



Regular Article

ChatGPT and generation 'Z': A study on the usage rates of ChatGPT

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ABSTRACT

This study aims to elucidate the prevailing patterns in the utilization of technology, specifically chatGPT. It determines the influence of Generation 'Z,' students' perspectives, and adoption tendencies on the rate of chatGPT usage. Data were analyzed using a structural equation model (SEM) through Amos version 24, focusing on university students (n = 307). Findings showed a direct relationship among all variables: students' views, Generation Z's, and adoption tendencies. All three variables had a positive impact on chatGPT usage rates. Of all three independent variables, Generation 'Z' had the most significant impact on chatGPT usage among university students. This study focused on students enrolled in public universities; future research could investigate the demographics of students attending private universities, specifically those in the twelfth grade and academics.

1. Introduction

The term "Fourth Industrial Revolution," "4IR," or "Industry 4.0" has become a buzzword akin to a neologism, characterizing the swift advancement of technological eras in the 21st century. Artificial intelligence (A.I.) has nearly supplanted the intelligence of humans and animals. OpenAI introduced and marketed ChatGPT (Chat Generative Pre-trained Transformer), a language-based chatbot, on November 30, 2022. Since its inception, it has allowed adopters to refine language-based length, style, and format, considering successive attempts at replies that create the true sense of live conversation. Given its capacity to generate substantial amounts of text and facilitate content creation, it has garnered considerable popularity as a pedagogical tool for both instruction and acquisition (Baidoo-Anu & Ansah, 2023; Hassani et al., 2020; Korteling et al., 2021; Memarian & Doleck, 2023; Pan et al., 2023; Rasul et al., 2023; Shin & Shin, 2022). Consequently, there has been a burgeoning fascination with ChatGPT beyond computer science, as scholars from many academic backgrounds are delving into its prospective utility (Sohail et al., 2023). The impact of A.I. models, particularly the notable potential applications of ChatGPT in education, has elicited a range of feelings among educators (Grassini, 2023; Sohail et al., 2023) (see Fig. 1).

The Gen Z population, similar to previous generations such as the Silent and Baby Boomer cohorts, as well as Generation X (Gen X) and

Generation Y (also referred to as Millennial), exhibits distinctive characteristics that have been influenced by advancements in information and communication technologies, societal and cultural changes, and economic instability (Chan & Lee, 2023). Generation Z, defined explicitly as the I-generation, net-gen, and digital natives, includes those who were born during the period spanning from the mid-1990s to the late 2010s (Turner, 2015). Many individuals belonging to Generation Z have developed a strong emotional connection to the internet. The survey revealed that over 90% of participants between the ages of 13 and 17 expressed distress at the prospect of losing their internet connection as punishment (Palley, 2012). ChatGPT introduced diversified features by considering the unique ideals and experiences of Generation Z in the age of digital media and the potential for this generation to shape and implement new forms of social activism (Boggs et al., 2023; Turner, 2015).

Younger people exhibit a greater inclination towards adopting technology. However, as they age, their tendency to embrace technology decreases due to the formation of deeply ingrained belief systems that are resistant to change, established through their accumulated experiences (Magotra et al., 2016). Several outcomes were revealed through the outstanding work done by researchers in this ChatGPT field. The study conducted on understanding and overcoming ChatGPT's problems will lead to more trustworthy conversational agents in the future (Nazir & Wang, 2023), and another study was made for: Conversational A.I.

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model ChatGPT has gained traction in the realm of digital marketing, providing businesses with a potent instrument for customer interaction and brand promotion (Sharma, et al., 2023). Prior research has been conducted to measure the adoption, knowledge, concern, and ethics of using chatGPT (Acosta-Enriquez et al., 2024; Biloš & Budimir, 2024; Chan & Lee, 2023). A study examines the utilization of ChatGPT among students in the UAE, focusing on their perspectives, apprehensions, and perceived ethical considerations (Farhi et al., 2023). Generation Z consumers' mobile phone addiction is rising with social media. Their behavior has changed drastically (Sharma, et al., 2023). Another analysis delves into technology's significant role and examines its impact on the development of prosaic interests among individuals belonging to Generation Z (Martinez-Gonzalez et al., 2021).

Since chatGPT launched in November 2022, there have been few studies. This study's novelty is measuring the usage rate while considering Generation Z as a stimulus and two other stimuli. More empirical evidence is needed regarding the study of Bangladesh's population. So, examined several Bangladeshi public university students who are part of Generation Z to explore how socio-demographic and inter-personal characteristics, including student views and adoption tendencies, affect the usage rate of chatGPT. The study aimed to determine the impact of Generation Z, students' perspectives, and adoption tendencies on the chatGPT usage rate.

2. Review of literature

2.1. ChatGPT

On the last day of November 2022, ChatGPT made its public debut as an advanced A.I. tool. Within the first seven days, it garnered a remarkable number of subscribers, surpassing one million (Caldarini et al., 2022). ChatGPT understands and analyzes natural language, generating precise and polished responses with advanced deep-learning methods (Susnjak, 2022). Shahriar and Hayawi (2023) found that, although Google and Meta have created their language frameworks, ChatGPT has maintained its position as the most widely used one. Quintans-Júnior et al. (2023) assert that ChatGPT relies on a transformative architecture. A crucial feature of ChatGPT enables it to learn from user feedback, facilitating system training and modification. Human A.I. trainers contribute to this process by engaging in conversations that involve both the virtual assistant and users. In addition, A.I. instructors offer written guidance to assist the system in enhancing the effectiveness of composing proposals, resulting in an interactive format (Farhi et al., 2022). ChatGPT is revolutionizing human-technology interaction and leading the path toward a future of sophisticated, conversational artificial intelligence (Mijwil et al., 2023; Rudolph et al., 2023).

2.2. ChatGPT in higher education

GenAI technologies, such as ChatGPT, can revolutionize higher education by providing opportunities to improve learning, instruction, and student involvement (Alfaisal et al., 2024; Hu, 2023). Creating AI-powered virtual tutors that offer students immediate, tailored assistance and evaluation on diverse topics is a noteworthy advancement in education (Celik et al., 2022). ChatGPT can enhance peer cooperation by facilitating connections between students with various backgrounds, interests, and experiences. For instance, we can integrate it into interaction platforms such as forums and chat rooms to encourage sharing ideas, group problem-solving, and teamwork. This improved connectivity has the potential to foster the growth of a more comprehensive and vibrant learning community. ChatGPT can aid instructors in creating course materials for higher education, including reviews, quizzes, and discussion prompt fields (Sharma et al., 2023). Chen et al. (2023) investigated A.I. in education review qualitatively. They discovered that A.I. systems have facilitated adapting and individualizing curriculum

and lesson plans based on students' requirements, enhancing learning experiences and overall educational excellence. Baidoo-Anu & Ansah (2023) and Sabraz Nawaz et al. (2024) examined the prospective advantages of ChatGPT in education. ChatGPT has several benefits, such as individualized learning, interactive learning promotion, formative assessments for teaching and learning, and continuous feedback. Halaweh (2023) emphasized the conscientious use of ChatGPT in education and the implementation of strategies to ensure ethical and efficient use of the technology.

2.3. Generation Z and chatGPT

Like their predecessors from the Silent and Baby Boomer generations, as well as Generation X (Gen X) and Generation Y (also known as Millennial), the Gen Z people have distinct features shaped by technological advancements, societal and cultural changes, and economic instability (Shorey et al., 2021). Born from 1995 to 2012, Gen Z is the first generation to grow up in an era of constant virtual communication through social media and technology, which has led to a strong affinity for digital platforms (Puiu, 2017). Immersed in computers and the internet since childhood, Gen Z students are inclined to readily adopt and accept new technological developments like GenAI and ChatGPT. Furthermore, the Gen Z respondents displayed a positive outlook regarding the prospective advantages of GenAI in higher education, such as improving productivity, efficiency, and individualized learning. Moreover, Gen Z students have indicated their intention to utilize ChatGPT for diverse educational objectives, including gathering and reinforcing knowledge, language acquisition, and writing assistance. Thus, it aligns with prior studies that indicate their appreciation for technology in augmenting their learning endeavors (Hernandez-de-Menendez et al., 2020; Jelahun, 2024; Mok, 2023). Marshall and Wolanskyj-Spinner (2020) stated that Gen Z students possess qualities such as being proactive in problem-solving and self-directed learning. These characteristics make them particularly well-suited to embracing Gen AI, specifically ChatGPT.

Gen Z pupils anticipate that their educational encounters will be propelled by technology and directly applicable to real-life situations. The individuals prioritize pragmatic, dynamic, experiential learning encounters that incorporate technology and equip them for the labor market (Schwieger & Ladwig, 2018). Gen Z and Millennial students have demonstrated an increased capacity for independent learning, relying on technology for problem-solving and knowledge acquisition. The adoption of autonomous instruction and technological usage may impact the design and implementation of educational programs targeting the engagement and support of these generations (Szymkowiak et al., 2021).

H₁. Generation 'Z' positively influences the usage rate of chatGPT.

2.4. Student's views on chatGPT

ChatGPT has demonstrated outstanding proficiency across various domains, including generating cohesive content and essays, functioning as a chatbot, deciphering languages, responding to inquiries, and aiding in programming code. ChatGPT can help students with challenging difficulties, essay writing, and topic understanding, speeding up their learning. ChatGPT can also help students learn programming by answering questions (Rahman & Watanobe, 2023). Most college students (51%) see utilizing artificial intelligence (A.I.) programs such as ChatGPT to finish coursework and tests as academic dishonesty. 20% of the respondents disagreed, while the rest remained neutral. According to the survey, 43% of college students reported using A.I. tools like ChatGPT. Half this group admits to relying on these tools to complete projects or tests. According to this statistic, 20% of college students acknowledge using A.I. to finish their school assignments. The majority of students who have utilized A.I. applications reported doing so for personal endeavors, driven by curiosity, or for recreational purposes

(Nietzel, 2023). Xiong et al. (2021) studied students' attitudes towards a chatbot in a language learning environment. The study revealed that students favored the virtual assistant and regarded it as a valuable tool for acquiring language skills. According to Adiguzel et al. (2023), ChatGPT provides learners with several opportunities, including improving inner learner drive, promoting a deeper grasp of topics, and evolving competence. According to the current investigation (Zhu, et al., 2023), ChatGPT utilization can enhance learning experiences by giving individualized support, facilitating access to knowledge, and boosting critical thinking abilities. Advocates assert that, when appropriately used, ChatGPT can function as a practical tool for students to improve their writing, inquiry, and problem-solving skills.

H₂. Students' views positively influence the usage rate of chatGPT.

2.5. Technology adoption tendency and chatGPT

The inclination to embrace ChatGPT pertains to the extent to which a user considers the technology valuable and straightforward to use and their readiness to adopt and utilize it for decision-making objectives (Turja et al., 2020). The term "actual use of ChatGPT" refers to how individuals in various domains have used the technology to make decisions. Successful technology adoption relies on the users' intention to utilize it and subsequent usage. Users may need to implement technology for various reasons, including time constraints, limited money, insufficient technical expertise, or unfavorable past encounters with the technology (Yan et al., 2021). Previous studies have confirmed a direct relationship between the intention to utilize technology and the actual usage of it, suggesting that individuals who intend to use technological equipment are more inclined to use it (Turja et al., 2020). According to Turja et al. (2020) study, users' intention to use robots as supportive social agents significantly predicted their actual usage. Furthermore, Laumer et al. (2019) found a direct correlation between users' intention to use chatbots for disease diagnosis and their actual usage of the chatbot.

H₃. Adoption tendency positively influences the usage rate of chatGPT.

2.6. Conceptual Framework

3. Methodology

Quantitative methods allow for measuring specific traits using a

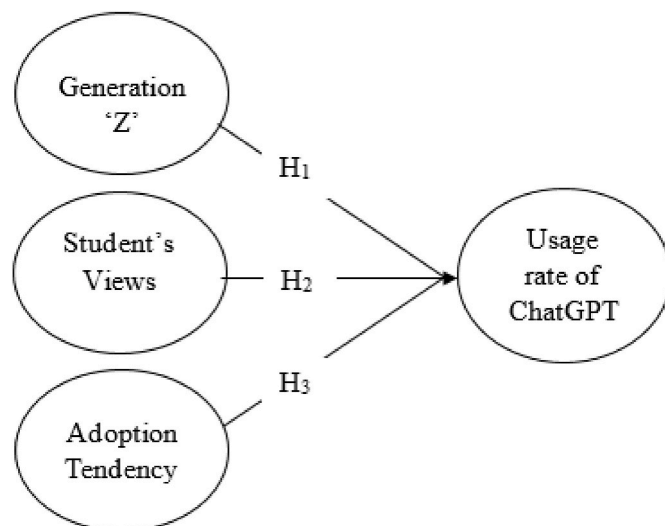


Fig. 1. Conceptual framework.

structured data collection method that includes many sample representatives. As a result, it can be easily and accurately extrapolated to the entire population (Creswell, 2014). The inherent categorization or standardization of quantitative measures implies that quantitative methods have utility in identifying concealed patterns and relationships. The discovery of these veiled associations can prove valuable in identifying novel and unforeseen mechanisms (McEvoy & Richards, 2006). The questionnaire used literature from multiple published articles (Farhi et al., 2023; Haleem et al., 2022; Wiastuti et al., 2020; Yoganathan et al., 2021).

3.1. Research design

The investigation is quantitative. This study used descriptive and correlational approaches to determine the strength of the relationship between variables. A non-probability convenience sampling technique was used for the sample selection process. Data were collected using survey methods, specifically administering a structured questionnaire via a Google Form. Out of 395 respondents, only 307 individuals were born between 1995 and 2012. The responses from individuals born outside the specified age range were not considered. The study mainly targeted a particular age group known as Generation 'Z.' According to the data sorting process, the valid data were analyzed.

3.2. Participants

Hair et al. (2010) recommend that the sample size for a study similar to the current one should be at least five times larger than the total number of questionnaire items. Sample sizes ranging from 30 to 500 are generally suitable for most research endeavors. When conducting multivariate research, especially multiple regression analyses, experts recommend that the sample size significantly exceed the number of variables under investigation, ideally by a factor of at least ten or more (Sekaran, 2003; Sekaran & Bougie, 2016). Therefore, 307 participants were selected from various public universities in Bangladesh as the study's target institutions. In the data collection, there was a clear statement regarding the purpose and use of the data. The questionnaire explicitly states that research purposes will use each respondent's responses, guaranteeing no invasion of privacy. Based on the statement, the respondents agreed and shared their opinion. So before participating in the study, all participants gave informed consent for inclusion.

Table 1 depicts the demographic profile of the participants in the entire sample; 48.9% identified as male, while 51.1% identified as female. The majority of respondents, comprising 27.7%, fall within the age range of 16–20 years and 72.0% fall within the age range of 21–25 years, while 97.4% have attained a graduate degree. A limited number of age groups were conducted on Generation 'Z.' The responses obtained for this study were collected from individuals with backgrounds in science, business, and the humanities. Most respondents, comprising 64.5% of the total sample, had a business background.

Table 1
Demographic profile of the respondents.

Particulars		Frequency	Percentage
Gender	Male	157	48.9
	Female	150	51.1
Age	16–20 Years	85	27.7
	21–25	221	72.0
	26–30	1	0.3
Study Level	Graduation	299	97.4
	Post-Graduation	8	2.6
Study Background	Science	87	28.3
	Business	198	64.5
	Humanities	22	7.2

Source: Survey Report, December 2023

3.3. Tools

In order to carry out this investigation, a range of instruments were employed for specific tasks. Google Scholar, JSTOR, and PubMed search papers manage references and verify grammar. Quillbot and Grammarly are also employed for these tasks. In addition, Turnitin is utilized to verify similarities. Excel, SPSS 25, and Amos 24 are utilized for data management and analysis.

3.4. Procedure

Deductive quantitative tools, such as structural equation modeling (SEM), can elucidate and illustrate various aspects of the basic theory (Brown et al., 2020; Ford et al., 2018). Using the SEM approach, researchers measured the adoption and acceptance of chatGPT on educational platforms (Alfaisal et al., 2024; Al-Marroof et al., 2024; Roy et al., 2023). Structural Equation Model (SEM) is a method that academics use to validate predetermined assumptions and ideas. Researchers can present a theoretical model and employ a structural equation model (SEM) to assess the degree to which the data aligns with the hypothesis. AMOS is a robust statistical software suite for structural equation models (SEM), path analysis, and confirmatory factor analysis.

4. Results

Table 2 displays the loading value of all assessment items. The loading value should be higher than 0.60, which indicates a strong association between items and factors (Babu et al., 2024; Jaman et al., 2023), as well as a loading higher than 0.70 implies a good correlation (Ab Hamid et al., 2017; Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). The loading value was from the model fitness test. The outcomes showed that the factor loadings were significantly higher than the recommended cutoff value of 0.70. The C.R. for all constructs is above 0.89, which must be more than 0.70 to consider the reliability statistics acceptable (Ab Hamid et al., 2017). AVE values also varied from 0.62 to 0.70, with AVE's cutoff value being 0.50 (Hair et al., 2010).

Table 3 shows that the CMIN/df model fit obtained a value of 2.30, and the recommended value is < 3 . Similarly, GFI 0.90, AGFI 0.86 and recommended value ≥ 0.80 . Besides that, the NFI, IFI, TLI, CFI, and RMSEA values meet the recommended level for considering the model as a best fit. So, all the indicators fit the recommended value.

Table 4 shows the hypothesized paths, parameter standardized β values, standardized errors (S.E.), p values, and acceptance or rejection

Table 2
Standardized estimates and reliability statistics.

Variables	Item Code	Factor Loading Value	C.R.	AVE
Generation 'Z'	GEN1	0.70	0.92	0.69
	GEN2	0.82		
	GEN3	0.80		
	GEN4	0.93		
	GEN5	0.89		
Student's Views	SV1	0.89	0.92	0.70
	SV2	0.89		
	SV3	0.84		
	SV4	0.72		
	SV5	0.82		
Adoption Tendency	AT1	0.77	0.89	0.62
	AT2	0.86		
	AT3	0.73		
	AT4	0.83		
	AT5	0.72		
ChatGPT Usage	CGU1	0.77	0.90	0.64
	CGU2	0.79		
	CGU3	0.74		
	CGU4	0.89		
	CGU5	0.80		

Source: SEM-Amos output

Table 3

Discriminant validity and model fit indices.

Constructs	Mean	SD	1	2	3	4
Generation 'Z'	4.13	0.61	0.829			
Student's View	3.94	0.83	0.041	0.835		
Adoption Tendency	3.80	0.81	0.074	0.151	0.785	
Usage Rate of ChatGPT	4.10	0.65	0.118	0.297	0.118	0.800
Indices	Model Fit Obtained Value	Recommended Value	Reference			
CMIN/df	2.30	< 3	Hair et al. (2010)			
GFI	0.90	≥ 0.80	Doll et al. (1994)			
AGFI	0.86	≥ 0.80	Doll et al. (1994)			
NFI (Delta 1)	0.93	≥ 0.90	Hair et al. (2010)			
IFI (Delta 2)	0.96	≥ 0.90	Hair et al. (2010)			
TLI (rho 2)	0.95	≥ 0.90	Hair et al. (2010)			
CFI	0.96	≥ 0.90	Hair et al. (2010)			
RMSEA	0.06	≤ 0.08	Brown and Cudeck (1993)			

Note: **Bold** diagonal numbers are the square roots of AVE.

Source: SEM-Amos and SPSS output

Table 4

Summary of results (Path Analysis).

Hypothesized Paths			Estimate (β)	S.E.	ρ	Result
Generation 'Z'	→	Usage Rate of ChatGPT	0.835	0.052	0.000 ^a	H ₁ Accepted
Student's View	→	Usage Rate of ChatGPT	0.456	0.039	0.000 ^a	H ₂ Accepted
Adoption Tendency	→	Usage Rate of ChatGPT	0.307	0.026	0.002 ^b	H ₃ Accepted

Note.

^a $p < 0.001$.

^b $p < 0.05$.

Source: SEM-Amos output.

of the hypotheses. The association quality among constructs was assessed by inspecting their respective standardized path coefficients (β values) and significance values (ρ values). The results supported 3 of 3 hypotheses.

Hypothesis 1. H₁ was generation 'Z' positively influences the usage rate of chatGPT. The usage Rate of ChatGPT is significantly predicted by Generation 'Z' ($\beta = 0.835$, $\rho < 0.001$) and the H1 is Accepted.

Hypothesis 2. H₂ was that the student's view positively influences the usage rate of chatGPT. The result explored that the student's view has a positive ($\beta = 0.456$) and significant ($\rho < 0.001$) influence on the usage rate of chatGPT. Thus, the H2 is also accepted.

Hypothesis 3. H₃ was that adoption tendencies positively influence the usage rate of chatGPT. The result explored that the adoption tendencies have a positive ($\beta = 0.307$) and significant ($\rho < 0.05$) influence on the usage rate of chatGPT. Thus, the H3 is also accepted.

4.1. Discussion

In order to ensure practical completion and trustworthiness, both male and female students should be included. The ratio is almost equal, with a close approximation of 1:1. Furthermore, the study includes students from many academic disciplines, such as science, business, and the humanities, as indicated in Table 1. The reliability statistics and model fit indices in Tables 2 and 3 show that the model demonstrated notable reliability and suitability. The data presented in Table 4 confirms the validity of all hypotheses, with H₁ suggesting a positive influence from generation 'Z' on the usage rate of chatGPT, H₂ suggesting

a positive influence from the student's perspective on the usage rate of chatGPT, and H₃ suggesting a positive influence from adoption tendencies on the usage rate of chatGPT. This study determines the utilization rate by accounting for the independent variables 'Z' generation ($\beta = 0.835$), student view ($\beta = 0.456$), and adoption tendency ($\beta = 0.307$). Students perceive ChatGPT as a sophisticated writing model that facilitates several activities, including essay composition, language translation, and even poetry creation. They perceive it as a revolutionary instrument that greatly enhances human efficiency and dramatically propels the capabilities of natural language processing (NLP) (Haleem et al., 2022). Generation Z members are characterized by their innovative and pragmatic nature. Crucially, they are recognized as technologically adept digital natives, the initial cohort to be born into a wholly digital realm, and thus, they have matured by substantially engaging with digital technologies (Bernstein, 2015; Euromonitor, 2018). The primary objective of adopting new technology, particularly for Generation Z, is to prioritize convenience (Leung et al., 2021).

The study reveals that Generation 'Z' students' views and adoption tendencies positively influence the usage rate of chatGPT, which is mentioned in Table 4. Students positively perceive using chatGPT to address their academic tasks, which eventually impacts the usage rate. In addition to these factors, the adoption trend and the presence of Generation 'Z' students also contribute positively to the chatGPT usage rate. This method upholds the integrity of academic endeavors, fosters individual growth through independent reasoning, and promotes responsible use of chatGPT.

This study outlines university students' chatGPT usage patterns, which can illuminate the cognitive processes involved in comprehending and generating natural language. In that case, the students may spend less time on critical thinking and reasoning analysis. Adopting the most recent technologies, such as chatGPT, is critical. It would also assist schools in identifying suitable contexts and limitations for usage, defining ethical boundaries, and establishing frameworks that prioritize students' academic integrity and well-being. Therefore, using ChatGPT for educational objectives has positive and negative implications for educational integrity. Nevertheless, the implementation of practical principles can enhance the process of informed decision-making and policy formulation in educational institutions.

5. Conclusion

Students are using chatGPT, and it also identified Generation Z's view and adoption tendency as a significant stimulus. The findings confirm all proposed hypotheses, as indicated by the P value. It is imperative to ensure the appropriate utilization of chatGPT; it cannot wholly discontinue its use and cannot actively urge students to rely on it in all situations.

The current study ensured a balanced ratio of male and female respondents to prevent gender bias despite potential differences in perceptions between male and female respondents. However, it is essential to mention that the sample consisted mainly of students with a business background, indicating a significant representation of this group. Conduct additional research with a more in-depth examination of science, business, and the humanities, ensuring an equal representation of males and females with a 1:1 ratio. Although the lack of equal representation from all study backgrounds may not significantly affect the results, the academic tasks of all university students are nearly identical. In addition to examining students' perceptions, it is crucial to understand the teacher's perspective on students' use of chatGPT. This study exclusively focused on students enrolled in public universities. However, future research could look at students from private universities and those in the twelfth grade.

Author's feedback for editor

Dear Editor, We didn't check grammar for references.

The overall score is 100%, excluding references. We used premium grammar-checking tools and a professional researcher to proofread.

It would be a great help if you could tell us where the improvement is required.

As we are emerging researchers, please give us another opportunity. It's my humble request that you do not consider this a last chance.

CRediT authorship contribution statement

Md. Asaduzzaman Babu: Writing – review & editing, Methodology, Formal analysis, Data curation, Conceptualization. **Kazi Md. Yusuf:** Writing – original draft, Data curation, Conceptualization. **Lima Nasrin Eni:** Writing – original draft, Data curation, Conceptualization. **Shekh Md. Sahiduj Jaman:** Writing – original draft, Project administration, Data curation. **Mst. Rasna Sharmin:** Writing – original draft, Project administration, Data curation.

Data availability statement

Data will be provided upon a reasonable request.

Studies in human

This research does not involve the use of any human or animal subjects for biological experimentation or the infringement of privacy.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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