.9	7.6	7	7.8	150	145	132
Jan-2019	18.8	19.5	19.5	7.5	7.1	7.5	158	142	134
Feb-2019	21.5	21.9	19.9	7.3	7.1	7.7	156	135	120
Mar-2019	22.8	26.7	23.8	7.4	6.9	7.7	148	138	126
Apr-2019	27.9	28.8	27.2	7.3	7	7.5	142	141	128
May-2019	28.2	29.2	28.8	7.1	6.8	7.4	144	138	130
Jun-2019	26.9	29.2	28.9	7.1	6.8	7.4	149	132	131
Jul-2019	28.2	25.9	29.2	7.6	7	7.3	146	130	128
Aug-2019	29.5	26.2	29.1	7.5	7.1	7.6	152	134	130
Sep-2019	28.7	29.8	29.1	7.5	7.1	7.7	156	137	132
Oct-2019	28.2	27.7	28.8	7.7	7.3	7.7	148	142	128

Table- 3 : Average monthly variation in Turbidity, Conductivity and Dissolved Oxygen Ganga river at Hajipur, Bihar.
Where as :   X- Konahara ghat
                  Y- Muktidham ghat
                  Z- Tehrasiya ghat

	Turbidity			Conductivity			Dissolved Oxygen		
Months	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2017	68	59	65	360	330	310	6.5	7.1	5.8
Dec-2017	65	55	67	260	350	315	6.8	7.6	5.9
Jan-2018	55	54	69	268	350	330	6.7	7.4	5.9
Feb-2018	58	58	58	288	280	288	6.9	7.2	5.7
Mar-2018	59	66	59	280	276	269	5.8	6.8	5.3
Apr-2018	68	68	68	265	270	262	5.7	6.7	5.2
May-2018	65	65	71	275	262	272	5.8	6.5	5.3
Jun-2018	63	66	73	260	268	285	6	6.6	5.1
Jul-2018	72	68	78	280	275	270	5.1	5.8	4.8
Aug-2018	75	75	80	276	280	281	5.2	5.7	4.6
Sep-2018	78	72	82	266	262	285	5.3	5.5	4.8
Oct-2018	80	78	85	288	285	277	5.3	5.6	4.9

Table- 4 : Average monthly variation in Turbidity, Conductivity and Dissolved Oxygen Ganga river at Hajipur, Bihar.

	Turbidity			Conductivity			Dissolved Oxygen		
Months	X	Y	Z	X	Y	Z	X	Y	Z
Nov-2018	68	59	62	358	320	310	6.8	7.8	6.2
Dec-2018	62	58	68	360	350	330	6.6	7.8	6.3
Jan-2019	64	65	65	362	352	345	6.7	7.6	6.8
Feb-2019	65	60	64	385	290	292	6.7	7.5	5.8
Mar-2019	72	69	72	258	270	268	6.2	7.1	5.5
Apr-2019	74	74	74	292	282	274	6.1	7	5.3
May-2019	73	69	72	298	288	280	6.1	7.2	5.2
Jun-2019	72	73	78	280	284	282	6.3	7.1	5.1
Jul-2019	78	79	85	286	282	272	5.8	6.6	5.1
Aug-2019	82	78	89	288	272	271	5.7	6.8	4.8
Sep-2019	83	78	87	262	278	270	5.8	6.5	4.6
Oct-2019	85	82	85	266	265	277	5.5	6.3	4.7

Discussion

Temp. : Temperature is an universal factor and change in it may the hydrobiology of the waterbodies (Prasad, 2002). Water temp. Is affected by ambient temp. (M unaware, 1970) as well as planktons present in the water body.

Turbidity: Water is clear and transparent during winter due to low turbidity. During summer it becomes turbid due to low water level and decomposition. During summer it becomes turbid due to low water level and decomposition. During monsoon it becomes highly turbid due to silt and organic matter which enters into the system through surface runoff.

Conductivity : The conductivity of water depends on ion present in water. conductivity reflects the nutrient status of the water and distribution of macrophytes. (crowder et al. 1977. sinha, 1995 , 2002) minimum conductivity during winter may be due utilization of ion by the growing biotic conductivity during summer may be due to decomposition of macrophytes and dead animals.

pH (Hydrogen pon concentration) :
pH measurement gives the intensity of acidic or basic character of water has significant role in survival of acquatic planktoms (sinha 1995). pH shows no significant acidic range munshi et al. (1993) have also reported slight of North Bihar, pH variation throughout the study period is 7.1 to 7.9 and it circumneytral in nature.

Dissolve Oxygen :
The solubility of dissolve oxygen in water depends on physical, chemical and biological activities and plays a vital role in distribution and abundance of phytoplankton. Dissolve oxygen also provide valuable information about the biological and chemical reaction going in water and it is a measure of one of the important environmental factors affecting aquatic life and the capacity of water to receive organic matter without causing nuisance (Wetzel, 1991; pillai et al, 1999, Sinha 1985, 2002). The do was in lower

range during summer due to low vdume of water and increase in the number of macroinvertibrates per unit area which consumes oxygen for their respiration. Higher value of Do were observed in winter primarily due to high photosynthetic activity by the planktons.

TDS :

TDS full form is total dissolved solids. Minerals, salt or dissolved mentals such as calcium, chloride , nitrate, iron, sulfur and some organic matter that dissolved in water commonly referred as TDS. TDS expressed in terms in milligrams (mg) per lit of water, also referred in parts per million (ppm) affect the water test.

Conclusion

The Physico-Chemical analysis of water reveals that water of all of three sites i.e., (x) Konahara ghat, (y) Muktidham ghat and (z) Tehrasiya ghat in Ganga river, hajipur is very rich and suitable for macroinvertebrates and planktons. The data also revealed that the important parameters were withing favorable range for macroinvertebrates. Therefore, the maintenance of a healthy aquatic ecosystem is dependent on the physic-chemical properties of water and biological activity, so the monitoring of the river water is mark the trend pattern of pollutants and their effect on living organism.

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Abstract: **This study evaluated the performance of selected solar photovoltaic (PV) projects installed by Federal and State government intervention agencies in Delta State, Nigeria. Thirty projects were studied, these projects were selected from Delta North, Central and South Senatorial Districts. The data for this study was obtained by using a structured questionnaire and field inspection. The data was statistically analysed using Kruskal-Wallis test at 5% and two-sample T-test. The results of the field inspection revealed that the performance of the installed solar PV projects is significantly different (P> 0.05) between the two government agencies. There are number of factors that affects solar PV system performance in Delta State, Nigeria, these include; high cost, poor awareness, theft/ insecurity, poor maintenance and lack of technical manpower. Practical steps and measures that can promote better performance (installation, operation and maintenance) of solar PV system as a clean and sustainable source of energy in Delta State are also discussed.**

*Keywords***: Environment, Renewable, Sustainable Energy, Solar Photovoltaic (PV) Systems, Green Energy.**

I. INTRODUCTION

Nigeria is one the largest growing economy in sub-Saharan Africa with a population of approximately 202 million people and one of the largest population of youths in the world. The Nigerian economy growth has been muted since 2015, with economic growth averaged at 1.9% in 2018 and this remained stable at 2% in the first half of 2019 [1]. The World Bank report further stated that, the increase in the first half of 2019 can be attributed to the performance in the services sector particularly telecoms. Nonetheless, the manufacturing and production sector recorded a decline and this is as a result of the poor performance in the Nigerian power sector. According to the [2], First Quarter Power Sector Report on Nigeria's Electricity Supply Industry, it is nearly impossible to discuss the growth potential of the Nigerian economy without reference to the challenges in the power sector. The country is endowed with an array of large oil, gas, mineral, hydro and solar resources and has the ability to generate 12,522 megawatts (MW) of electric power from existing hydro-electric and thermal/fossil power plants (Thermal:10,142MW and Hydro:2,380 MW). Unfortunately, in recent times the country has only been able to generate approximately 4,000 MW and this is grossly insufficient [3].

One of the ways the government and stakeholders are increasing citizen's access to electricity, is through the Power Africa Initiative, under auspices of the United States Agency for International Development (USAID) and the U.S. Trade and Development Agency (USTDA). The goal of this partnership is to improve commercial operations and reduce losses of the five national electricity distribution companies: Abuja, Benin, Eko, Ibadan, and Ikeja [3]. Power Africa Initiative is also supporting off grid power projects, with a $15 million Overseas Private Investment Corporation (OPIC) loan.

In Nigeria, less than 40% of the country is connected to the national electric grid, however, less than 6% of the energy demand of this group is generated or distributed. The Federal Government, through the Federal Ministry of Power and Steel, enacted the Renewable Electricity Policy Guidelines in December, 2006, to drive the renewable energy vision in the power sector, so as, to achieve universal access to affordable, reliable sustainable power [4]. Nonetheless, this initiative can be boosted through an increase in supply of renewable energy to the national electricity supply grid [4].

The country's current energy mix for electricity generation is approximately 70% thermal and this is mainly originates from coal fired power stations located in various parts of the country and from the unreliable natural gas supply company's [5]. The outstanding 30% of Nigeria's electricity supply originates from hydro sources, with insignificant contributions from wind and solar technologies [5]. In a study published by the GET. Invest (An African- European Union Renewable Energy Cooperation Programme), the northern and central regions of Nigeria have the potential to generate large amount of electricity from solar PV. The study further stated that the estimated generated capacity for solar PV in both regions (North and Central region) is approximately 43,000MW, and of which a very large portion remains unutilised [6, 5].

The Nigerian renewable policy guidelines recognizes only four forms of renewable energy, these are; Solar, Hydropower, biomass and wind. Currently, the total contribution of renewable energy (large hydropower not inclusive) in Nigeria's power industry is approximately 35MW. This comprises of 30MW small hydropower and 5MW solar photovoltaic (PV), this is an abysmal 0.6% of total nominal electricity generating capacity in Nigeria [4]. Thus, from the aforementioned data, it can be stated that renewable energy

utilization is still terribly low and the abundant renewable energy potential in Nigeria is still very much untapped. The Federal Government through the Ministry of Power and Steel set the Nigeria's Renewable Energy targets as follows [7,4];

- 18% electricity from renewables by 2025.
- 20% electricity from renewables by 2030.
- 760 MW small hydro capacity by 2025.
- 400 MW solar PV capacity by 2025.
- 40 MW wind capacity by 2025.
- 5 MW biomass fired capacity by 2015 and 30MW by 2025.

In 2017, the federal government of Nigeria, invested approximately 20 billion US dollars in solar PV projects in various parts of the country and plans are currently ongoing for the development of a 30MW privately owned solar farm which is to be situated in the North eastern region of Nigeria [5]. A basic barrier to the development of solar energy technology in Nigeria lies in high initial costs and long payback times. Nigeria is a developing country and a large majority of the population are poor and therefore, do not have the financial resources to purchase and install these devices thereby resulting in decline in solar energy utilization in the country [8, 9].

The aim of this study is to assess the performance of selected Solar Photovoltaic (PV) systems installed by the State and Federal Government owned intervention agencies in Delta State, Nigeria.

II. MATERIALS AND METHODOLOGY

The solar powered projects (street light, traffic light and boreholes) installed by State and Federal government agencies within the last five years in the three senatorial areas of Delta were inspected for efficiency in installation, orientation and maintenance.

Description of study area

Delta State (Fig. 1) was created in 1991 is located in the southern part of Nigeria. It is an oil and agricultural producing state

Figure 1: Geographical location of Delta State

Source: Google Maps accessed July 19, 2020

It is situated in the region known as the South-South geo-political zone with a population of 4,112,445.The capital city is Asaba and this is located at the northern end of the state, with an estimated area of 762 square kilometers (294 sq mi), while the city of Warri is the economic center of the state and also the most populated. It is located in the southern end of the state. The state has a total land area of 16,842 square kilometers [10]). Delta State, Nigeria which is an oil and agricultural producing state in Nigeria is still far behind in terms of solar energy utilization. In a report published by the [11], In the years 2016 and 2017, 63.1% and 50.7% respectively of the State Gross Domestic Product (GDP) was obtained from non- oil sources. While, 36.9% and 49.3% of its GDP was obtained from oil sources. The economic nerve center of the state is the city of Warri and this city used to be the economic hub for oil and gas companies in the Niger Delta Region.

Methodology

Data collection involved the use of questionnaires, oral interviews and field inspection using a checklist. Oral interviews were conducted on the technical personnel involved in solar powered projects and data were generated based on their response. Questionnaires were also distributed to the engineers working in the Federal and state owned government agencies who are involved

in installation and maintenance solar powered projects. Similarly, street lights, traffic light and boreholes across Delta State were inspected for efficiency, installation, orientation and maintenance. The data containing the locations of different solar powered projects installed in Delta State was provided by the two (Federal and Stated owned) government intervention agencies.

Similarly, in order, to get a clear understanding of the proper method for installation of a solar PV system, an experimental procedure was set up to simulate a solar PV system placement and orientation. The accessories used to simulate the solar PV system includes; solar panel, charge controller, dial angle gauge and battery. The solar panel was arranged on the ground, mounted on a pole so as to avoid been shaded by tree or building but exposed to the direct rays of the sun. The solar panel was also inclined at an angle as close to the area of latitude as possible to absorb the maximum amount of energy.

The caveat is that the optimum angle which depends on the latitude must be maintained. To determine the optimum angle for solar panel, the latitude of the area was calculated using Global Positioning System (GPS).

III. RESULTS AND DISCUSSION

The results of the field inspection of the solar powered projects across the three senatorial districts in Delta State are highlighted in Tables 1, 2 and 3 below;

Table 1: Delta Central Senatorial District

S/N	LGA	Location	Type of Solar powered project	Working performance	Awardees
1	Uvwie	Ugborikoko, DDPA, Effurun, Agric Road, Ovie Palace, Effurun. Warri – Sapele Road	Streetlight Streetlight Streetlight Streetlight Traffic Light	2 2 1 1 1	Federal Federal State Federal Federal
2	Ethiope West	Otefe-Oghara, Mosogar, Otumare-Oghara	Streetlight Street light Streetlight	1 1 1	State Federal State
3	Ughelli South	Oginibo, Usieffurun	Streetlight Streetlight	1 1	State Federal

Source: Field Survey, 2020

Table 2: Delta South Senatorial District

S/N	LGA	Location	Type of Solar powered project	Working performance	Awardees
1	Bomadi	Akugbene	Streetlight	1	Federal
2	Burutu	Burutu Town Oboro	Streetlight Streetlight	1 1	Federal State
3	Warri South	Okpe-Isoko	Streetlight	4	Federal
4	Isoko South	Oleh Oleh Campus Atebo	Streetlight Streetlight Streetlight	1 2 1	Federal Federal State
5	Isoko	Okpe-Isoko Emevo Ozoro	Borehole Streetlight Streetlight	2 1 2	State State Federal

Source: Field Survey, 2020

Table 3: Delta North Senatorial District

S/N	LGA	Location	Type of Solar powered project	Working performance	Awardees
1	Ndokwa West	Utagbi-Uno Agiliame	Streetlight Streetlight	3 1	Federal Federal
2	Ndokwa East	Obi-Obeti Afure Obodigbo	Borehole Borehole	1 3	State State
3	Aniocha North	Akoku	Borehole	1	State

Source: Field Survey, 2020

Key for working performance

Rating options	Description
1= Poor	Bad, Not working, faulty; Maintenance and replacement of damaged parts required
2=Average	Satisfactory working performance. Regular Maintenance required
3=Good	A consistently high standard of performance. On scheduled Maintenance
4=Very Good	Excellent standard of performance. On scheduled Maintenance

Table 1 shows that out of the ten solar powered project that was inspected in Delta Central Senatorial District from three Local Government Areas and only two was in good working performance, while eight were in a bad condition may be attributed to poor maintenance. The batteries are placed on ground level where it is exposed to theft and climatic/environmental conditions. Furthermore, the solar panels were installed with no consideration of the tilt angle of the latitude of the area and lastly, the electrical conductors are not neatly and professionally held in place.

Table 2 revealed that ten solar powered projects were inspected in Delta South Senatorial district. Eleven projects were inspected, in five Local Government Areas. The results showed that, four of these projects inspected had a good working performance. However, one was working more effectively than the others. The remaining six projects had poor working performance and this may the attributed to poor maintenance, the electric boxes are not accessible, poor electrical connection and lastly, the array of electrical conductors and fittings are not professionally held in place.

Table 3 shows that five solar powered projects were inspected in Delta North Senatorial District. Out of the five, only two were in good working condition while the performance of the other three installed projects was poor. It was also noticed that the batteries were placed on ground level and no maintenance work has been carried out since its installation.

Comparison of solar PV performance in the three locations

The Data collected from three senatorial areas in Delta state was analysed using Kruskal-Wallis test at 5%. This was carried out to determine if there is significance variation in the performance of PV solar systems installed in the three locations irrespective of installer (state or federal).The result revealed that the P-value of the test is greater than 0.05 (P>0.05) which implies the performance does not significantly vary among the locations irrespective of installer (State or Federal).

Comparison between the two government agencies

The data was also analyzed using a two sample t-test to determine whether there is a significant variation in the performance of solar PV systems installed by the two government agencies (State and Federal). The P-value of the test is less than 0.05 (P<0.05) which implies the performance is not the same for the two government agencies. From the mean value, the mean rating of the State installed solar PV projects is less than that of Federal which implies that the variation in the rating is statistically significant (P< 0.05).

IV. DISCUSSION OF RESULTS

There are several factors that can cause the solar PV system installed by one agency to perform better than the other thus, impeding the performance of solar PV system in Delta State, Nigeria. The results from the statistical analysis of the field inspection revealed that the solar PV systems installed by the Federal government intervention agency performed better than the state government installed projects. This may be attributed to a number of factors such as; high budget allocation for installation and maintenance of solar PV projects, availability of technical personnel and Good quality of products. Studies has shown that there are number of factors that affect solar energy performance in Nigeria. They are; High cost, lack of awareness, insecurity, poor maintenance and lack of technical manpower [12, 9, 8].

Problems Associated With Solar PV Systems in Delta State

There are a number of problems associated with solar PV performance in Delta State, Nigeria. These are as follows;

Cost of purchase, installation and maintenance

Cost is a major drawback to solar energy utilization in Delta state. In Nigeria the use of renewable energy particularly solar energy for power generation is still the early stage of development. The components/parts of the solar PV system which are imported from overseas enter the country through the sea ports which are controlled by the federal government, Nigeria and indeed Delta State is still underdeveloped with a higher percentage of her population living under poverty level. This makes the ability to acquire solar energy devices difficult. The Federal government have the resources and power for trade/bilateral agreements with the solar manufacturing countries thereby sourcing original components and importing these solar PV systems at a reduced cost thus, reducing the cost of purchase.

However, the case may be different for the state owned agencies, which is heavily dependent on Federal government allocation to fund part of its budget and projects. Similarly, they do not have the available resources to offer trade agreements with the manufacturer

of the solar PV systems and they have to use contractors to source this components and this is usually done at a higher price (possibility even a lower quality) from suppliers across country. [13] agreed that high cost of solar PV systems is a main barrier to the adoption of solar PV systems in Akure, Ondo, state. The paper also highlighted other barriers such as; lack of awareness, environmental conditions and lack of technical knowledge as hindrances to growth and development of solar PV systems in Akure, Ondo State.

Poor quality of products

The performance of the solar PV systems installed by State and Federal may vary significantly due to the quality of the installed solar PV system/components. The Federal government have a vast supply of resources to directly source the solar PV components from the manufacturers, by this means, installing standard PV systems with a longer lifespan. Nevertheless, the case may be different for the state owned agencies who do not have the available resources (primarily due to low budget allocation for power/renewable energy) to source products directly from the manufacturer.

Subsequently, they have to use local contractors to source the solar PV components from local suppliers and these components may be of a lower standard/quality. This is supported by findings of [14] who stated that, there are no effective government standards or specific requirements monitoring /regulating the quality/grade of solar PV products that should be imported into the country. The solar PV market is flooded with substandard products some of which have no brand name or warranty and when these products are installed they shorten the life span of the solar PV system thereby causing residents/users to be dissatisfied with the quality of service rendered either by the federal or state government intervention agencies [9].

Technical Personnel

Another factor that affects the performance of the solar PV system is level of technical knowledge of the project team. Renewable energy is a fairly new energy concept in Delta state and Nigeria as a whole and as a result, most electrical engineers are focused on design and installation of electricity in homes, businesses and oil installations and as such the state agencies do not have access to a vast team of skilled personnel's who have the ability to quickly detect any failure or improper installation before major damage is done. Most of the technical staff of the state agency are indigenes of the host communities in the state and are imposed on the state government and as such, they do not have the adequate skills, and knowledge and expertise perform their job effectively.

On the contrary, technical personnel's from the federal intervention agencies are made up of people from the different parts of the country who are carefully selected through rigorous examination /interviews process and thus possess the right skills and expertise to properly install and supervise solar PV projects .This is finding is in agreement with [12] who studied the challenges facing solar energy projects in Nigeria. The study pointed out that the lack of skilled technical knowledge is one major causes of failure in solar PV projects in Lagos state and proposed that a solar project engineer, someone with in depth knowledge on renewable/solar PV systems, installation, operation and maintenance should supervise solar powered projects. Similarly, this finding is also in tandem with [4] study on renewable energy development in Nigeria, which pointed out that the renewable energy market do not have a large number of skilled personnel who can install, operate, maintain solar energy systems.

Poor, installation and maintenance

This is another factor that affects the performance of solar PV systems installed by both federal and state agencies. Solar energy utilization, is still in the early stages of development in Nigeria and there is shortage of manpower and skills to operate and maintain the solar PV systems. This is scenario is more severe for the state owned government intervention agencies whose technical personnel's are mainly made of host indigenes and thus do not possess adequate skills and expertise to install, and maintain the solar energy systems.

This finding is in agreement with [12] study which stated that, one of the factors causing the failure of installed solar PV projects is poor maintenance. This can be linked to shortage of trained personnel and as such when the trained personnel are available, they are often too busy to monitor installation, operation and maintenance of the solar projects and this shortens the life span of the commissioned project. Furthermore, [14] also suggest that the absence of skilled technical support for the installation, operation and maintenance of solar projects may slow down the development of solar powered projects especially in rural areas.

High illiteracy rates

According to the [15], over 41 million Nigerians aged between 15 years and are illiterate. This means that in Nigeria, there is low level awareness on the enormous socio-economic and environmental benefits derivable from solar energy [8].The current trends of information concerning the development, various applications, dissemination and diffusion of solar energy resource and technologies are grossly inadequate and should be stepped up through various channels such as; social media, networks, schools etc.

Lack of effective national energy policy

The Federal government of Nigeria through its relevant agencies have set up policies to promote and harness/develop the renewable energy potential of the country. According to [16], there are three main renewable energy generation policies in Nigeria and they are as follows; Nigeria Feed-on Tariff for Renewable Energy and Sourced Electricity (RNSE), Multi-Year Tariff Order (MYTO) and Nigeria Renewable Energy Master Plan (NREMP). The installed capacity target which was set up by NREMP, is proposing an increase in small hydro power by 1400MW in 2025, increase in Solar PV systems to 500MW, wind energy to 40 MW and biomass powered plants by 385MW. The RNSE policy stipulates that, electricity distribution companies should purchase 50% of electricity

from renewable sources and the MTYO II ensures the renewable energy tariffs are fixed and proportionate to market price of conventional energy sources [16].

Nevertheless, due to government bureaucracies, such policies are not actualized and never see the light of day and they mostly end up at the back pages of newspaper publications, ministry/parastatals newsletters or form part of a keynote /welcome address for government functionaries in conferences and seminars [14, 16]. On the contrary, Government support in form of subsidies are usually given to investors of conventional energy to boost energy supply in the country however, this creates an unfavorable and competitive environment for solar energy to grow in Nigeria [16] In a study carried out by [17], the paper highlighted that, lack of awareness and politics, as the two major challenges affecting the growth and development of solar energy in Nigeria. These factors have negatively contributed to the poor implementation and monitoring of renewable energy policies and targets.

Insecurity and Vandalism
There is high rate of poverty and unemployment in the State and, as a result, the solar PV systems are prone to theft and vandalism. Most times, some of these stolen components are employed for their personal use while others are resold to solar PV dealers or end users at a reduced price. Similarly, insecurity also arises through the incessant kidnap of key project personnel's during routine site inspection or installation activities. Thus, resulting in the delay in project completion, inspection or monitoring and this ultimately reduces the performance of the performance of the solar PV system. [9] agrees that theft and vandalisation is one of the principal challenges facing the utilization of solar energy in Nigeria. Furthermore, [14], agreed that the general state of insecurity around solar installations around the country through the killing and abduction of workers in various parts of the country can threaten the growth and development of large scale solar PV systems in Nigeria.

V. CONCLUDING REMARKS

In this paper, the performance of selected solar photovoltaic systems installed by government intervention agencies in Delta State, Nigeria was investigated. The solar PV systems installed by Federal governments agencies performed better than those installed by State owned intervention agencies. The poor performance of solar photovoltaic systems installed by state owned agencies in Delta State can be linked to low budget allocation for renewable energy, lack of technical manpower, poor quality of solar PV system components and poor maintenance. Nevertheless, it would be irrational to say that these aforementioned underlining factors are only limited to state owned intervention agencies. There are other factors such as; inadequate training, theft and vandalism, lack of awareness, technology of equipment and fabrication, environmental as well as climatic conditions that can greatly affect the performance of solar PV systems regardless of whether it was installed by a Federal government, State government or private/corporate entity. Therefore, in order to extensively improve the performance of Solar PV systems in the State, vigorous and enforceable policies should be established and duly maintained. These policies should be backed with strong political influence at both Federal, State and Local government level. These laws/policies are duly essential to promote the actualisation of the following recommendations needed for the performance improvement of solar photovoltaic systems in the State.

Recommendations
- Proper follow-up on the maintenance of solar photovoltaic system e.g. exchange of the battery when it has reached its end of life, cleaning of the panel surface to remove dust and dirty which create a layer on the panel surface, thereby, preventing direct penetration of sunlight with the panel.
- Private/corporate body involvement in solar PV projects should be encouraged.
- Batteries of a PV system should be properly installed in a manner, so as, to avoid theft and vandalism.
- More research should be made on the design and fabrication of solar PV systems using locally sourced materials so as to reduce the cost of importation.
- Proper awareness and publicity should be carried out on the benefits of renewable energy in the country.
- Proper training and certification of technical staff on the proper method of installation, operation and maintenance of soar PV systems.
- Solar panel should be placed where it can get optimum sunlight from the sun in other for it to work in a good capacity.
- Agencies should consider the use of all in one solar street light which are popular in wide open area and in places rich in sunlight and lack constant power supply. The system integrates the solar panel, Light-emitting Diode (LED) lamp, LED source, die casting cap, Passive Infrared Sensor (PIR) motion sensor and lithium battery into to one single product. There are no arrays of electrical wires or heavy batteries to carry thus making it very practical and convenient. This ultimately reduces the cases of poor installation, missing component, theft and vandalism and environmental factors. It also makes maintenance activities easy and less cumbersome

VI. ACKNOWLEDGMENT

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Share Auto Rickshaw Transport Service

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Abstract: **Transport in India is a compulsion as well as convenience. Public transport is still the primary mode of transport for population and India's public transport system are the most heavily exploited in the world. As India is a developing economy, road transport justifies a high precedence as it forms the strength of both the passenger transport and freight movement. Private division operators are also occupying a part in the passenger services in the country. Share auto-rickshaws are mostly found only in capital cities until one decade ago. Now it is a common sight that even in semi-urban areas share auto-rickshaws are plying connecting the network of rural areas. The present article has drawn its strength from such a social background and thus assumed a greater social relevance to-day.**

1. Introduction

Transport in India is a vital part of the nation's economy with a land area of 32,87,240 km which means (12,69,210 Square Meters) and a predictable population of 1.27 billion in 2013. Since the economic liberalization of the 1990's, development of groundwork within the country has developed at a rapid stride and today there is a wide variability of modes of transportation by land, water and air. Public transport is still the primary mode of transport for most of the people and India's public transport system are amongst the most heavily employed in the world.

India with the vast stretches of roads connecting nook and corner of the country, road transport has a vital role to play in the expansion and opening up of background and interior or distant areas of the country. The private sector operators are also occupying a part in the passenger services in the country. The urban transport system is predominantly operated by the private agencies particularly by taxis and share auto-rickshaws.

Share auto-rickshaws are mostly found only in capital cities until one decade ago. Now it is a common sight that even in semi-urban areas share auto-rickshaws are plying connecting the network of rural areas.

The expansion of residential areas, distant location of schools and colleges, and life-style changes even among the rural masses have paved the way for the preference of share auto-rickshaws even to reach their destination of shortest distance.

Besides serving the different sectors of the society, it provides self employment to lakhs of people especially youth. There is a tendency also much evident that school drop outs, and educated youths mostly preferring share auto-rickshaws for their livelihood as it offer sample scope of immediate self-employment either by owning or hiring share auto-rickshaw.

The tremendous developments that are taking place in education, health, tourism and construction sectors indicate an impressive population development in India in respect of income and employment. This makes the millions of people in the state utilizing all modes of transport including share auto-rickshaws transport everyday.

The present article by focusing over the share auto-rickshaw transport service would help bring to light the factors such as employment opportunities offered by the service, the socio-economic conditions of the share auto-rickshaw drivers, their problem, the satisfaction level on their jobs and other related aspects serving as a broad base for government intervention and action wherever necessary. Therefore, the present article has drawn its strength from such a social background and thus assumed a greater social relevance to-day.

2. Share auto-rickshaws in India

Most of the Indian auto-rickshaws are not having doors or seatbelts. They are usually black and yellow in color and have a covering on the top. Their design differs significantly from one place to another. In some places, they have an extra floorboard on the seat to lodge a fourth traveler. Share auto-rickshaws which are used for driving children to school generally have two extra seats/planks like narrow brackets, one facing the main seating space and one to the other side. Such share auto-rickshaws may transport up to 20 children to school. In India it is common to find mechanics shop around every corner, thus allowing share auto-wallahs easy access to spot-repairs. As a mode of transport the share auto-rickshaws is turning out to be a major employer in India. Many graduate youths drive share auto-rickshaws. All major banks of India offers loan to buy one under self-employment schemes.

Nagpur in India has the highest number of share autos in the country. In Bangalore alone, nearly 3 lakh drivers depend upon auto transport service for their livelihood.

3. Review of literature

The past studies found in the present article were reviewed by the researcher and presented in this section.

1. Jaisen in his research article titled "The City Rickshaw" stated that auto rickshaws were much more humble and economic vehicle, safe for both drivers and passengers and appropriate to inner-city use, of all kinds of transportation.

2. Anvita Anand and Rajendra Ravi, in their article titled "Auto-rickshaw drivers in Delhi" mentioned that it would be possible for the drivers to render services efficiently and effectively in the interest of the people as well as the interest of the country by fixing the electronic meters in their auto-rickshaws.

3. In wikipedia it is reported that, the traffic regulating authorities has tried to implement prepaid schemes where the passengers pay pre-determined auto-fares to some central authority and board the autos in metro cities.

4. Objectives of the study
The following are the major objectives of the study.
i)   To understand the employment opportunities offered by the share auto-transport service.
ii)   To know the profile of sample respondents across their socio-economic factors.
iii) To measure the satisfaction level of share auto-rickshaw driver respondents and to identify their problems.
iv)   To offer propositions based on the conclusions of the study.

5. Hypothesis of the study
i)   The age of the respondents does not inspiration their level of fulfillment.
ii)   The educational qualification of the respondents does not affect their level of fulfillment.
iii)   The type of religion of the respondents does not influence their level of fulfillment.
iv)   Marital status of the respondents does not influence their level of fulfillment.
v)   The size of the family of the respondents does not influence their level of fulfillment.
vi)   The residential status of the respondents does not influence their level of fulfillment.
vii)   The status of ownership of share auto of the respondents does not influence their level of fulfillment.
viii) The source of finance of the respondents does not influence their level of fulfillment.

6. Measurement of satisfaction level of respondent share auto-rickshaw drivers
Sample respondents taken for the present article are 50. The measurement level of satisfaction of share auto-rickshaw drivers would help to understand their different levels of satisfaction over their job with a specific analysis of understanding across their socio-economic factors.

6.1 Age of sample respondents
The distributions of sample respondents according to their age are given in table 6.1

Table 6.1
Distribution of sample respondents according to their level of age

Sl.No.	Level of age	Number	Percentage
1	Below 25	31	62
2	Above 25	19	38
	Total	**50**	**100**

Below 25 is the dominating age group in the sample. It can be concluded that the relationship between the age of the respondents and their level of satisfaction is not statistically significant.

6.2 Educational qualification of sample respondents
The distribution of sample respondents according to their educational qualification is given in table 6.2.

Table 6.2
Distribution of sample respondents according to their educational qualification

Sl.No.	Educational qualification	Number	Percentage
1	Schooling	15	30
2	College educated	35	70
	Total	**50**	**100**

Sample respondents who have educational qualification up to college level are dominating in the sample.
It clearly indicates that the association between the educational qualification of the respondents and their level of satisfaction is statistically significant.

6.3 Religion of sample respondents
The distribution of sample respondents according to their religion is given in table 6.3

Table 6.3
Distribution of sample respondents according to their religion

Sl.No.	Kinds of religion	Number	Percentage
1	Hindu	21	42
2	Muslim	19	38
3	Christian	10	20
	Total	**50**	**100**

Sample respondents belong to Hindu are dominating in the sample. It can be concluded that the association between the religion of the respondents and their level of satisfaction is statistically significant.

6.4 Marital status of sample respondents
The distribution of sample respondents according to their marital status is given in table 6.4

Table 6.4
Distribution of sample respondents according to their marital status

Sl.No.	Marital Status	Number	Percentage
1	Married	37	74
2	Unmarried	13	26
Total		**50**	**100**

Sample respondents belong to the married are dominating in the sample. It is concluded that the association between the marital status of the respondents and their level of satisfaction is statistically significant.

6.5 Size of the family of sample respondents

The distribution of sample respondents according to their size of family is given in table 6.5

Table 6.5
Distribution of sample respondents according to their size of family

Sl.No.	Size of the family	Number	Percentage
1	Up to 4	39	78
2	Above 4	11	22
Total		**50**	**100**

Sample respondents who have size of the family up to 4 are dominating in the sample. It can be concluded that the association between the size of the family of the respondents and their level of satisfaction is not statistically significant.

6.6 Residential status of sample respondents

The distribution of sample respondents according to their residential status is given in table 6.6

Table 6.6
Distributions of sample respondent according to their residential status

Sl.No.	Residential status	Number	Percentage
1	Own house	10	20
2	Rented house	21	42
3	Leased house	19	38
Total		**50**	**100**

Sample respondents belong to the rented house are dominating in the sample. It can be concluded that the association between the residential status of the respondents and their level of satisfaction is statistically significant.

6.7 Status of ownership of share auto and sample respondents

The distribution of sample respondents according to their status of ownership of share auto is given in table 6.7

Table 6.7
Distribution of sample respondents according to their status of ownership of share auto

Sl.No.	Status of ownership of share auto	Number	Percentage
1	Own	13	26
2	Hired	37	74
Total		**50**	**100**

Sample respondents belong to the hired are dominating in the sample. It can be concluded that the association between the status of ownership of share auto of the respondents and their level of satisfaction is statistically significant.

6.8 Source of finance and sample respondents

The distribution of sample respondents according to their source of finance is given in table 6.8

Table 6.8
Distribution of sample respondents according to their source of finance

Sl.No.	Sources of finance	Number	Percentage
1	Own funds	16	32
2	Other sources	34	68
Total		**50**	**100**

Sample respondents belong to the other sources are dominating in the sample. It can be concluded that the association between the source of finance of the respondents and their level of satisfaction is statistically significant.

7. Problems of share auto-rickshaw driver

Share auto rickshaw drivers encounter their problems like problem in hiring, irregular demand, no satisfactory margin, police harassment, too much renewal, and license fee quarrels among driver etc. They not only merely look as problems but they also serve as potential ground for problems to be faced by drivers.

To understand the problems of the share auto drivers, five major problems are identified and given to respondents for ranking according to their preference. Using Garrets Ranking Technique, the problems of respondents were identified, ranked and presented in table 7.1

Table 7.1
Problems of respondents

Sl.No.	Problems	Rank
1.	Problem in hiring	1
2.	Unsatisfactory margin	2
3.	Working during odd hours	3
4.	Police harassment	4
5.	Too much renewal, license fee	5

This analysis has cautioned the people concerned to address the identified problems immediately and help the share auto rickshaw drivers to drive a pleasant and peaceful life.

8. Summary of findings

The present article assumes a greater significant and provides a valuable data for the policy makers to take corrective measures wherever necessary. The findings of the article given as follows:

i)   It is known that a majority of 70 percent of share auto drivers are college educated.
ii)   It is clear that a majority of 42 percent of share auto drivers are living in rented houses.
iii)   It is found that a majority of 60 percent share auto drivers have expenses of per month of between Rs.500 and Rs.1,000
iv)   It is disclosed that a majority of 43 percent of share auto drivers belong to the category of membership in association of AICTU
v)   It is clear that a majority of 62 percent share auto drivers experienced above 5 years.
vi)   It is found that the satisfaction of respondents is the highest among the respondents who belong to the other sources category.
vii)   It is found from chi-square analysis that the relationship between the education qualification, religion, marital status, residential status, status of ownership and source of finance and their level of satisfaction is statistically significant.
viii)   It is found that from chi-square analysis that the relationship between the age of the respondents and size of the family and their level of satisfaction is not statistically significant.

9. Suggestions

The following are the some major suggestion offered by the researcher based on his findings.

i)   It is suggested that a separate housing scheme may be introduced for share auto drivers.
ii)   It is suggested that "Share Auto-Rickshaw Drivers Co-operative Bank" may be allowed to be opened by their associations.
iii)   It is suggested that "Public-police-share auto drivers meet" may be arranged frequently.
iv)   It is suggested that instead of issuing driving license under general category, share auto driving license may be issued by the Road Transport Office separately.
v)   It is suggested that installing of electronic meter, by made compulsory.
vi)   It is suggested that a considerable amount may be earmarked every year, by the District Industries Centre (DIC) to finance share auto drivers.

Conclusion

Share auto drivers being the backbone of this transport, all their problems should be settled so as to change their mindset towards commuters, police and society at large. Some of the findings of the present article are revealing and worth considering. It is the hope of the researcher that if the suggestions given in the study are implemented in letters and spirit, the share auto drivers would not only become more public friendly. But also make this transport an indispensable one in this country.

References:

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[2] The Hindu, English daily newspaper, July 25, 2009, p.23
[3] Ibid, June 10, 2008