Original Research Article

Mathematics Anxiety and Mental Well-Being of Secondary School Students in Morigaon District, Assam, India

ABSTRACT

Aims:
To examine the level of Mathematics anxiety and mental well-being among Class IX students in Morigaon district, Assam, and to investigate the relationship between Mathematics anxiety and mental well-being with reference to gender.

Study Design:
Descriptive survey method.

Place and Duration of Study:
Three Secondary schools of Morigaon district, Assam, during the academic session 2024–2025.

Methodology:
A sample of 218 Class IX students (Boys = 98; Girls = 120) was selected using purposive sampling technique. Mathematics Anxiety Scale developed by Mahmood and Khatoon (2012) and the Warwick-Edinburgh Mental Well-being Scale (Tennant et al., 2007) were administered. Mean, Standard Deviation, Skewness, Kurtosis, independent samples t-test, and Pearson's Product Moment Correlation were used for statistical analysis.

Results:
The mean Mathematics anxiety score was 31.43 (SD = 12.32). About 8.72% of students exhibited extremely high anxiety, while 18.81% showed extremely low anxiety. No significant gender difference was found in Mathematics anxiety, $t(216) = .14$, $P > .05$, or mental well-being, $t(216) = .35$, $P > .05$. The mean mental well-being score was 49.12 (SD = 16.35). A significant negative correlation was observed between Mathematics anxiety and mental well-being ($r = –.63$, $P < .001$).

Conclusion:
Mathematics anxiety is significantly and negatively associated with students' mental well-being. Reducing Mathematics anxiety through effective pedagogical strategies may enhance students' psychological health and academic outcomes.

Keywords: Mathematics anxiety, Mental well-being, Secondary school students, Gender, Correlation

1. INTRODUCTION

Mathematics plays a crucial role in scientific, technological, and socio-economic development. The National Curriculum Framework (2005) emphasizes the "mathematization" of children's thinking to develop logical reasoning and problem-solving skills. Despite its importance, Mathematics often evokes anxiety among students, which may negatively influence both academic performance and psychological health.

Mental well-being refers to an individual's positive evaluation of life, including feelings of happiness, satisfaction, and resilience (Keyes, 2006). Research indicates that while Mathematics achievement may enhance confidence and cognitive skills, Mathematics anxiety can impair emotional stability and increase stress levels (Wang et al., 2024).

Mathematics anxiety is defined as a feeling of tension, fear, or worry that interferes with the manipulation of numbers and problem-solving (Tobias & Weissbrod, 1980). Persistent anxiety may adversely affect self-esteem and overall mental well-being. Therefore, examining the relationship between Mathematics anxiety and mental well-being is essential for improving both academic achievement and adolescent mental health.

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2. RATIONALE OF THE STUDY

Mathematics plays a crucial role in developing essential skills such as problem-solving, critical thinking, and logical reasoning, which contribute significantly to adolescents' overall development. Active engagement in mathematical learning enhances cognitive functioning, including concentration, memory retention, and analytical thinking (Kim & Lee, 2023). When students successfully solve mathematical problems, they experience a sense of achievement that strengthens their self-confidence and self-efficacy (Parker et al., 2013). Such positive academic experiences are associated with improved mental well-being.

Engagement in Mathematics also promotes emotional regulation and resilience. During the learning process, adolescents often encounter feelings of frustration, challenge, and eventual satisfaction. Managing these emotional responses helps build perseverance and coping skills, thereby contributing to improved mental well-being (Rodrigues, Safeekh, & Veigas, 2023). Studies have further highlighted the relationship between mathematics learning experiences and adolescent mental health (Wang, Li, & Chen, 2024).

Despite its cognitive and emotional benefits, many students develop negative attitudes toward Mathematics. One major concern is Mathematics anxiety, which refers to feelings of tension, panic, helplessness, and mental confusion when dealing with mathematical tasks (Tobias & Weissbrod, 1980). Mathematics anxiety has been widely documented among secondary school students and has been found to negatively influence academic achievement (Khatoon & Mahmood, 2010; Olmez & Ozel, 2012; Wani, 2021).

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Research indicates that Mathematics anxiety is closely associated with students' emotions, thoughts, and behavioral responses in learning situations (Musa & Maat, 2021). High levels of mathematics anxiety not only impair academic performance but may also contribute to stress and reduced mental well-being among adolescents (Arslan, 2020; Wang, Li, & Chen, 2024). If left unaddressed, persistent anxiety related to Mathematics can affect students' confidence, self-esteem, and overall psychological health (Singh & Jethwani, 2023).

Given the growing concern regarding adolescent mental health and the documented impact of Mathematics anxiety on both academic achievement and emotional well-being, it becomes essential to explore this relationship in specific educational contexts. Therefore, the present study seeks to examine the relationship between Mathematics anxiety and the mental well-being of secondary school students in Morigaon district, Assam.

2.1 OBJECTIVES OF THE STUDY

1. To find out the level of Mathematics anxiety of the Class IX students of Morigaon district, Assam.
2. To compare the Mathematics anxiety Class IX students of Morigaon district, Assam with reference to their Gender (Boys/Girls).
3. To find out the level of mental well-being of the Class IX students of Morigaon district, Assam.
4. To compare the mental well-being of Class IX students of Morigaon district, Assam with reference to their Gender (Boys/Girls).
5. To study the relationship between Mathematics anxiety and mental well-being of Class IX students of Morigaon district, Assam.

2.2 HYPOTHESES OF THE STUDY

1. There is no significant difference in Mathematics anxiety of Class IX students of Morigaon district, Assam with reference to their gender.

2. There is no significant difference in mental well-being of Class IX students of Morigaon district, Assam with reference to their gender.

3. There is no significant correlation between Mathematics anxiety and mental well-being of Class IX students of Morigaon district, Assam.

3. METHODOLOGY

3.1 RESEARCH DESIGN

The present study adopted the Descriptive Survey Method.

3.2 POPULATION

The population comprised all Class IX students studying in Secondary schools of Morigaon district, Assam, during the academic session 2024–2025.

3.3 SAMPLE

A sample of 218 students (Boys = 98; Girls = 120) was selected from three Secondary schools using purposive sampling technique.

3.4 TOOLS USED

1. **Mathematics Aanxiety Sscale (MAS) constructed and standardized by Dr. Mahmood and Dr. Khatoon (2012):** This ~~anxiety~~ scale is designed to measure the anxiety of students towards Mathematics of secondary and senior secondary school students. This scale is intended to identify the bi-dimensional effects, positive (e.g. liking, excitement, pleasant, comfortable) and negative (e.g. fear, dread, nervousness, worry) toward Mathematics. It consists of 14 statements from which 7 are positive and 7 are negative. It is a questionnaire with five-point likert scale ~~means each statement has 5 replies that are strongly agree, agree, undecided, disagree, strongly disagree.~~ This Mathematics Anxiety Scale has split-half reliability 0.89 and Cronbach alpha 0.87. The scoring procedure of this scale is shown in Table 1:

Table1: Scoring procedure

Statements	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	1	2	3	4	5

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Commented [R6]: Replace "find out" with "determine".

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Commented [R9]: Please justify your choice of research design. State how it aligns with your objectives of the study.

Commented [R10]: Please provide a brief rationale/justification as to why all Class IX students studying in Secondary Schools of Morigaon district, Assam, were chosen as the population of study (e.g., Why Class IX? Why in that location?) This ensures transparency and credibility in doing the research.

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Negative	5	4	3	2	1

The range of scores is from 14-70 and high scores in the scale indicate high Mathematics anxiety.

2. **Warwick-Edinburgh Mental Well-being Scale (WEMWBS):** The ~~Warwick-Edinburgh Mental Well-being Scale (~~WEMWBS~~)~~ was developed by Tennant et al. in 2007, with funding from the Scottish Government's national program aimed at improving mental health and well-being. This measure is designed to assess the mental health of adolescents. It consists of 14 items, each rated on a 5-point Likert scale. The scale has a Cronbach's alpha coefficient of .84, indicating good internal consistency, and its test-retest reliability is .83.

Each of the ~~14 positive~~ items is scored from 1 (none of the time) to 5 (all of the time). The total scale score is calculated by summing the scores of the individual items. The minimum score achievable is 14, while the maximum score is 70. Higher scores on the scale indicate a greater level of mental well-being. The scoring procedure for this scale is detailed in Table 2:

Table 2: Scoring procedure

Statements	**None of time**	**Rarely**	**Some of the Time**	**Often**	**All of the time**
Scores	1	2	3	4	5

3.5 STATISTICAL TECHNIQUES

Mean, Standard Deviation, Skewness, Kurtosis, independent samples t-test, and Pearson's Product Moment Correlation were used.

4. RESULTS AND DISCUSSION

4.1 LEVEL OF MATHEMATICS ANXIETY

~~The scores obtained by the Class IX students of Morigaon district in the Mathematics anxiety scale were used to calculate the level of Mathematics anxiety, Mean and Standard Deviation, Skewness and Kurtosis.~~ The level of Mathematics anxiety of the Class IX students of Morigaon district is shown in Table 3:

Table 3: The level of Mathematics anxiety of the Class IX students of Morigaon district

Category	**Number of students**	**Mean**	**SD**	**Skewness**	**Kurtosis**
Total	218	31.43	12.32	0.47	-0.92

It is revealed from the Table 3 that the value of m~~M~~ean and s~~S~~tandard d~~D~~eviation of the distribution of ~~Mathematics anxiety score~~ the MAS obtained by the Class IX students of Morigaon district are 31.43 and 12.32, respectively. The value of skewness is 0.47. Thus, the distribution of Mathematics anxiety scores obtained by the students was skewed positively. It means that more individuals of the group scored less than the average score. The value of kurtosis is -0.92. Thus the distribution is platykurtic i.e. the peak of the curve is lower than the normal curve.

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Distribution of the students based on their Mathematics anxiety scores is shown in table 4:

Table 4: Distribution of the students based on their Mathematics anxiety scores

Range of Z scores	Level of Mathematics Anxiety	Frequency	Frequency %
+2.01 and above	Extremely High Anxiety	19	8.72
+1.26 to +2.00	High Anxiety	25	11.47
+0.51 to + 1.25	Above Average Anxiety	31	14.22
-0.50 to +0.50	Average Anxiety	22	10.09
-0.51 to -1.25	Low Anxiety	31	14.22
-1.26 to -2.00	Very Low Anxiety	49	22.47
-2.01 and above	Extremely Low Anxiety	41	18.81
Total		218	100

From the Table 4, it was observed that 8.72% of Class IX students of Morigaon district have an 'extremely high' level, 11.47% have a 'high' level, 14.22% showed an 'above average' level and 10.09 % have an 'average' level of Mathematics Anxiety. 14.22% showed a 'low' level, 22.47 % showed a 'very low' level and 18.81 % have an 'extremely low' level of Mathematics Anxiety.

4.2 COMPARISON OF THE LEVEL OF MATHEMATICS ANXIETY OF CLASS IX STUDENTS OF MORIGAON DISTRICT WITH REFERENCE TO THEIR GENDER (BOYS/GIRLS): The 't-test' was used to compare the level of Mathematics anxiety of Class IX students of Morigaon district with reference to their Gender (Boys/Girls). The following Table-5 shows the comparison of the level of Mathematics anxiety of Class IX students of the Morigaon district with reference to their gender.

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Table 5: Comparison of the level of Mathematics anxiety of Class IX students of Morigaon district with reference to their gender

Category	N	M	SD	SE_D	df	't' value	Significance
Boys	98	30.07	11.28	1.65	216	.14	Not significant at 0.01% level
Girls	112	32.54	13.04				

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To investigate whether there is a significant difference in Mathematics anxiety levels between Class IX students in Morigaon district based on gender, the null hypothesis was formulated as follows: **"There is no significant difference in the level of Mathematics anxiety among Class IX students in Morigaon district with reference to their gender."** The calculated 't' value is found to be .14, which is not significant at the 0.01 level. Therefore, the null hypothesis could be accepted. This indicates that there is no significant difference in the level of Mathematics anxiety among Class IX students in Morigaon district with reference to their gender.

4.3 Level of mental well-being of the Class IX students of Morigaon district, Assam: The scores obtained by the Class IX students of Morigaon district in the ~~Warwick-Edinburgh Mental well-being scale (WEMWBS)~~ were used to calculate the level of mental well-being, Mean, Standard Deviation, Skewness and Kurtosis. The level of mental well-being of the Class IX students of Morigaon district is shown in Table 6:

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Table 6: The level of mental well-being of the Class IX students of Morigaon district

Category	N	Mean	SD	Skewness	Kurtosis
Total	218	49.12	16.35	-0.75	-0.59

It is revealed from the table-6 that the value of Mean and Standard Deviation of the distribution of mental well-being score obtained by the Class IX students of Morigaon district are 49.12 and 16.35 respectively. The value of skewness is -0.75. Thus, the distribution of mental well-being scores obtained by the students was skewed negatively. It means that more students of the group scored higher than the average score but a few students score very low. The value of kurtosis is -0.75. Thus the distribution is platykurtic i.e. the peak of the curve is lower than the normal curve.

The categorization of students based on their mental well-being scores is shown in Table 7:

Table 7: Categorization of students based on their mental well-being scores

Variable	Grading	Range of score	Frequency (f)	Percentage (%)
Mental well-being	High mental well-being	61-70	97	44.50
	Moderate mental well-being	43-60	58	26.60
	Low mental well-being	14-42	63	28.90
	Total		218	100

Table-7 reveals that, 44.50% of Class IX students have 'high' level, 26.60% have 'moderate level and 28.90 % have 'low' level of mental well-being.

4.4 COMPARISON OF THE MENTAL WELLBEING OF CLASS IX STUDENTS OF MORIGAON DISTRICT, ASSAM WITH REFERENCE TO THEIR GENDER (BOYS/GIRLS): The 't-test' was used to the compare the mental wellbeing of Class IX students of Morigaon district with reference to their gender (Boys/Girls). The Table-8 shows the comparison of mental wellbeing of Class IX students of Morigaon district with reference to their gender.

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Table 8: Comparison of the level of mental well-being of Class IX students of Morigaon district with reference to their gender

Category	N	M	SD	SE_D	Df	't' value	Significance
Boys	98	50.19	16.22	2.08	216	.35	Lower

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Girls	112	48.25	14.03

To determine whether there is a significant difference in the levels of mental well-being among Class IX students in the Morigaon district based on gender, a null hypothesis was formulated: "**There is no significant difference in the levels of mental well-being of Class IX students in the Morigaon district with reference to their gender**." The calculated t-value is .35, which is not significant at the 0.01 level of significance. Therefore, the null hypothesis could be accepted. This indicates that there is no significant difference in mental well-being among Class IX students in the Morigaon district with reference to their **g**ender.

4.5 RELATIONSHIP BETWEEN MATHEMATICS ANXIETY AND MENTAL WELLBEING OF CLASS IX STUDENTS OF MORIGAON DISTRICT, ASSAM: Product moment coefficient of correlation was used to know the relationship between Mathematics anxiety and mental wellbeing of Class IX students of Morigaon district**.** Table-9 shows the relationship between Mathematics anxiety and mental wellbeing of Class IX students of Morigaon district.

Table 9: Relationship between Mathematics anxiety and mental wellbeing of Class IX students of Morigaon district

Variables	N	df	Coefficient of Correlation
Mathematics anxiety			
Mental well- being	218	216	-.63

Table-9 shows that computed value of product-moment coefficient of correlation (r) between Mathematics anxiety and mental wellbeing of Class IX students of Morigaon district is -.63. Thus, there is a significant negative correlation between Mathematics anxiety and mental wellbeing of Class IX students of Morigaon district.

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5. CONCLUSION

The study revealed that although many students demonstrate moderate to high mental well-being, a significant negative relationship exists between Mathematics anxiety and mental well-being. Gender differences were not statistically significant. Reducing Mathematics anxiety through supportive teaching strategies, conceptual learning approaches, and confidence-building interventions can significantly enhance students' mental health and academic success.

CONSENT

Written informed consent was obtained from the school authorities and participants prior to data collection.

ETHICAL APPROVAL

All authors hereby declare that the study was conducted in accordance with ethical standards and approved by the appropriate academic authority. The research was performed in accordance with the ethical principles of the Declaration of Helsinki.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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