



Effect of Parent Teachers' Role and Students' Self Beliefs in Mathematics Performance at Secondary Level

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Abstract: The effect of parents on the teachers' role in relationship on mathematics performance at secondary level and students' beliefs about mathematics which are affecting on mathematics performance at secondary level were the main objectives of the study. The study focused on determining the relationship between teachers' role and students' self-beliefs at secondary school level. Researcher used the methodology regarding survey based research and research tool was developed in questionnaire form with a five-point Likert scale to find results on the basis of findings and conclusion. A total of 692 students sample was taken from target population. The participants belonging to rural, urban, male and female gender also, After the analysis of data, it was found from the descriptive as well as inferential statistics analysis of data that demographic characters like tehsil, school sector, current class, school location, student gender, student subjects of study, student residential area, math achievement ranking, fathers' qualification, mothers' qualification, students' age and obtained marks in 8th class were having positive significant effect on the teachers' role and students' self-belief in mathematics at secondary level. Moreover, it was also found that most of the demographic factors having positive effect on the study and having sig. value 0.00. Similarly, it was concluded that demographic characters were important for mathematics performance at secondary level in connection with teachers' role and students' self-belief also. The descriptive statistics including frequency, percentage and Standard Deviation and inferential statistics having Independent t-test as well as ANOVA t-test for demographic informations as well as on all statements of students and students were calculated and their findings as well as interpretations were taken also. It was also recommended that similar research study will also be conducted at primary and higher secondary level and teachers will also be taken for participants also. It was also suggest that the same study will also produce fruitful results in future at different level of schooling also and It was suggest that it is also necessary to discover how institutions might focus on making pleasurable things useful by promoting educational mathematics.

Key Words: Mathematics, Performance, Secondary Schools, Demographic Characteristics, Self-Beliefs

1. Introduction

Students are required to take mathematics classes because it is a crucial topic. The learner must actively participate in mathematics since it is a human endeavor. Social learning environments allow pupils to develop mathematical concepts and relations rather than rote memorization of rules (Brophy, 2013). The four basic concepts of mathematics are numbers, structures, space, and change. From science and technology to society and culture, and even into everyday life with personal health and finances, mathematics' impact on school mathematics has grown beyond its original context in today's dynamic world (Attard, 2016; Awan, 2011; McLeod, 1992).

Numerous variables that substantially affected students' performance, especially in mathematics, have been identified by researchers throughout the last 30 years (Lubienski et al., 2005; Reardon et al., 2009). According to

the research, there are a lot of elements that influence students' performance in mathematics, including the teacher-student interaction, students' self-beliefs, and how students view mathematics. According to Ezenweani (2006) and Hart (1998), pupils' mathematical performance is significantly impacted by their life experiences.

The public and corporate sectors of education have shown great concern over pupils' mathematical ability (Loma et al., 2012). Design, software engineering, engineering, development, woodworking, and many more disciplines rely on mathematical understanding (Tella, 2008). The teacher-student connection has been found to have a negative impact on students' mathematical performance in multiple research investigations (Cano, 2005).

It has been crucial for the member states of the European Union and Turkey to narrow the long-standing achievement gap between pupils with high and low achievement in mathematics classes (Eurydice, 2011). Thanks to developments in learning theories, additional variables like self-beliefs, self-regulation, behaviour, etc., have emerged in response to the current demand for mathematical knowledge and its applications (Schunk, 2009). In research on mathematics education, it is also a crucial part of the attitude component. An individual's attitude towards an object is defined as the "tendency" that consistently shapes his feelings, ideas, and actions towards that object (Awan et al., 2011).

In mathematics teaching, the mindset of the students is crucial. According to research (Bloom, 1995), affective characteristics account for around 25% of the variance in how people learn. One of the primary aims of mathematics education is to foster an optimistic outlook on the subject (Reyes, 1984). According to research, students' mathematical performance is heavily influenced by the quality of the relationship between their maths professors and themselves (Hughes & Kwok, 2007). Teachers should strive to maintain cordial relationships with their pupils in order to foster an optimal learning environment. Having a teacher one can relate to as a "buddy" will help students succeed (Pianta, 1999). Many pupils attribute their low maths scores to the fact that they and their teachers don't get along.

Teachers usually approach students who have high capacity levels more often since these students tend to have a favourable attitude towards the subject. Students with lower capacity are negatively impacted by this separation. Since mathematics is often considered a challenging topic, fostering positive relationships between instructors and their students can have a significant impact on academic success (Murray, 2015). There are four distinct types of relationships between teachers and their students, as identified by Ewnetu and Fisseha (2008): connection, anxiety, independent/dependent, and peaceful/conflicting. The level of intimacy between students and teachers can be better understood by looking at connectedness.

The implication, according to Tella (2007), is that instructors can influence their students' mathematical performance by establishing strong, positive relationships with them. When seen in this light, anxiety clarifies why some students feel uncomfortable around their instructors. The degree to which students rely or are independent of their teachers can be shown in a dependent/independent relationship. This exemplifies the level of confidence that students have in their instructors, especially when handling a problem in class (Schunk, 1995).

Maintaining motivation is assured by having high self-beliefs. When people succeed in accomplishing their objectives, they often go on to accomplish much more (Schunk, 1989). One's level of dedication and effort is significantly impacted by their self-beliefs (Bandura & Cervone, 1983, 1986; Schunk, 1995). Those that have strong faith in themselves put out more effort when things get tough, and they grow reliant on challenges as a means to hone their abilities.

From a physiological, psychological, and kinaesthetic perspective, one may characterise perception. Whatever the case may be, the scope of this inquiry will be limited to its recommended expansion by Allport (1996), namely, the means by which we assess the individuals with whom we come into contact. Students' mathematical understanding stems from a combination of classroom instruction, prior knowledge, and personal experiences (Hannula, 2007). According to studies, men tend to view mathematics in a positive light (Kaasila et al., 2006).

Perception of mathematics is defined in this study as an individual's subjective mental representation of the subject, shaped by their interactions with others, whether those interactions take place in the context of formal education, informal school networks, or the influence of family, friends, or peers. The way students see mathematics education is closely related to their mathematical attitudes and beliefs (Yahaya et al., 2007). A student's mathematical perception is defined as their mental image of mathematics, including their feelings and thoughts about the topic and their motivation to learn it.

Relationships, good and bad, significantly impact one's quality of life. Here, we agree with (Dahal et al., 2019), who argue that healthy connections are foundational to happiness. This part delves further into the significance and impact of student-teacher connections on mathematics learning, building on our prior knowledge of the notion and

significance of relationships.

There is evidence that a positive teacher-student relationship develops when students are able to actively participate in classroom activities. The type of relationships that teachers establish with their pupils greatly affects their academic performance, according to Hughes and Kwok's (2007) research. In addition, the findings of Daud et al. (2020) demonstrated that the type of interaction between the instructor and the student acts as a bridge between the two, creating an environment that is either conducive to learning or detrimental to it. Wasike (2013) found that a strong teacher-student relationship could be the foundation for divergent perspectives to operate well.

A major aspect of Bandura's social cognition theory is the concept of self-beliefs (Bandura, 1982, 1997, 2001). People, according to social cognitive theory (SCT) (Bandura, 2001), are neither completely dependent on nor limited by their immediate environment. Rather, the connection is considered as two-way, whereby the domain can limit the options available to an individual, and the individual can determine which part of the possible environment will be capable (Zimmerman, 1990). According to Callaman and Itaas (2020), students' mathematical test scores were positively correlated with their academic self-beliefs. How well students do in school is directly related to their confidence in their own academic talents and their ability to put their information and skills to use.

There have also been reports of studies looking at how men and women rate their own mathematical abilities and how well they do in maths. While it has been found that men tend to score higher on math self-confidence surveys than women do (Betz & Hackett, 1983). Those who have historically struggled with mathematics are more likely to shun mathematical challenges, claim May and Glynn (2008). There is substantial evidence linking mathematical confidence with mathematical performance, according to multiple research (Bonne & Lawes, 2016).

Because of this, they make sure that when someone scores highly on the mathematics self-beliefs scale, they also score highly on math tasks. Toropova et al. (2019) found that students' propensity to express positive attitudes towards academics was significantly higher than that of their friends when their self-confidence was higher. Higher levels of self-belief were also associated with greater use of learning and metacognitive strategies, according to Schunk (1999). Four factors were shown to be associated with students' self-belief advancement: physiological state, verbal persuasion, vicarious experience, and prior experience (Bandura, 2002). When a person enters a new situation, their prior experience focusses on the fundamental actions they build upon. Adults and peers rely on vicarious experiences, often called social models, as they tackle problems. What we call "verbal persuasion" is the data we glean from other people's influences while we're at work. A person enters a physiological and affective state when they are trying to put new knowledge into practice; this happens when they are responding to both emotional and physical signals. These traits are difficult to cultivate in a school environment.

A large number of pupils fail to demonstrate proficiency in maths despite having learnt the material. Maths education will be affected by the difficulties pupils face in understanding the fundamental ideas. This part of the study aims to find out if students' understanding of mathematics impacts their performance in the subject and, by extension, their overall grades. Students' mentality towards a subject has a significant impact on how well they do in it, say Mutodi and Ngirande (2014).

According to prior research (Durik et al., 2006), students' perceptions of their own abilities significantly impact their actions. Students' perceptions of their own competence in a given area is known as their "self-concept of ability" (Eccles, 2005). This perception has been linked to various outcomes, such as academic performance (Cooper et al., 2004) and college major choice (Musu-Gillette et al., 2015). Studies have shown that parental beliefs about their children's abilities play a significant role in shaping their self-concept of ability. This effect has been observed in primary school students (Frome & Eccles, 1998; Simpkins, et al., 2012; Spinath & Spinath, 2005), secondary school students (Fredricks & Eccles, 2002; Simpkins et al., 2012), and students making the transition to lower secondary school (Gniewosz et al., 2012).

There is new evidence, meanwhile, that shows how parental opinions may affect their children's academic achievement. Some research suggests that mothers' opinions may have a greater impact on high-performing students than on low-performing ones (Pesu et al., 2016). Nevertheless, additional data is required to determine whether parental assistance has a different effect on adolescents with low and high test scores.

In the relationships between mothers' beliefs and students' self-concepts of ability, only two preceding research have examined the moderating role of students' performance level. Two investigations were conducted by Pesu et al. (2016) and Pesu et al. (2016), both of which dealt with first graders and lower secondary school pupils, respectively. Important educational transitions were not the primary emphasis of either study, which raises the apparent question of whether or not alternative samples would be sufficient to confirm the results. Parents' opinions on their children's abilities, for example, may have a disproportionate impact on them when they are going through

the school transfer process (Ruble, 1994).

Consequently, a fresh perspective on how students' self-concepts of abilities evolve and the impact of moms' ideas on this development during the many stages of transition is necessary. The current research intends to investigate the potential moderating effect of students' performance on the associations between mothers' perceptions of their children's abilities and their children's self-concepts of mathematical and literary ability development during the crucial transition from elementary to lower secondary school (Zan, 2010).

Having a good attitude towards a subject frequently leads to improved performance in that area for students. It was found that students' negative views of mathematics have an effect on their interest in the subject, similar to what Arthur et al. (2017) found. In particular, his research by Ma and Kishor (1997) revealed that a big issue in mathematics education research has been the correlation between students' views of mathematics and their actual performance. For example, according to Neale (1969), the link between the two is due to mutual influences. What this means is that perceptions influence accomplishment, and accomplishment influences perceptions.

For each of the three categories of beliefs listed, separate investigations were conducted:

(a) Traditionally, students' perceptions about themselves as math learners have been seen as having to do with their ability to solve specific types of problems, such as those involving fractions, proportions, algebra, geometry, calculus, and both frequent and uncommon problems. Students who have a high opinion of themselves in a particular area of study are more likely to actively participate in activities that foster their learning and achieve higher grades. Therefore, Beghetto (2012) provided more evidence that teachers' scientific and math credentials mirrored students' motivated views. Students' belief in their own abilities to achieve goals has a similar effect on their drive and concentration in the classroom. Awan (2011) found that students' motivation and performance were both enhanced by having a good self-concept and self-perception, based on an analysis of data from a study of 336 secondary school students.

(b) According to Schommer-Aikins et al. (2005), students' success and engagement in mathematics class are influenced by their ideas about the topic and how they perceive its value and usefulness. The common perception of mathematics is that it is an incredibly challenging field that necessitates advanced mental techniques for comprehension and application. A.E. Vizcaino is a prime illustration of this. In a study conducted on 522 Cuban secondary school students in 2006, it was confirmed that students hold unhelpful beliefs about mathematics education, which in turn impacts the effectiveness of teachers. Specifically, students' perception of mathematics as a challenging subject has a negative impact on their academic performance. The most important component in students' interest in and subsequent success in mathematics is their belief in the subject's practicality, which is positively correlated with their performance (Schommer-Aikins, 2013).

(c) Students state that their environment constantly sends messages that shape their attitudes about mathematics and how to learn it. Teachers' and students' assumptions about their place in the classroom, as well as the norms and expectations surrounding mathematics and social studies, are examples of beliefs held in the social environment. That is why Parra, H. As pointed out by (2005), there is a robust relationship between classroom instruction and student learning.

There are two distinct schools of thought when it comes to the nature and function of educators' pedagogical practices and the classroom environment. Many pupils see their maths teacher as a tutor who imparts knowledge and expects them to absorb all of it, claims the first. The second viewpoint is more constructivist and sees the educator less as a communicator and more as a facilitator of learning who helps students make sense of what they are studying.

By listening to students, considering their perspectives, and encouraging participation, teachers can build meaningful relationships with their students (Chacón, I.M.G., 2006). This is how Jennings, P.A. stands. Teachers' social and emotional competence is crucial to establishing positive relationships with their pupils and, by extension, to the success of any classroom model put forward by (2008).

A number of studies have looked at students' arithmetic beliefs throughout age groups; one of these claims is that, in contrast to elementary school, secondary school reinforces a set of negative beliefs that undoubtedly contribute to the unfavourable outcomes. These ideas spread through secondary school since maths is becoming a more and more challenging subject, which in turn leads to poor grades (Alonso, S.H. et al., 2004; Hidalgo, S., 2005). The insight students have on mathematics remains very critical in educational stakeholder's desire to find a lasting remedy to the issue of low academic outcome and lack of interest in mathematics. These impressions of students about mathematics might be a consequence of encounters students go through in the beginning phases of their educational life.

2. Research Questions

Following three hypotheses were formulated to test the main objectives of the study.

- a) To determine the effect parents on the teachers' role in relationship on mathematics performance at secondary level.
- b) To examine whether students' beliefs about mathematics affects mathematics performance at secondary level.
- c) To find out the effects of teachers' role and student's beliefs on mathematics achievement.

3. Method and Procedure

3.1 Study Design, Population and Sample

All the secondary public schools of District Muzaffargarh will be included in the population of the study and it was depicted the data about the total population of students were taken for from public and private sector, from Muzaffargarh Tehsil, there were 8662 (Male=4867, Female=3795), from Alipur Tehsil total students were taken 3762 (Male= 2108, Female= 1654), and from Jatoi total participants were 3975 (Male=1964, Female=2011). The total population of students was 16399 for both public and private sector including male (8939) and female (7460) students also. Similarly, it was also depicted the data about the total sample of students were taken for from public and private sector from Alipur total students were taken 197 (Male= 84, Female= 113), from Muzaffargarh, there were 375 (Male=163, Female=212) and from Jatoi total participants were 120 (Male=42, Female=78). The total sample of students was 692 for data analysis.

3.2 Tool Development and Validation

A research tool is used to measure the reliability and consistency of data which also measure the future predictions. A questionnaire was designed to measure the student's perceptions and outcomes of study. Questionnaire was designed on the structure of Likert scale in which degree of selection is five which is strongly agree, agree, satisfactory, disagree and strongly disagree. The research tool was developed according to the need of study. To calculate the students' responses on distributed leadership, and trust in head teacher 5-point Likert scale was used. The items of questionnaire were ranging from "Strongly Agree" to "Strongly disagree". The scoring to the items were assigned (i.e., Strongly Agree=5, Agree=4, No idea=3, Disagree= 2 & Strongly Disagree =1). Codes were assigned to demographic information of respondents (i.e., 1, 2, 3, 4 & 5). These scores and codes were helped in analyzing responses and perception differences.

The developed questionnaire was observed by senior teachers, administration staff and expert of university. They found it observe able for the topic and easy to understand for the participant going to fill it. This method is also used as an instrument to make long-term predictions. For long term this research is used on the basis of student's perception on social, emotional and cognitive competence at secondary level at district Muzaffargarh. A pilot test was organized to twenty participants and then tested their reliability. The result showed positive and significant relationship. The test also showed that the students have positive perception about their education system.

The reliability of research tool was measured through SPSS. The value of Chronbach alpha was found 0.7 for my survey design which was highly reliable for research. In this regards, the research tool was found valid for further use for study.

3.3 Tool Administration and Data Collection

Before starting data collection, mandatory approvals had been obtained from CEO of district Muzaffargarh for public schools and from principals of private schools. After obtaining approval to conduct the study, the researcher, with the assistance of the DEO of public and private schools, was provided with a list of the secondary schools.

After finalization of the research survey design questionnaires, the researcher took permission from Chief Executive Officer (DEA), Muzaffargarh. Researcher visited the elementary schools and distributed the survey questionnaires. The researcher briefly described the purpose of study to the students also. Researcher requested all to fill or gave response honestly and fairly. Researcher visited the all secondary schools of four tehsils of district Multan.

After a month, researcher made a visit of these schools again. Researcher collected the questionnaires. Similarly, researcher collected the questionnaires from the students of secondary schools of district Multan. Data collection procedure is important and major step in research thesis in which complete demographics were discussed. In this research a data was collected through students of secondary schools and analyzed their responsiveness against

factors leading to social, emotional and cognitive competence at secondary level in district Multan. SPSS software is used to get more accurate results from the collected data.

It was examined by applying both the descriptive and inferential statistics. Analysis of demographic information was examined by measuring frequency and percentage of the respondents. The descriptive analysis of each item was conducted through calculating percentage (%), mean and standard deviation (SD). For ease of analysis, responses on options "Often" and "always" were combined into one option i.e., "often". Likewise, "rarely" and "never" were combined into one option i.e., "rarely". To analyze the possible differences between the perceptions of participants inferential statistics (i.e., t. test, ANOVA) were conducted.

3.4 Data Analysis and Results

The study was conducted at district Muzaffargarh and secondary schools were taken as population of study. The students were the population and sample of the study. The demographic information of the participants especially location is given in the Table 1.

Table 1: ANOVA test on overall students' perception of their self-beliefs beliefs about mathematics with respect to fathers' qualification

Overall Students' Perception of their Self-Beliefs about Mathematics	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3418.50	5	683.70		
Within Groups	102499.42	686	149.42	4.58	0.00
Total	105917.92	691			

Table 4.1 displayed the ANOVA t-test on overall students' perception of their self-beliefs about mathematics with respect to fathers' qualification. It was found that between groups the value of df was 5, mean squares was 683.70 and within groups value of df was 686 and mean square was 149.42. It was concluded that the sum of square of within groups is greater than the between groups participants and value of F is equal to 4.58.

It was found that value of sig was 0.00 which was found less than the standard sig. value (p=0.05). Similarly, it was concluded that the fathers' qualification having positive significant effect students' perception of their self-beliefs about mathematics at secondary level. Moreover, similar data was also given in Figure 1.

Figure 1: ANOVA test on overall students' perception of their self-beliefs beliefs about mathematics with respect to fathers' qualification

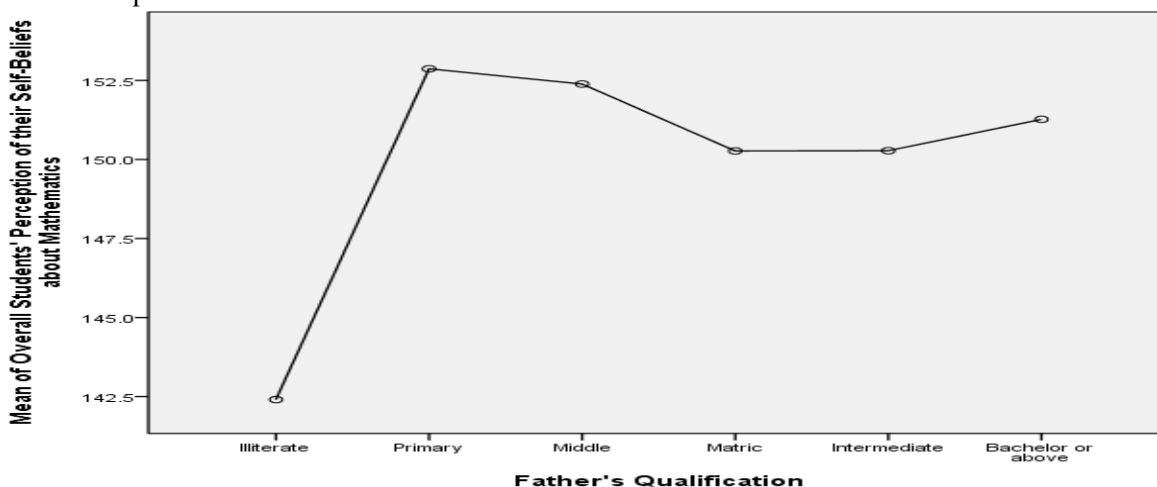


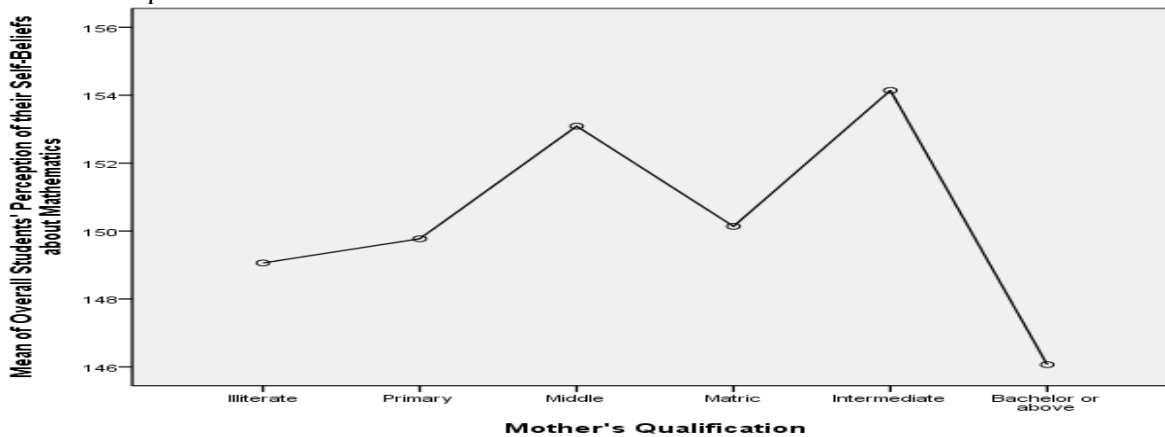
Table 2: ANOVA test on overall students' perception of their self-beliefs beliefs about mathematics with respect to mothers' qualification

Overall Students' Perception of their Self-Beliefs about Mathematics	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3534.70	5	706.94		
Within Groups	102383.22	686	149.25	4.74	0.00
Total	105917.92	691			

Table 4.2 displayed the ANOVA t-test on overall students' perception of their self-beliefs about mathematics with respect to mothers' qualification. It was found that between groups the value of df was 5, mean squares was 706.94 and within groups value of df was 686 and mean square was 149.25. It was concluded that the sum of square of within groups is greater than the between groups participants and value of F is equal to 4.74.

It was found that value of sig was 0.00 which was found less than the standard sig. value ($p=0.05$). Similarly, it was concluded that the mothers' qualification having positive significant effect students' perception of their self-beliefs about mathematics at secondary level. Moreover, similar data was also given in Figure 2.

Figure 2: ANOVA test on overall students' perception of their self-beliefs beliefs about mathematics with respect to mothers' qualification



4. Discussion

The objectives of the research study were to find out students about teachers' role and students' self-beliefs in mathematics performance at secondary level. The main objectives of the study were as effect of the teachers' role in relationship on mathematics performance at secondary level and students' beliefs about mathematics which are affecting on mathematics performance at secondary level were the main objectives of the study. The study focused on determining the relationship between teachers' role and students' self-beliefs at secondary school level.

Researcher used the methodology regarding survey based research and research tool was developed in questionnaire form with a five-point Likert scale to find results on the basis of findings and conclusion. A total of 692 students sample was taken from target population. The participants belonging to rural, urban, male and female gender also. The participants of sample were taken as from Tehsil Mzuaffargarh was 375 (54.2%), Alipur were 197 (28.5%) and from Jatoi were 120 (17.3%).

After the analysis of data, it was found from the descriptive as well as inferential statistics analysis of data that demographic characters like tehsil, school sector, current class, school location, student gender, student subjects of study, student residential area, math achievement ranking, fathers' qualification, mothers' qualification, students' age and obtained marks in 8th class were having positive significant effect on the teachers' role and students' self-belief in mathematics at secondary level. Moreover, it was also found that most of the demographic factors having positive effect on the study and having sig. value 0.00.

Similarly, it was concluded that demographic characters like tehsil, school sector, current class, school location, student gender, student subjects of study, student residential area, math achievement ranking, fathers' qualification, mothers' qualification, students' age and obtained marks in 8th class were important for mathematics performance at secondary level in connection with teachers' role and students' self-belief also. It was also recommended that similar research study will also be conducted at primary and higher secondary level and teachers will also be taken for participants also. It was also suggest that the same study will also produce fruitful results in future at different level of schooling also and It was suggest that it is also necessary to discover how institutions might focus on making pleasurable things useful by promoting educational mathematics as a tool for not just communication and amusement, but also for learning

Data was collected and put into SPSS and excel sheet. The frequency of responses was recoded into tables, for different interpretation descriptive and inferential statistical tools are applied. First of all, mean and standard deviation were found, and then variance and co-relation are found. All factors were tested through an independent t-

test for the mean difference of factors, and all descriptive as well as inferential statistics will be applied for results. As reported in previous studies that one must comprehend what was taught previously in order to comprehend new concepts in Mathematics at secondary level because they are all interconnected and difficult to comprehend and solve problems without prior knowledge about student's perception of social, emotional and cognitive competence at secondary level (Genene, 2014). It was further recommended that similar study would also be conducted at post graduate level to investigate the factors on social competence, emotional competence and cognitive competence having significant relationship for Mathematics at Secondary level.

The descriptive statistics including frequency, percentage and Standard Deviation and inferential statistics having Independent t-test as well as ANOVA t-test for demographic informations as well as on all statements of students and students were calculated and their findings as well as interpretations were taken also. It was also concluded that different factors from demographic informations were most important for social competence, emotional competence and cognitive competence having significant relationship for Mathematics at Secondary level.

Moreover, it was suggested that This study cannot analyzed overall teachers and parents' views regarding their views their social competence, emotional competence and cognitive competence having significant relationship for Mathematics at Secondary level. Future researchers may focus on analyzing views of teachers based on their specific subject of teaching or area/discipline at any level.

5. Conclusions and Recommendations

It was concluded that the fathers' qualification having positive significant effect students' perception of their self-beliefs about mathematics at secondary level. Moreover, it was concluded that the mothers' qualification having positive significant effect students' perception of their self-beliefs about mathematics at secondary level. This study was delimited to seeking perception of students' at secondary level of District Muzaffargarh only. The future researcher may conduct research on other levels of Schools and Colleges in others Districts also. This study focused on investigating views of students only. Future research can be extended to examining head teachers' perception about the perception of teachers' views about self-beliefs in Mathematics at secondary level. This study cannot analyzed overall students' views regarding their views about the self-beliefs and usefulness of Mathematics at primary level.

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