RESEARCH ARTICLE

INFLUENCE OF INTELLIGENCE QUOTIENT ON THE ACADEMIC ACHIEVEMENT OF STUDENTS.

Ms. Navjot Kaur[1], Mrs. Anoopjit Kaur[2] and Dr. (Mrs) Jasbir Kaur[3].
1. Ex-nursing Tutor, Dayanand Medical College and Hospital, College of Nursing, Ludhiana.
2. Nursing Tutor, Dayanand Medical College and Hospital, College of Nursing, Ludhiana.
3. Principal and Professor, M.M. Institute of Nursing, Mullana, Ambala.

……….....

Manuscript Info	*Abstract*
…………………….	………………………………………………………………

……….....

Introduction:-

Intelligence is a person's capacity for logical/abstract thought, self-awareness, understanding, communication, emotional knowledge, planning, learning, memory, creativity and the problem solving (Weinberg 1989). And an intelligence quotient (IQ) is the score derived from the several standardized tests that are designed for assessing human intelligence.[1] It is observed that average IQ is rising steadily, year by year, and all over the world (tendency known as the Flynn effect).[2] IQ score is the criterion for assessing and judging academic achievement of individual students and their learning outcome in studies.[3] On the other hand academic achievement is the way of knowing the learning of different individual and is found to be bound up with and dependent upon intelligence.[4]

The relationship between the academic achievement and intelligence has always been the area of interest of researchers. Some have found that there is a strong association between the general cognitive-ability and achievement in academics. Psychologist Alfred Binet too developed the test to measure intellectual skills IQ.[5] Modern intelligence tests have been designed to predict how well individual students are likely to perform in the classroom and similar situations. Academic achievement isextent to which students have achieved their educational goals that is generally assessed by continuous assessment and/ or examinations.[6]

Studies repeatedly shown that performance on intelligence tests is correlated with the school performance/achievement.[7,8] Average children having higher IQ scores do better on school grades, perform better on standardized achievement tests, and complete more years of education.[9]Also, there are many studies conducted a study on IQ with relation to gender difference[10,11] The researchers too conducted certain comparative studies among various regional/racial differences on intelligence and academic achievement.[12, 13]

As new research concludes that IQ scores are partly a measure of motivation a child to do well on the test which harnessing that motivation might be as important to later success as so-called native intelligence.[14] The intelligence is usually measured by the verbal skills, numerical skills, logic reasoning, creativity and memorization skills.[15] Intelligence is a cognitive problem solving skill, which is one of the most important factor that have an influence on the academic achievement of the students (Harri 1961). According to Laidra Pullmmann and Allik (2007), IQ and academic achievement are identical constructs while some believe that IQ and academic achievement are reciprocal. While certain studies stated that aspects of the intelligence were not related with academic

Corresponding Author:- Mrs. Anoopjit Kaur.

achievement and there is no significant association of IQ with the academic achievement[4]as many factors like motivation, family's resources, parental support too plays vital role in academic achievement.[16]

Extensive researches have already been conducted to find the correlation between IQ and academic achievement. However, the relationship of the intelligence scores obtained in IQ test and the school achievement is, of course, critical.[17] Thus the need was felt to find out the correlation between IQ and academic achievement among the students.

Material and Methods:-
The correlational study was conducted on 200 B.sc (N) 4th year students studying three selected nursing colleges of Ludhiana, Punjab. Total enumerative sampling technique was employed to collect data from the students of the colleges.

Inclusion & Exclusion criteria:-
Inclusion criteria: Students who were studying in B.Sc. (N) 4th year in selected colleges and were willing to participate in the study. Exclusion criteria: Students who were not present at the time of data collection.

Tool for data collection:-
The tool for the data collection consisted of three parts: I. Socio-demographic profile, II. Advanced Raven's Progressive Matrices Test (1989) and III. Academic achievement profile.

I. Socio-demographic profile: it includes socio-demographic and socio-economic characteristics like: age, gender, ordinal position in the family, religion, father's education and mother's education and major sources of financial support for education and certain schooling details.

II. The Advanced Raven's Progressive Matrices Test (1989): IQ is assessed using Advanced Raven's Progressive Matrices Test, which is a psychometric test used to measure intelligence. IQ is assessed according to scores given by J Ravens, J C Ravens and J H Court. Reliability of tool was 0.91. (Raven, Raven, & Court, 1999) There are 5 standardized categories to classify the subjects according to their IQ i.e. 70-79 (Borderline), 80-89 (Below average), 90-109 (Average), 110-119 (Bright normal), 120-129 (Superior).

III. Academic achievement profile: assessed the academic performance of students. It includes marks obtained by students in 1st year, 2nd year, 3rd year, percentage of 1st year, 2nd year and 3rd year and their marks aggregate from all the three years that was out of 2200.

Method for data collection:-
The methods adopted for data collection are self report and records (detail marks sheet) for the marks obtained by students in last 3 years i.e. from B.Sc. (N) 1st year to B.Sc. (N) 3rd year. The study was conducted in 2016.

Ethical considerations:-
A written permission to conduct the study and ethical permission was taken from the principals of all the respective colleges. Also, informed consent was taken from the participants. Anonymity of participants and confidentiality of information was maintained. Descriptive and inferential statistics (t-test and ANOVA) were used to analyze and interpret the primary data.

Results:-
I. Socio-demographic profile of the subjects:
Table 1 depicts the distribution of subjects as per their socio-demographic and socio-economic characteristics. As per age, most of the subjects 120 (60%) were of 20-21 years and the mean age was 21.39±0.68 years. Majority of the subjects i.e. 194 (97%) were females, 110 (55%) living in rural area and belonged to Sikh religion 154 (70%). Also, most of the subjects i.e. 140 (70.0%) belonged to upper middle class (II) (according to Kuppuswamy's scale 2014) and the major sources of financial support for education were parents and family i.e. 189 (94.5%).

Table 3 depicts the percentage distribution of subjects as per the educational characteristics and their association with IQ and academic achievement. It shows that out of 200 subjects, most of them i.e. 155(77.5%) studied in

private school. Most of the subjects i.e. 117(58.5%) have completed their schooling from P.S.E.B. board followed by C.B.S.E. board 76(38%) and rest from others. The majority 160(80%) have completed schooling in English medium.

II. Association of IQ and academic achievement with socio-demographic characteristics: Table II represents the association of IQ and academic achievement with gender, ordinal position in the family, father's education and mother's education. The data obtained indicates that the male students have higher IQ i.e. 108.83 ± 9.02 (p=0.24), though non-singnificantly higher than females. On the other hand, academic achievement was higher among females i.e. 1512.89 ± 73.9 (p=0.000) which indicates significant association. As for the ordinal position in family, it has significant association (p=0.01) with IQ and academic achievement both. The subjects having second position in family have higher IQ as well as significantly better academic achievement i.e. 104.94 ± 8.88 (p=0.54) and 1521.89 ± 73.33 (p=0.01) respectively.

The association of IQ with father's education indicates that the students whose fathers were graduate and above have significantly higher IQ (104.89 ± 10.25; p= 0.005) as compared to others but its association with academic achievement is quite non-significant (p= 0.53). Association with mother's education indicates that its association with subject's IQ comes out to be non-significant but its association with academic achievement was significant as academic achievement of the subject having mother's education upto higher secondary were significantly higher i.e. 1517.22 ± 71.15 (p= 0.01).

Hence, it was inferred that the subjects whose father's education was graduate and above had higher IQ, and the students whose mother's education was higher secondary had high academic achievement.

Table 3 also depicts the association of IQ and academic achievement with schooling /educational factors, the results indicates that the subjects whose schooling were from private schools had higher IQ and academic achievement i.e. 103.34 ± 11.09 (p=0.99) and 1516.40 ± 74.46 09 (p=0.01) respectively. Thus, indicating significant association of schooling with academic achievement.

Association with board of education during schooling indicates that subjects who had done their schooling from C.B.S.E. board having higher IQ and significantly higher academic achievement i.e. 106.11 ± 9.68 (p=0. 06) and 1519.47 ± 70.57 (p=0.02) respectively. Thus, indicating significant association of board of education with the academic achievement. Association with medium of education during schooling indicates that the subjects who have English medium of education, have higher IQ and academic achievement i.e. 103.80 ± 11.70 (p=0.43) and 1515.56 ± 76.40 (p=0. 06) respectively. But no statistically significant association with IQ or academic achievement was found. Hence, it was concluded that the subjects who had studied in private school, had C.B.S.E. board had higher academic achievement and it was found statistically significant.

III. Levels of IQ among subjects
Table 4 and figure 1 show that almost half number of subjects i.e. 93(48.5%) had average IQ. In fact, only 5(2.5%) falls in category of superior (120 – 129), 77(33.5%) subjects had bright normal, 14(7%) subjects hold the category of below average and 11(5.5%) falls in category of borderline.

1V. Levels of academic achievement among subjects
Table 5 and figure 2 show the percentage distribution of subjects as per their level of academic achievement. The data reveals that 125(62.5%) subjects falls in category of IInd division i.e. 60- 69% marks. 72(36%) were in category of I[st] division i.e. 70% - 79% marks and 3(1.5%) acquired distinction which means 80% and above. Hence, most of the subjects had acquired II[nd]division.

V. Correlation between IQ and academic achievement of subjects
Table 6 depicts the relationship between IQ and academic achievement. The correlation between IQ level and academic achievement was found weakly positive i.e. r = 0.152 (p=0.031). It can be thus concluded that, the students who have more score of IQ had higher academic achievement.

Hence, analysis revealed statistically significant weak positive relationship between IQ and academic achievement. Figure 3 is the scatter diagram depicting the relationship between IQ and academic achievement. It elaborates the fact that higher the scores of IQ, higher is the academic achievement. Though it is weakly positive correlation.

Table 1:-Distribution of subjects as per their socio-demographic and socio-economic characteristics**.**

N=200

Socio-demographic characteristics	f (%)
Age (in years)	
20-21	120(60.0)
22-23	79 (39.5)
24-25	01 (0.50)
Gender	
Female	194(97.0)
Male	06 (3.00)
Habitat	
Rural	110(55.0)
Urban	90 (45.0)
Religion	
Hindu	41 (20.5)
Sikh	154(77.0)
Muslim	02 (1.00)
Christian	03 (1.50)
Socio-economic status (according to Kuppuswamy's scale 2014)	
Upper (I)	38 (19.0)
Upper middle (II)	140(70.0)
Middle/Lower middle (III)	22 (11.0)
Major sources of financial support for education	
Parents and family	189(94.5)
Relatives	04 (2.00)
Loan	07 (3.50)

Mean age $\pm$S.D= 21.39$\pm$0.68 yrs

Maximum age=24 yrs, minimum age=20 yrs

Table 2:-Association of socio-demographic characteristics with I.Q. and academic achievement   **N=200**

Socio-demographic characteristics	f (%)	I.Q. Mean± SD	Academic achievement (Mean± SD)
Gender			
Female	194(97.0)	103.16± 11.66	1512.89±73.90
Male	06 (03.0)	108.83± 9.02	1379.83±73.595
		t= 1.178, p=0.240[NS]	t= 4.344, p=0.000[*]
Ordinal position in family			
First	97 (48.5)	102.23± 11.41	1514.00± 75.61
Second	66 (33.0)	104.94± 8.88	1521.89± 73.33
Third	30 (15.0)	103.47± 13.95	1476.73± 75.92
Fourth	07 (03.5)	103± 12.80	1453.57± 93.6
		F=0.714, p=0.545[NS]	F=3.864, p=0.010[*]
Father's education			
Illiterate	02 (1.00)	76.00±.00	1433.50±16.26
Elementary	48 (24.0)	102.75±12.21	1505.92±70.62
Higher secondary	79 (39.5)	102.99±11.76	1512.97±85.67
Graduate and above	71 (35.5)	104.89±10.25	1508.51±72.11
		F= 4.395, p= 0.005[*]	F= 0.732, p= 0.534[NS]
Mother's education			
Illiterate	06 (3.00)	104.50± 16.34	1418.17± 21.70
Elementary	46 (23.0)	103.26± 11.95	1514.04± 81.20
Higher secondary	103(51.5)	103.37± 11.17	1517.22± 71.15
Graduate and above	45 (22.5)	103.18± 12.00	1496.69± 83.17
		F=0.23, p= 0.995[NS]	F=3.760, p= 0.012[*]

[NS] =Non-Significant, [*] =Significant

Table 3:-Association of IQ and academic achievement with educational factors.

N=200

Educational factors/characteristics	f	I.Q. Mean± SD	Academic achievement Mean± SD
Schooling during education			
Government	45	103.33± 13.38	1483.07±81.43
Private	155	103.34± 11.09	1516.40±74.46
		t= 0.001, p=0.999[NS]	t= 2.588, p=0.010*
Board of education during schooling			
P.S.E.B.	117	101.57± 12.53	1505.14±78.74
C.B.S.E.	76	106.11± 9.68	1519.47±70.57
I.C.S.E.	04	104.75± 7.45	1509.25±90.61
L.A.U.S.D.	03	100.00± 14.73	1387.33±78.94
		F= 2.495, p=0.061[NS]	F= 3.151, p=0.026*
Medium of education during schooling			
English	160	103.80± 11.70	1515.56±76.40
Hindi	02	96.50± 24.74	1405.00±70.71
Punjabi	38	101.74± 12.92	1495.08±90.11
		F=0.833, p= 0.436[NS]	F=2.82, p= 0.062[NS]

* = Significant, [NS] =Non-Significant

Table 4:-Distribution of subjects as per their IQ scores.

N=200

IQ Range	Classification	f (%)
120 to 129	Superior	05 (02.5)
110 to 119	Bright normal	77 (33.5)
90 to 109	Average	93 (48.5)
80 to 89	Below average	14 (07.0)
70 to 79	Borderline	11 (05.5)

Mean ± S.D= 103± 11.77   Maximum score: 135
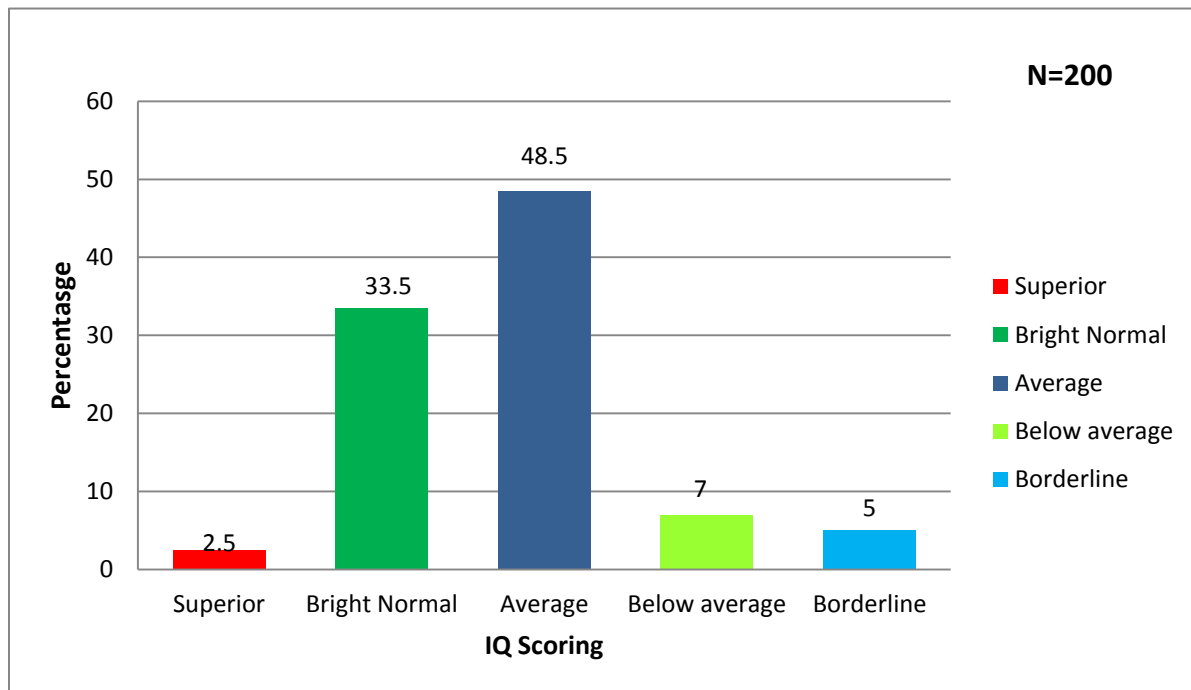   Minimum score: 65

Figure 1:-Distribution of subjects as per level of IQ.

Table 5:-Distribution of subjects as per their academic achievement.

N=200

Range of scores (percentage)	Levels of academic achievement	f(%)
80 & above	Distinction	03(1.5)
70-79	Ist division	72(36)
60-69	IInd division	125(62.5)

Maximum score: 2200   Mean ± S.D= 1510.57 ±79.85
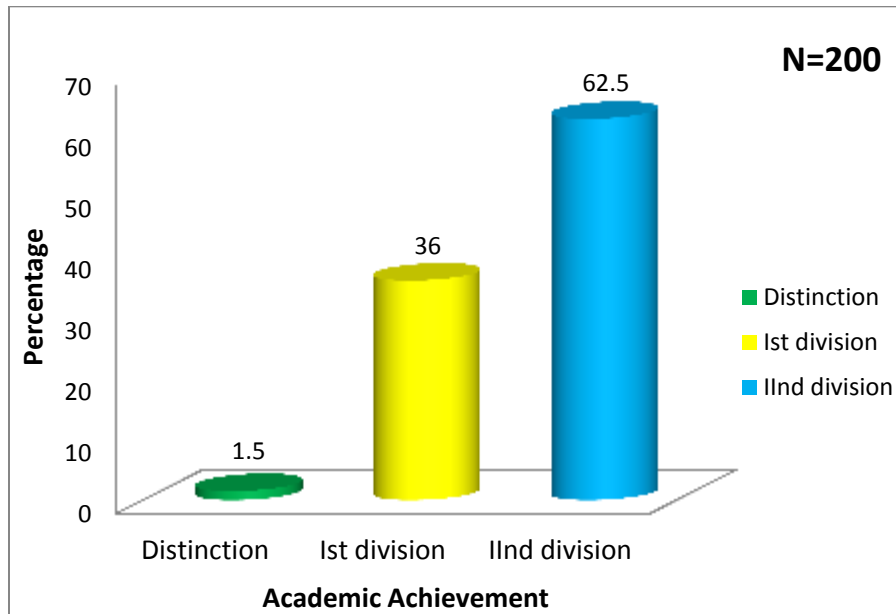Minimum score: 0

Figure 2:-Percentage distribution of subjects as per their level of academic achievement.

Table 6:-Correlation between IQ and academic achievement of subjects

N=200

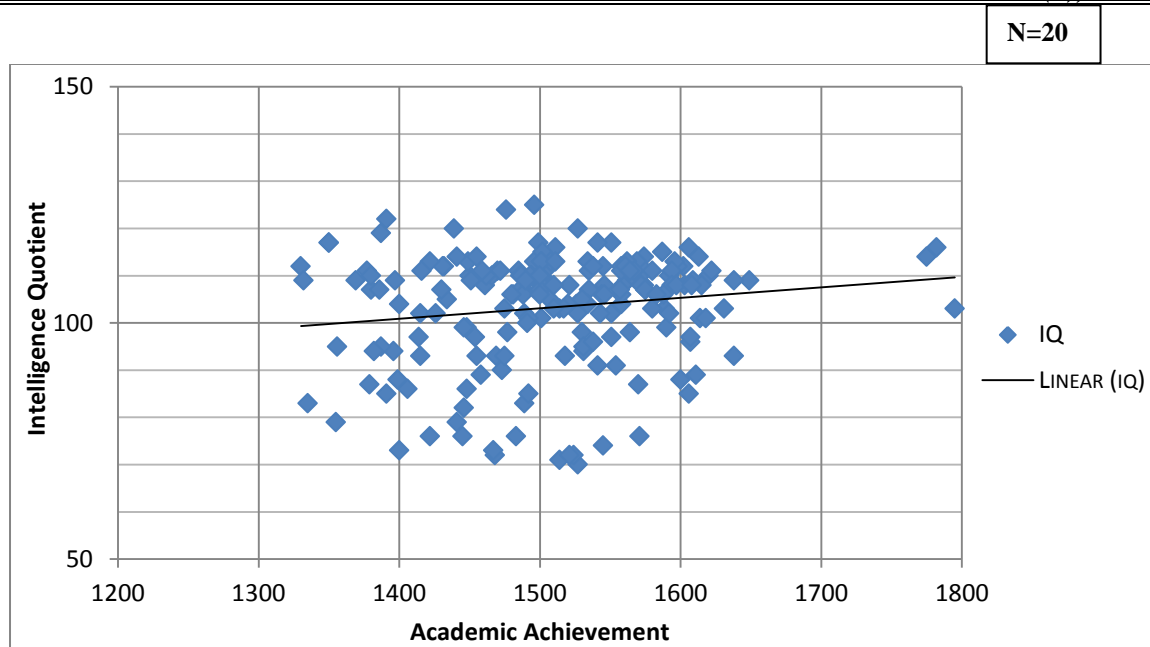| Category	Mean ± S.D	Correlation coefficient (r)	p value
IQ	103.33±11.61	0.152	0.031[*]
Academic achievement	1510.16±79.85		

*Significant (p≤0.05)

Figure 3:-Scatter diagram showing relationship between IQ and Academic achievement.

Discussion:-

The analysis of socio-demographic profile of the subjects revealed that 60% were from age group of 20-21 year, majority of them 97% were females, 70% students belongs to upper middle socioeconomic status. Parents of most of the subjects were educated.

In present study, it was inferred that the subjects whose father was graduate and above had higher IQ, and the students whose mothers education was higher secondary had higher academic achievement. While **Forough H et al. (2010)** revealed no association of academic achievement and the educational status of parents.[18]

Assessing the IQ and academic achievement among the students

According to the findings of present study, it can be concluded that maximum of the subjects 93(48.5%) falls in category of average IQ with an IQ range (90-109). Similar conclusion was drawn by **Bharathi U et al. (2015)** in Andhra Pradesh as the results show that most of the subjects 38.42% fall in the category of average IQ.[10]

Our study revealed that males had more IQ than females but it was found statistically insignificant. Similarly **Habibollah Net al.** (**2011**) reported that there was significant relationship between IQ with gender difference i.e. males had more IQ than females.[4] On the other hand the academic performance of the females was significantly better than males. Similar findings were reported by **Joseph A et al.**[19] However the contrary findings were reported by **Dania et al. (2015)** stating no significant difference of gender of students' on academic achievement.[20]

Assessing the relationship of IQ and academic achievement

The present study indicates statistically significant weak positive relationship between IQ and the academic achievement ($r=0.152$, $p=0.03$). Related to this, there varied results were reported by different studies. A study by **Afshaan A (2007)** on academic achievement in relation to IQ on 180 students of seventh standard studying in a high school revealed that there was a positive relationship between the IQ and academic achievement at $p=0.01$.[3] similar results were reported by certain another researchers.[11,21] On the contrary, **Kulkarni SD et al. (2010) and Naderi H et al.(2009)** found that there was no significant relationship between IQ and academic achievement $p \leq 0.5$.[4, 22]

Conclusion:-

According to the findings of present study it can be concluded that majority of the subjects had average IQ and 2nd division of academic level. And there was a weak positive correlation between IQ and academic achievement though significant. And IQ was found to be significantly associated with father's education and academic achievement was significantly associated with gender, mother's education, ordinal position in family, school of education and board of education.

Recommendations:-

A similar study can be conducted on large sample and different settings to validate and generalize its findings. An exploratory study can be conducted to assess the other factors contributing to academic achievement.

References:-

1. Galtfrendson, Linda S. Main stream science on intelligence. Am.J.Sci. 1997;1(2):13-23.
2. Flynn, James R. What is intelligence, beyond the Flynn effect. S. Afr. J. Sci. 2009;3(2):1-2.
3. Anees A. Study of Academic Achievement in relation to Intelligence of class viii students. Int.J.edu.res. 2013;1(3):239-41.
4. Naderi H., Abdullah R., Aizan T.H, Sharir J. Intelligence and Academic Achievement an investigation of gender differences. J.Life.Sci. 2009; 7(1):83-85.
5. Binet A, Simon T. History of intelligence in relation to psychology. Am. J. Med. Sci. 1997; 18(6):35–45.
6. Lassiter, Kerry. The relationship between academic achievement and measures of intelligence. Am. Psychol. 1995;170-77.
7. Neisser, Ulrich. Rising scores of intelligence tests. A. J. Sci. 1997;3(3):440 – 47.
8. Brody N. Intelligence, schooling, and society. American Psychologist.1997;52(10):1046-50
9. Seligman, Daniel. Quotas for smart kids. Am. J. Med. 1996; 8(3):45–60.
10. Bharathi NU, Devivasundara B, N.Anitha, C.K.Rani, Radhika. Gender performance on intelligence quotient test among medical students in a Government Medical College. IOSR-JDMS. 2015;14(10):17-18
11. Chauhan P, Sharma N. Academic Achievement of Intellectually gifted students in relation to their gender and Intelligence. ZIRAF. 2015; 5(2):139-45.
12. Hafiz M, Dilruba S.Y. Intelligence and Academic Achievements of Kashmiri and Pakhtooni students. Ind.Res.2012 1(2):108-13.
13. Hafiz M, Dilruba S.Y. Intelligence and Academic Achievements of Kashmiri and Tibetan students.SJE. 2012 1(5): 76-80.
14. Sweeney R.B, Bracken B.A. Influence of family structure on children self-concept and development. Dev. Psychol. 2007;14 (5):35–45.
15. LIPI I. Student Intelligence and Academic Achievement in Albanian Universities (Vlora University). AUDA. 2013; 5(2):48-58.
16. Bracken B.A, Cowford. Basic concepts in early childhood educational standards. Am.J.Med. 2010;37:421–31.
17. Chandra R, Azimmudin S. Influence of intelligence and gender on academic achievement of secondary school students of Lucknow. IOSR-JHSS.2013;17(5):09-14.
18. Heiarry F, Khoshnood E. To assess the background variables on the achievement of the accounting students of Islamic Azad University of Yazd. HRMARS. 2013; 3(4):294-298.
19. Joseph A, John O, Eric I, Yusuf S, Olubunmi A. Journal of Education and Practice. 2015.6(33);1-7.
20. Dania PO. Effect of gender on student's academic achievement. Am. Sci. 2015;14 (21):14 - 20.
21. Deary J.I, Strand S, Smith P, Fernandes C. Intelligence and educational achievement. Intell.2006;16(5):13-21.
22. Kulkarni S.D, Pathak R.N, Sharma S.C. Academic performance of school children with their intelligence quotient. NJARIM. 2010;1(2):113 – 20.