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Bio-psychosocial health problems related to the excessive use of digital technology among al- azhar preparatory institutes' students

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Abstract

Digital technology widespread has completely changed how students communicate, access information and interact with the outside world. The increasing usage of digital technologies raises concern about their related bio-psychosocial health Problems. The current study aimed to assess bio-psychosocial health problems related to excessive use of digital technology among Al-Azhar preparatory institutes' students. A descriptive research design was used in this study. Multistage random sample was used included 356 of Al-Azhar preparatory students. This study was conducted at two institutes of Al-Azhar preparatory institutes in Cairo Governorate called (EL- Salam institute for males) and (EL-Marg institute for females). Tool I: A structured interviewing questionnaire consisted of demographic characteristics and student's digital technology usage. Tool II: Assessment of preparatory students' bio-psychosocial health problems. 52.5%of studied preparatory students were excessive users of digital technology, 32.9% of students had high physical symptoms, 28.4% of students had high level of psychological health problems and 27.6% of students had high level of social health problems related to their excessive usage of digital technology. There was highly statistically significant relation between bio-psychosocial health problems and the excessive usage of digital technology among studied preparatory students. Health educational programs should be directed to improve students' awareness regarding potential health risks associated with excessive digital technology use.

Keywords: Al-Azhar Preparatory Institutes, Bio-psychosocial health problems, Digital technology and Excessive use.

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1. Introduction

The widespread adoptions of digital technology have transformed various aspects of peoples' lives including how they communicate, access information, and engage with the world. Among the population most affected by this digital revolution are students, who have integrated digital devices and platforms into their daily routines and educational experiences. Digital technology usage among students is increasing rapidly; around 71% of students in the adolescent stage worldwide are internet-users [1]. Al-Azhar preparatory institutes are well-known educational institutions known for their academic excellence and religious teachings, providing students with a comprehensive cognitive progress, emotional control, physical, social and moral development and education that combines secular knowledge with religious principles. Students spend more time in institute than in any other formal institutional structure. Despite the distinguished educational environment, students in these institutes are not immune to the attraction of digital technology and its potential consequences [2]. The current generation of preparatory students are growing up immersed in a world saturated with digital technology. The excessive use of digital technology encompasses various activities, including spending long hours on smartphones, engaging in extensive social media interactions, playing online games, and consuming digital content. While these activities offer numerous benefits, such as instant access to information and enhanced communication, they also pose potential risks to the bio-psychosocial health of students [3]. The American Academy of Pediatrics recommends that students in adolescence stage should be exposed to less than 2 h of screen time per day. However, a large percentage of students already exceed this recommendation. In general, these media-related activities occupy about 6 to 9 h of American students' day excluding housework and schoolwork [4]. Preparatory school students' bio-psychosocial health problems arise from a combination of several factors including personal issues like low self-efficacy and poor communication skills, social issues such as lack of family and social support, longer technology usage times, easier access to digital technology, students' professional skills in using digital technology. therefore, the excessive technology use is a symptom of increasing possibility of psychosocial health issues [5]. Students may experience specific issues with their physical,

psychological, emotional, and behavioral health because of the negative consequences of excessive usage of digital technology. includes problems with their eyes, headaches, neck pain, irregular eating, poor physical condition, sleeping problems or fatigue, physical inactivity, obesity, sleep disturbance, time management problems and poor dietary behaviors [6]. The social life of preparatory students can be also crucially affected by using digital technology. An increase of the time spent with the Internet led to a reduction of the time that students dedicate to the offline communication or social activities, also leading to complaints with family members on the excessive use of digital technology. Moreover, it can affect the closeness or quality of interpersonal communication [7]. A community health nurse serves as crucial in managing health issues associated to digital technology by increasing awareness of students about the healthier control of technology use promote protective factors such as positive relationships with parents, teachers, friends, perception of safety, alternative leisure activities and providing health education about the negative health effects of excessive technology use and also develop socio-emotional skills for students to manage risks, through self-regulation for healthy choices [8]. In addition, community nurse should emphasize the importance of practicing good ergonomics, taking regular breaks, engaging in physical activity and maintaining a balanced approach to technology use which can help to reduce bio-psychosocial health problems associated with the excessive use of digital technology [9]. Nurses can help to improve the physical, mental, emotional, and social development of preparatory school students who are using excessive technology through counseling, supporting, advocacy, and providing efficient strategies as preventive guidelines to maintain healthy technology use [10].

1.1 Significance of the study

Digital technology use is becoming increasingly widespread as more and more students go online around the world, particularly with a high percentage in Arab countries, especially Egypt. The development of new technologies frequently brings new challenges for maintaining, enhancing, and recovering health and well-being [11]. In Egypt, mobile connections were 93.9 % of the total population in January 2023. The number of mobile connections in Egypt increased by 7.0 million (7.2 %) between 2022 and 2023. There were 80.75 million (72.2%) internet users in Egypt at the start of 2023 and 46.25 million social media users equating to 41.4 percent of the total population [12]. A study conducted in Beni-Suef City, Egypt, found that students who used digital technology excessively reported experiencing physical symptoms. These symptoms were digestive symptoms, musculoskeletal, neurological, and ophthalmological (93.3%, 83.75%, 81.25%, and 56.25%) respectively. Furthermore, 36.6% of students had reported experiencing social health problems such as loneliness [13]. In Egypt, the prevalence of psychological health problems related to the excessive use of digital technology among studied sample of 248 Egyptian students aged 11 to 18 years old was 60%. The common health problems included major depressive episodes 9.3%, generalized anxiety disorder 7.7%, attention-deficit hyperactivity disorder 4.4% and social phobia 4% [14]. Moreover, studies have consistently linked excessive digital technology use to psychological issues, including anxiety and depression [15,16]. According to 2030 Agenda, the Egyptian Government has launched a working plan called Egypt's Vision 2030 emphasise on providing prevention actions to decrease technology use and their negative health effects [17]. So, it is important to assess bio-psychosocial health problems related to excessive use of digital technology among Al- Azhar preparatory institutes students.

1.2 Aim of the study

To assess bio-psychosocial health problems related to the excessive use of digital technology among Al-Azhar preparatory institutes' students. This aim has been achieved through the following objectives:

- Assessing preparatory students' patterns of digital technology usage.
- Appraising preparatory students' bio-psychosocial health problems related to excessive use of digital technology.

1.3 Research questions

- What is preparatory students' usage of digital technology?
- What are preparatory students' bio-psychosocial health problems related to excessive use of digital technology?
- Is there a relationship between preparatory students' excessive usage of digital technology and bio-psychosocial health problems?
- Is there a relationship between preparatory students' excessive usage of digital technology and demographic characteristics?

2. Subject and Methods

The subject and methods of this study were portrayed under four main items as following:

I- Technical item.
II- Operational item.
III- Administrative item.
IV- Statistical item.

2.1 Technical Item

2.1.1 Research Design

A descriptive research design was used in this study.

2.1.1.1 Setting

This study was conducted at two institutes of Al-Azhar preparatory institutes in Cairo Governorate called (EL-Salam institute for males) and (EL-Marg institute for females).

2.2 Sampling

2.2.1 Type of sample

Multistage random sample was used to collect the sample of the study, through the following stages:

2.2.1.1 1st stage

Al-Azhar institutes in Cairo Governorate consisted of 6 directorate sectors (North of Cairo, South Katamya, South Maadi, East of Cairo, West Nasr city and West Heliopolis). The East directorate sector was selected randomly by the investigator from the sectors mentioned above.

2.2.1.2 2nd stage

East directorate sector consisted of 12 preparatory institutes (6 for males and 6 for females) and they worked in morning only including first, second and third preparatory grades with students aged from 12 to 16 years old. The selected students should own digital technology and the availability of the internet.

2.2.1.3 3rd stage

10 % of all preparatory institutes selected randomly from East directorate sector. Number of selected students in the East directorate sector is 356.

2.2.1.4 4th stage

2 institutes were selected randomly (EL-Salam preparatory institute for males and EL-Marg preparatory institute for females) according to the following table:

Gender	Number of students in Sample
Male	356/4888*2728=199
Female	356/4888*2160=157

2.2.2 Sample size

Study subjects included a representative of total students (N=4888) at Al-Azhar institutes. The sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5% using the following equation:

Type I error (a) = 0.05
Type II error (B) = 0.2
With power of test 0.80

$$n = \frac{N \times p(1-p)}{[[N-1 \times (d^2 \div z^2)] + p(1-p)]}$$

$$\frac{4888 \times 0.50(1-0.50)}{[[4888-1 \times (0.05x^2 \div 1.96\,x^2)] + 0.50(1-0.50)]} = 356$$

n=sample size
z: The standard score (1.96)
d: The error rate (0.05)
P: Property availability and neutral ratio (0.50)
N=size of population (**Thompson, 2012**) [18].
Based on sample size equitation 356 was participated in the study.

2.3 Tools for data collection

Two tools were used to collect data in this study as the following:

2.3.1 Tool I

A structured interviewing questionnaire designed by the investigator and consisted of two parts as the following:

2.3.1.1 Part 1

Demographic characteristics of studied preparatory students of Al-Azhar institutes. This part consisted of 10 questions and included: Age, sex, grade, birth order, number of family members … etc.

2.3.1.2 Part 2

Assessment of studied preparatory students' digital technology usage. This part consisted of 7 questions and included: Types of digital technology ownership device, digital technology ownership time, time spent daily on digital technology usage, activities on digital technology device …etc.

2.3.2 Tool II

Assessment of preparatory students' Bio-psychosocial health problems included three parts:

2.3.2.1. Part 1

Assessment of student's bio health problems included questions concerning students' bio health about: Weigh, height, body mass index (BMI), physical symptoms and energy and physical activity level.

a) Assess Body mass index (BMI) scores: BMI was calculated from the weight and height data according to the following equation:

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (meter)2}}$$

The scale of body mass index was divided into four categories [19]. <18.5 underweight, 18.5- 24.9 normal weight, 25-29.9 overweight, ≥ 30 obesity. Measuring BMI is an essential part of assessment of potential bio health problems by assessing if there a relation between underweight, overweight and obesity and excessive usage of digital technology.

b) Assess physical symptoms; included 18 questions about neurological symptoms, eye symptoms, musculoskeletal symptoms and digestive symptoms.

2.3.2.1.1 Scoring system of physical symptoms

The scale consisted of 18 items; responses of students answered with two points Likert scale, ranging from 1 "negative response" to 2 "positive response". The total score ranged from 18 to 36 and the higher value indicated high physical symptoms. Students total scores were classified as the following:

- Low physical symptoms when total score is <50% (< 18 points).
- Moderate physical symptoms when total score is50 <75 % (18<27 points).
- High physical symptoms when total score is ≥ 75% (≥27).

c) Assess energy and physical activity level of students' bio health problems: questions were designed by investigator and consisted of 4 questions about feeling tired all the time, feeling that everything is an effort, participating in any sport, physical activity or recreation program and ability to play active games and sports without getting tired too quickly.

2.3.2.1.2 Scoring system of energy and physical activity level

Responses of students answered with two points Likert scale, ranging from 1 "negative response" to 2 "positive response". 'Yes', means negative response for questions 1 and 2 and positive response for questions 3 and 4 while 'No' means positive response for questions 1 and 2 and negative response for questions 3 and 4. The test score ranged from 4 to 8 and the higher value indicated more energy and physical

activity level. Students total score was classified as the following:

- Low energy and physical activity level when total score is <50% (< 4 points).
- Moderate energy and physical activity level when total score is 50 < 75% (4 < 6 points).
- High energy and physical activity level when total score is ≥ 75% (≥ 6 points).

2.3.2.2 Part 2

Assessment of student's psychological health problems .

a. Anxiety scale: the original scale was developed by *(Birmaher et al., 1999)* [20] *and* modified by the investigator. The scale consisted of 20 questions about anxiety symptoms such as feeling frightened, having nightmares and worrying about something bad happening to self or parents, worrying about going to school …etc.
b. Depression scale: the original scale was developed by *(Kutcher et al., 2002)* [21] and modified by the investigator. The scale consisted of 10 questions about depression symptoms such as feeling down, low mood, sadness, and depressed, feeling irritable and lose temper easily, having sleep difficulties, decreased Interest In:(going out with friends, doing school work, doing hobbies or sports or recreation) …etc.

2.3.2.2.1 Scoring system of psychological health problems

The total scale of psychological health problems consisted of 30 questions. Responses of students answered with three points Likert scale, ranging from 0= Never, 1= Sometimes and 2= Often. The test score ranged from zero to 60 and the higher value indicated high psychological health problems. Students total score was classified as the following:

- Low psychological health problems when total score is < 50% (< 30 points).
- Moderate psychological health problems when total score is 50 < 75 % (30<45 points).
- High psychological health problems when total score is ≥ 75% (≥ 45 points).

2.3.2.3 Part 3

Assessment of student's social health problems .

Loneliness Scale: The original scale was developed by ***(Russell et al., 1980)*** [22]. and modified by the investigator. The scale consisted of 18 questions about social loneliness such as lack companionship, feeling alone, feeling left out, feeling isolated from others …etc.

2.3.2.3. 1Scoring system of social health problems:

Responses of students included 3 points likert scale. The test score ranged from zero to 36 and the higher value indicated high social health problems. Students total score was classified as the following:

0= Never, 1= Sometimes and 2= Often. In questions from 1 to 10; often means positive response while in questions from 11 to 18, often means negative response. The score of each item summed up and converted into percent score. Students total scores were classified as the following:

- Low social health problems when total score is <50% (< 18 points).
- Moderate social health problems when total score is 50 < 75 % (18<27 points).
- High social health problems when total score is ≥75% (≥ 27 points).

2.4 Ethical considerations

Official permission to conduct the proposed study was obtained from the Scientific Research Ethical Committee, Faculty of Nursing, Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, and confidentiality of the information which could not be accessed by any other party without taking permission of the participants. Ethics, values, culture, and beliefs were respected.

2.4.1 Operational Item

The operational item for this study included preparatory phase, testing validity and tool reliability.

2.4.1.1 Preparatory phase

It included reviewing past, current, national, and international related literature and theoretical knowledge of various aspects of the study using books, articles, the internet, periodicals, and magazines to develop tools for data collection.

2.4.1.2 Content validity

The revision of the tools for clarity, comprehensiveness, relevance, understanding and applicability was tested through a panel of five experts in Community Health Nursing, Faculty of Nursing, Helwan University to assess the content validity of the tools. Simple modifications were done accordingly.

2.4.1.3 Reliability

Cronbach's Alpha was used to determine the internal reliability of the tool.

2.4.1.3.1 Reliability Statistics

Tool	**Cronbach's Alpha**
Physical symptoms	0.808
Anxiety	0.827
Depression	0.817
Loneliness	0.968

2.5 Pilot study

The pilot study was done on 10% (36) students of the sample to examine the clarity of questions and the time needed to complete the study tools. Based on the results, no modifications were needed, and students of pilot study were included in the actual study sample.

2.6 Field work

- The official letter was issued from the Dean of Faculty of Nursing, Helwan University and was directed to the

director of Al-Azhar institutes sector including the aim of the study to obtain permission.

- Data was collected during the academic year (2022-2023) over a period of four months from (February 2023 to June 2023). Data was collected twice weekly, on Sunday and Wednesday from 8.00 am to 1 pm, 11-12 students were interviewed per day.
- The investigator introduced herself to the students and briefly explains the nature and purpose of the study to each student before participation.
- Informed consent was taken after explaining the purpose of the study and each student was interviewed separately.
- During the physical examination, the researcher measured weight and height for every student alone for maintain privacy.

2.6.1 Administrative Item

After explanation of the study aim and objectives, an official permission was obtained from the Dean of Faculty of Nursing, Helwan University and director of Al-Azhar preparatory institutes sector asking for cooperation and permission to conduct the study.

2.6.2 IV-Statistical Item

Upon completion of data collection, data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 26 for analysis. The P value was set at 0.05. Descriptive statistics tests as numbers, percentage, mean ± standard deviation (± SD), were used to describe the results.

Significance of the results was considered as the following:

Highly statistically significant (HSS) at p-value ≤ 0.001, statistically significant at p-value ≤0.05 and not significant when p-value >0.05.

3. Results

(Table 1) shows that, 55.9% of studied preparatory students were males with mean age 13.44 ± 1.14 years old, 60.4% of students had families with more than five members. Regarding father's educational level, 35.1% had university education or more, while 4.8% could not read or write. Regarding mother's educational level, 34.6% had university education or more, while 5.3% could not read and write. Regarding father's occupation, 97.5% were employee, while 76.7% of mothers were housewife. 63.8% had sufficient family income. Table (2) reveals that, 88.8 % of studied students had smart phone, 48.6% of them had digital technology device for two years or less. 28% of them spent 3 -5 hours daily on digital technology usage, while 18% spent more than 5 hours daily. Regarding activities on digital technology devices, 72.2% of them engaged in chatting and 70.2% browsed the internet. Also, it is shown in Table 2 that, social media purpose represented 85.1% of digital technology use. 74.7% of studied students used digital technology at bedtime. 11.3% of them spent 3 - 5 hours using digital technology at bedtime. Also, 7.9% used digital technology for more than 5 hours at bedtime. (figure 1) illustrates that, total digital technology usage time during the day and at bedtime, 52.5% of studied students were excessive users of digital technology. (Table 3) presents that, the average of studied students' weight was 54±12.92 while height was 157.66± 8.82 and Body Mass Index (BMI) was 21.57 ± 4.14. (Figure2) reveals that, 53.7% of studied students had normal weight, while 27.2% of them were underweight, 15.2% were overweight and 3.9% had obesity.

(Table 4) shows that, the most common physical symptoms o students related to their usage of digital technology were neurological symptoms including headache 36.8% and nervousness 36.2%. The most common eye symptoms were tears in 33.4% and eye redness in 25.2%. Neck pain 41.3% and back pain 39.9% were the most common musculoskeletal symptoms. Forgetting to eat while using digital devices was the most common digestive symptom in 34.5%.

(Figure 3) illustrates that, 32.9% had high physical symptoms, while 39.9% had low physical symptoms. (Figure 4) reveals that, 45.3% of studied students had low physical activity. (Table 5) shows that, 27.5% of studied preparatory students often had nightmares and worried about something bad happening to them or their parents, while 37.4% of them sometimes were anxious. Concerning worry about what is going to happen in the future, 32.3% often worried about the future. (Table 6) reveals that, 27.8 % of studied students often felt low mood, sadness, feeling down and depressed. 23% of them had often decreased interest in going out with friends, doing schoolwork, doing hobbies, sports or recreation, while 34% of studied students sometimes had feelings of worthlessness, hopelessness, letting people down and not being a good person. In addition, 40.2% of them often felt guilty and blamed themselves all the time for their weaknesses and mistakes. (Figure 5) shows that, 28.4% of studied preparatory students had high level of psychological health problems related to their usage of digital technology, while 33.4% of them had moderate level of psychological health problems related to their usage of digital technology. (Table7) reveals that, 20.2% of studied students often felt alone, 28.4% of them sometimes felt part of a group of friends while 52.5% of studied students never felt isolated from others. (Figure 6) illustrates that, 27.6% of studied students had high level of social health problems, while 48.4% of them had low level of social health problems. (Table 8) shows that, there was a highly statistically significant relation between bio- psychosocial health problems and the usage of digital technology in all items except Body Mass Index (BMI). (Table 9) reveals that, there was statistically significant relation between preparatory students' usage of digital technology and their demographic characteristics as grade, birth order and father's educational level (P value = 0.031, 0.023 and 0.044 respectively).

Part (I): Demographic characteristics of studied preparatory students.

Part (II): Preparatory students' usage of digital technology.

Answering research question No. (1) What is preparatory students' usage of digital technology? In (Table 2; figure 1)

Part (III): Bio health problems of studied preparatory students related to their usage of digital technology.

Answering research question No. (2) What are preparatory students bio-psychosocial health problems related to their excessive usage of digital technology? (Table 3-7; figures 2-6)

Part (IV): Psychological health problems of studied preparatory students.

Part (V): Social health problems of studied preparatory students.

Part (VI): Relation and correlation between studied variables.

Answering research question No. (3) Is there a relationship between preparatory students' excessive usage of digital technology and their bio-psychosocial health problems? In (Table 8)

Answering research question No. (4) Is there a relationship between preparatory students' excessive usage of digital technology and demographic characteristics? In (Table 9).

4. Discussion

The widespread usage of digital technology has merged with everyday life for preparatory students in recent years. Even if digital technology has many advantages, there is rising worry about the possible negative consequences associated with its excessive use, especially in relation to the bio-psychosocial health of preparatory students [23]. Therefore, the aim of this study was to assess bio-psychosocial health problems related to excessive use of digital technology among Al-Azhar preparatory institutes' students.

4.1 Part I: Demographic characteristics of the studied preparatory students

Regarding the demographic characteristics of studied preparatory students, the results of the current study illustrated that, more than half of studied students were males, the studied students age ranged between 12 <16 years old with Mean ±SD =13.44± 1.14. More than half of students aged between 12<14 years old (Table 1). The result was agreed with the result of the study conducted by Emad et al., (2022) [24]. in Egypt entitled "Dimensions of mathematical competence as predictors of solving engineering problems among Al-Azhar preparatory stage students" (n=120) who revealed that the mean age of Al-Azhar preparatory students was 13.7 ± 1.2 years old. Regarding birth order and family size of studied students, the results of the present study revealed that, one third of students were the first order in their families and nearly two thirds of students had more than five family members. These findings contrasted with Yosr et al., (2021) [25]. study entitled "Perceived parenting style, self-compassion, resiliency and bullying behavior among early adolescents" (n=306) who illustrated that 46.1% of students were the first order in their families, while 77.5%of students had between four and seven family members. From the investigator point of view, this could be due to different regions. Our study was carried out in urban area, while the other study was carried out in rural area. Concerning fathers' occupation, the majority of students' fathers were employees, while three quarters of students' mothers were housewives. These results were in contrary with Elewa et al., (2022) [26]. study entitled "Effect of guidelines for preparatory students on prevention and combatting COVID -19" (n=605) who reported that, 60% of students' fathers were employees, while 65% of students' mothers were housewives.

4.2 Part II: Preparatory students' usage of digital technology

Answering research question No. (1) what is preparatory students' usage of digital technology?

The results of the current study demonstrated that, the majority of studied students owned smart phone and used it more than other digital technology devices such as desktop computer, tablets or laptops (Table 2). These results were in the same line with study by Hussien, (2022) [27] entitled "Association between internet addiction and mental well-being among adolescents in the Al-Qassim region of the Kingdom of Saudi Arabia" (n=663), who reported that 73% of students had smart phones. This may be related to easier smartphone accessibility. Smart phones tend to always be closer at hand than other devices. Smart phone light weight makes it more convenient to use in bed than larger electronic devices (such as laptop computers), which makes it particularly appealing because it can be used while lying in bed to browse the Internet, watch videos, and play games. The current study revealed that one third of studied students had their first digital technology device for more than 5 years ago. These results were consistent with Ozturk and Ayaz, (2021) [28] entitled "Internet addiction and psychosocial problems among adolescents during the COVID-19 pandemic" (n=1572), who stated that 33% of studied preparatory students had their first digital technology device for more than 5 years ago. This indicates that early exposure age to digital technology is a contributing factor to increase excessive use of digital technology. Similarly, López-Bueno et al., (2023) [29] in study entitled "Association between age of first exposure and heavy internet use in a representative sample of 317,443 adolescents from 52 countries", stated that preparatory students whose first age of exposure to Internet was ≤ 9 years exhibited significant higher odds for heavy digital technology use. The current study also indicated that, more than one quarter of studied students reported that they spend time in using technology for 3 to 5 hours daily, and nearly one fifth of them reported using it for more than 5 hours daily. These findings were consistent with study conducted in Korea by Kwak et al., (2022) [30] entitled "Impact of Internet usage time on mental health in adolescents" (n=29811) stated that the daily average of digital technology usage time was 3 hours and 20 minutes daily among high school students. According to the present study, more than half of students used digital technology for playing video games. Also, majority of students used digital technology for social media purpose. These results were consistent with study by Hussien, (2022) [27] entitled "Association between internet addiction and mental well-being among adolescents in the Al-Qassim region of the Kingdom of Saudi Arabia" (n=663), who stated that, 16.4% of students used digital technology for games, while 66.7% of students used it for social purpose. Regarding total digital technology usage time during the day and bedtime, the results of current study showed slightly more than half of the students were excessive users of digital technology (figure 1). The results were consistent with those of other studies reported in Saudi Arabia and Egypt by Shehata & Abdeldaim, (2021) [31] entitled "Internet addiction among medical and non-medical students during COVID-19 pandemic" who reported that, 76,4 %of participants reporting that they often stay online longer than intended. In addition, an Indian study by Shresta & D'mello, (2020) [32] entitled "Internet addiction and psychological well-being among high school students of Mangaluru City" (n=654), showed that students aged 12<16 were particularly vulnerable to excessive usage of digital technology because they were more willing to use the internet

during their free time, and lack guidance for proper digital technology use.

Answering research question No. (2) What are preparatory students bio-psychosocial health problems related to their excessive usage of digital technology?

4.3 Part (III): Bio health problems of studied preparatory students related to their usage of digital technology.

Regarding Body Mass Index (BMI), the current study indicated that more than half of studied students had normal weight while, more than one tenth of students had overweight and minority of students had obesity (Figure 2). These results were consistent with the conducted study in faculty of Nursing, University of Kerbala, Iraq by Abod and Obaid, (2023) [33] entitled "Association between adolescents' body mass index and excessive use of electronic media" (n= 382), stated that 62.6% of students had normal weight while, 22.2% of students were overweight or obese. As regards to physical symptoms, the most common physical symptoms associated with digital technology use among studied students were neurological symptoms and occurred in more than one third of studied students including headache, nervousness, and lack of concentration. Also, about one fifth of students had difficulty falling in sleep. In addition, the most common musculoskeletal symptoms among studied students were neck and back pain in more than one third (Table 4). These results were in the same line with study conducted by Mustafa, (2018) [13] entitled "Health profile of school age children using digital technology in Beni-Suef City" (n=240), indicated that the excessive screen time had adverse health effects and physical symptoms including headache 57.1%, difficulty falling in sleep 79.2%, as well as back and neck pain 82.5%. Moreover, results of the current study were in the same line with study by Maurya et al., (2022) [34] entitled "The association of smartphone screen time with sleep problems among adolescents and young adults" (n= 16,292) who stated that, 15.64% of adolescent males and 23.52% of females with excessive usage of technology had sleep problems in the last 15 days of the interview. According to the investigator point of view, sleeping problems may be related to exposure to blue lights of digital devices especially before bedtime which may disturb sleep pattern and affect sleeping quality the general health of students. Also, musculoskeletal symptoms may result from poor posturing and poor ergonomics especially with excessive use of digital technology. Regarding eye symptoms related to excessive use of digital technology, the most common eye symptoms among studied students were tears in one third of students, eye redness and itching in one quarter and burning sensation of eyes in one fifth of students. These results were consistent with study in Hog Kong by Chu et al., (2023) [35]entitled "Association between time spent on smartphones and digital eye strain" (n=1508) stated that, there was increased incidence of eye symptoms in accordance with time spent on a digital technology; Particularly students with greater digital technology usage time (>4 h/d). There were high incidence of eye discomfort symptoms including eye fatigue and redness in 60.2%, burning sensation of eye was 41.9% and headache was 38.1%.

These results were also supported by Bahkir and Grandee (2020) [36] entitled "Impact of the COVID-19 lockdown on digital device-related ocular health" (n=407) who reported that, 29% had eye pain, 23.1% had redness of eyes and tears, 22.9% had burning sensation of eyes and 18.9% had itching of eyes while 43.5% had headache. From the investigator point of view, eye symptoms may occur due to extended screen time and close-up viewing of digital devices which can contribute to vision problems. Regarding digestive symptoms related to excessive use of digital technology, slightly more than one third of studied students reported forget to eat while using digital technology devices. While more than one tenth of students reported overeating while using electronic devices (Table 4). However, these results were in contrast with study conducted by Mustafa, (2018) [13] stated that 85% of students reported overeating while using digital technology devices while only 15% of students reported forget to eat while using digital technology devices. Additional contrast study by Rocka et al., (2022) [37] entitled "The impact of digital screen time on dietary habits and physical activity in children and adolescents" (n= 3127) who stated that, 89% of students were exposed to screens during meals and this behavior may increase risk of obesity due to higher energy intakes and more frequent consumption of junk food. From the investigator point of view, physical symptoms generally can vary between students according to several factors such as the duration and intensity of digital technology use and overall lifestyle habits. Regarding energy and physical activity level, nearly half of studied students using digital technology had low energy and physical activity level (Figure 4). These results were consistent with the results by Alotaibi et al., (2020) [38] entitled "The Relationship between Technology Use and Physical Activity among Typically Developing Children" (n=458) Students who exceeding screen time recommendations were at least 60% high risk of having poor or very poor physical activity level. Also, high use of technology was significantly associated with low level of activity.

4.4 Part (IV): Psychological health problems of studied preparatory students related to their usage of digital technology.

The present study revealed that, more than one quarter of studied preparatory students reported high psychological health problems including anxiety and depression. Also, about one third of them had moderate level of psychological health problems related to their excessive use of digital technology **(Figure 5)**. These results were supported by **Ozturk and Ayaz, (2021)** [28] entitled "Internet addiction and psychosocial problems among adolescents during the COVID-19 pandemic" (n=1572) who reported that 20.7% of preparatory students with excessive usage of digital technology had psychosocial health problems. These results also were consistent with study by **Limone and Toto, (2021)** [39] entitled "Psychological and emotional effects of digital technology on children in COVID-19 Pandemic", indicated that students experienced adverse psychological health effects, including feelings of depression and anxiety because of increased digital technology usage. Moreover, study by **George et al. (2018)** [40] entitled "Concurrent and subsequent associations between daily digital technology use and high-risk adolescents' mental health symptoms" (n=151) who stated that, across over 4,300 study days, students reported experiencing at least one anxiety symptom on 32% of study days and at least one depression symptom on 27% of study days. However, these results were in contrast with study by

Jensen et al. (2019) [41] entitled "Young adolescents' digital technology use and mental health symptoms" (n=388) who reported that, the psychological health symptoms of the preparatory students did not worsen in the days that followed their excessive usage of digital technology. From the investigator point of view, this result was based on the fact that the findings were limited to the immediate and recent effects of digital technology usage. However, it is important to note that prolonged and consistent use of digital technology may indeed contribute to psychological health problems with the long-term usage.

4.5 Part (V): Social health problems of studied preparatory students related to their usage of digital technology

More than quarter of studied preparatory students using digital technology had high social problems including loneliness **(Figure 6)**. This result was consistent with study in Egypt by **Mustafa, (2018)** [13] who reported that 29.6% of students had severe symptoms of loneliness. Moreover, study by **Herrero et al., (2019)** [42] entitled "Socially connected but still isolated: Smartphone addiction decreases social support over time" (n=416)**,** stated that excessive digital technology usage among preparatory students was reportedly related with diminished overall physical and psychological functioning, which may lead to a deterioration of social skills in real life, and as a result, these students experience loneliness.

4.6 Part (VI): Relation and correlation between studied variables

Answering research question No. (3) Is there a relationship between preparatory students' excessive usage of digital technology and their bio-psychosocial health problems?

The current study revealed that, there is no significant association between excessive usage of digital technology and high BMI (**Table 8**). These results were in the same lines with **Jari et al., (2020)** [43] in study entitled "The Association Between High Body Mass Index and Technology Use Among Female Elementary School Students" (n=681) stated that increase in BMI was non-significantly linked with the period spent using digital technology and illustrated that: lack of physical activity, fast food consumption, and genetic predispositions are still major contributing factors for obesity and overweight. Also, consistent with study by **Aloufi et al., (2022)** [44] entitled"The COVID 19 related increased negative impact of the unmonitored use of digital technology on children in kingdom of Saudi Arabia (KSA)" (n=207) who stated that, there was notable insignificant associations between general health of preparatory students despite rising rates of technology usage. However, these results were in contrast with study by **Abod and Obaid, (2023)** [33] stated that the excessive use of digital technology was significantly influence students' BMI. Also, excessive use of digital technology was discovered to raise the likelihood of being overweight. From the investigator point of view, years of exposure is an important factor and students may experience increased BMI with their prolonged years of usage of digital technology as a long-term effect but not necessarily affect students' general health in the present time. Regarding physical symptoms, the current study revealed highly statistically significant relationship between excessive digital technology use and physical symptoms. These results were consistent with the study by **Šace et al., (2022)** [45] entitled "Effects of excessive use of technology on physical health" (n=30) who reported similar associations between high screen time and bio health problems because excessive digital technology usage had a detrimental impact on physical health and growth of students. Regarding psychological health problems, current study revealed highly statistically significant relationship between excessive digital technology use and psychological health problems including anxiety and depression ($p \leq 0.001$). These findings were consistent with **Marciano et al., (2021)** [16] who confirmed the same correlation. Regarding social health problems, there was a positive correlation between excessive digital technology use and social health problems. Higher levels of digital technology use were associated with increased levels of loneliness ($P \leq 0.001$). These findings were aligning with study by **Douglas et al., (2021)** [46] entitled "Belonging and loneliness in cyberspace: impacts of social media on adolescents' well-being" indicated that excessive digital technology use had detrimental effects on social interaction and relationship quality among preparatory students.

Answering research question No. (4) Is there a relationship between preparatory students' excessive usage of digital technology and demographic characteristics?

The current study indicated that preparatory students' grade level was significantly related to excessive usage of digital technology. Third grade preparatory students exhibited higher levels of technology use compared to their younger counterparts in the first grade **(Table 9)**. This indicates that the incidence of the excessive use of digital technology among students increases with grade level.

Table 1: Frequency Distribution of Studied Students regarding their Demographic Characteristics (n=356).

Demographic Characteristics	Frequency	Percent
Age/ years		
12-<14	202	56.7
14-<16	144	40.5
≥16	10	2.8
Mean ± SD	13.44 ± 1.14	
Sex		
Male	199	55.9
Female	157	44.1
Grade		
First	118	33.2
Second	118	33.2
Third	120	33.6
Birth order		
First	118	33.1
Second	97	27.3
Third or more	141	39.6
Number of family members		
Three	6	1.7
Four	33	9.2
Five	102	28.7
More than five	215	60.4
Father's educational level		
Not read and write	17	4.8
Read and write	50	14.0
Basic education	44	12.4
Secondary education	120	33.7
University and more	125	35.1
Mother's educational level		
Not read and write	19	5.3
Read and write	58	16.3
Basic education	42	11.8
Secondary education	114	32.0
University and more	123	34.6
Father's occupation		
Employee	347	97.5
Unemployed	9	2.5
Mother's occupation		
Housewife	273	76.7
Employee	83	23.3
Family income		
Sufficient	227	63.8
Sufficient and save	18	5.0
Insufficient	111	31.2

Table 2: Frequency Distribution of Studied Preparatory Students regarding their Digital Technology Usage (n=356).

Digital technology items	Frequency	Percent
Digital technology ownership*		
Smart phone	316	88.8
Desktop computer	115	32.3
Tablet	47	13.2
Laptop	30	8.4
Time spends daily on digital technology usage		
< 1 hour	33	9.3
1 hour	64	18.0
2 hours	95	26.7
3 to 5 hours	100	28.0
> 5 hours	64	18.0
***Activities on digital technology device**		
Playing video games	200	56.2
Talking on the phone	141	39.6
Chatting	257	72.2
Internet browsing	250	70.2
Listening to news	39	11.0
***Purpose of using digital technology**		
Education	182	51.1
Searching and gathering information	128	36.0
Social media	303	85.1
Use of technology at bedtime		
Yes	266	74.7
No	90	25.3
If yes:		
Hours spend in using technology at bedtime		
< 1 hour	106	39.8
1 hour	66	24.8
2 hours	43	16.2
3 to 5 hours	30	11.3
> 5 hours	21	7.9

* Responses are not mutually exclusive.

Table 3: Mean and SD of Weight, Height, and BMI of Studied Students.

Items	x̄	SD
Weight	54.00	12.92
Height	157.66	8.82
BMI	21.57	4.14

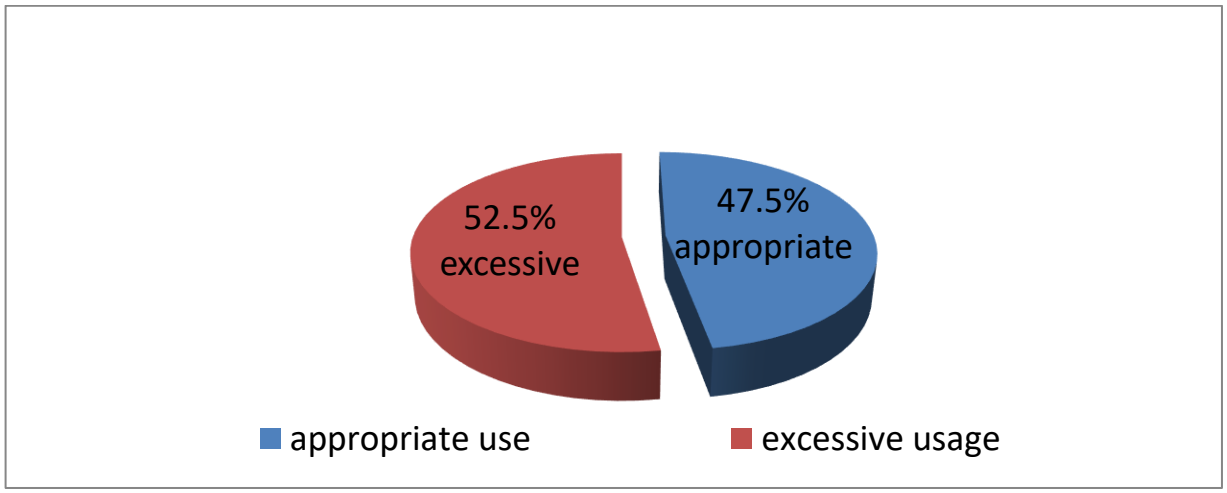

Figure 1: Total Digital Technology Usage Time during the Day and at Bedtime (n=356).

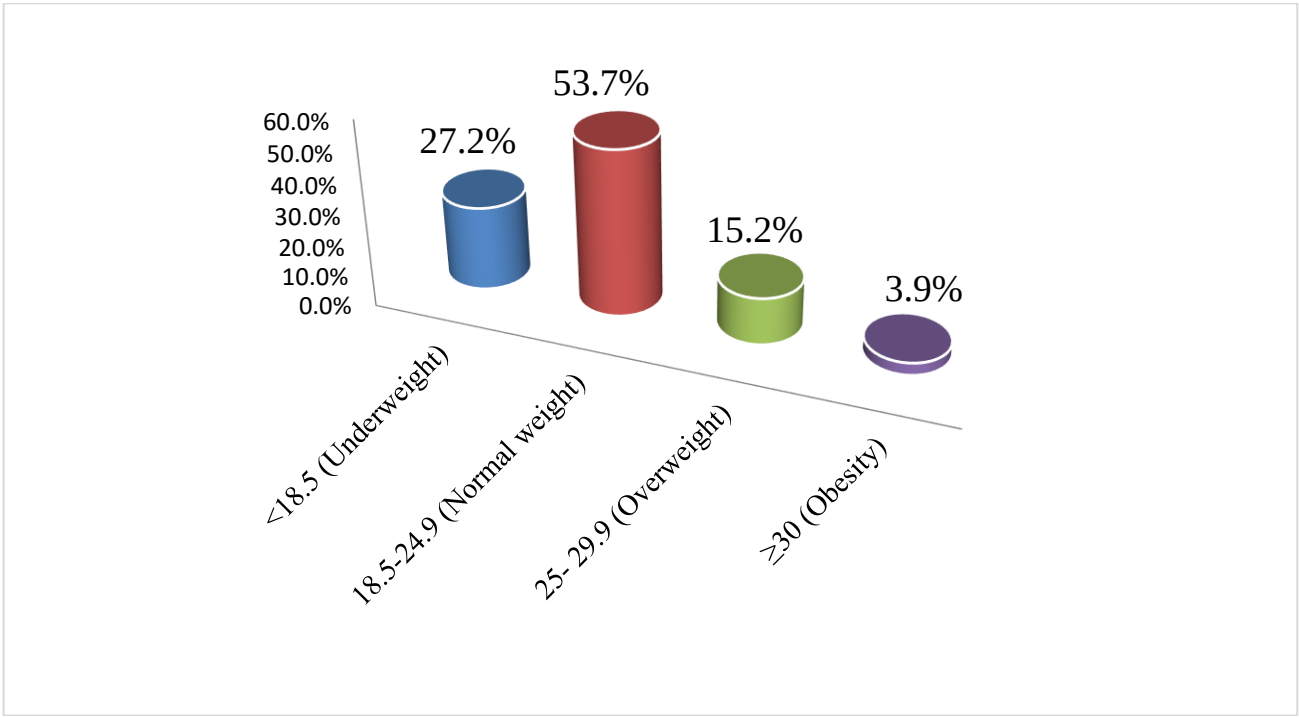

Figure 2: Percentage Distribution of Studied Students regarding their Body Mass Index (BMI) (n=356).

Table 4: Frequency Distribution of Studied Preparatory Students Physical Symptoms related to their Usage of Digital Technology (n=356).

Physical symptoms	No	%
***Neurological symptoms**		
Headache	131	36.8
Dizziness	67	18.8
Lack of concentration	117	32.9
Difficulty falling in sleep	74	20.8
Nervousness	129	36.2
***Eye symptoms**		
Tears	119	33.4
Eye redness	90	25.3
Itching in the eyes	89	25.0
Pain in the eyes	60	16.9
Burning sensation of eyes	74	20.8
***Musculoskeletal symptoms**		
Shoulders pain	76	21.3
Wrist pain	38	10.7
Neck pain	147	41.3
Back pain	142	39.9
Joint pain	2	0.6
****Digestive symptoms (n= 208)**		
Forget to eat while using digital technology devices	123	34.5
Abdominal pain	47	13.2
Overeating while using electronic devices	38	10.7

* Responses are not mutually exclusive **only 208 of studied students had digestive symptoms.

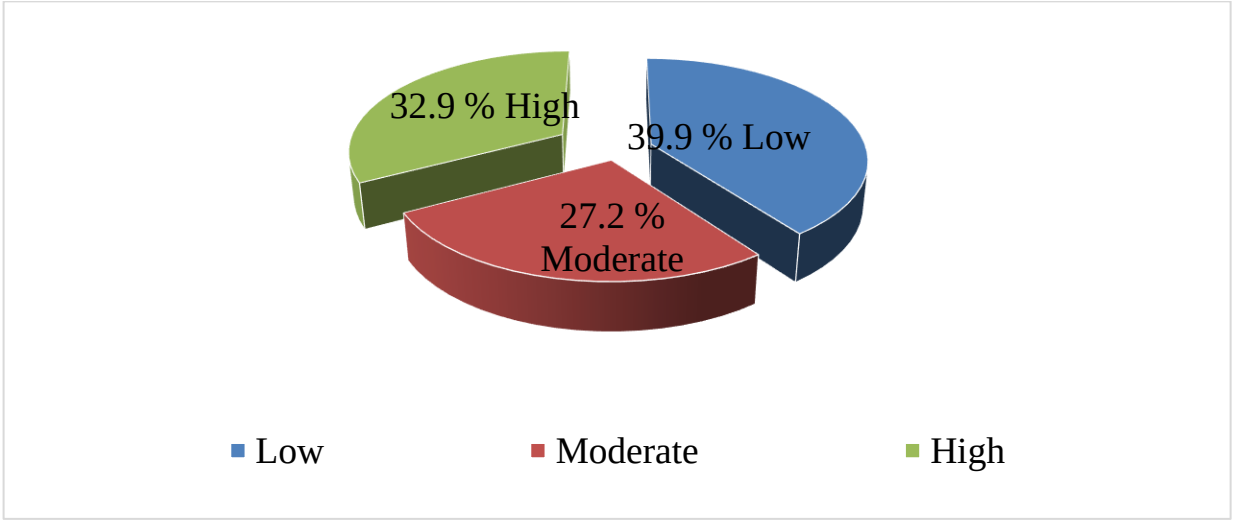

Figure 3: Percentage of Studied Preparatory Students regarding their Total Physical Symptoms (n=356).

Table 5: Frequency Distribution of Studied Preparatory Students Psychological Health Problems regarding Anxiety related to their Usage of Digital Technology (n=356).

Anxiety items	Never		Sometimes		Often	
	No	%	No	%	No	%
When I feel frightened, it is hard for me to breathe, my heart beats fast and I sweat a lot	96	27.0	169	47.6	91	25.6
I don't like to be with people I don't know well	65	18.3	149	41.9	142	39.8
I get scared if I sleep away from home or sleep alone	148	41.6	109	30.6	99	27.8
I worry about other people liking me	184	51.6	107	30.1	65	18.3
I am nervous	91	25.6	124	34.8	141	39.6
I follow my mother or father wherever they go	168	47.2	136	38.2	52	14.6
I worry about being as good as other students	194	54.5	93	26.1	69	19.4
I have nightmares and worry about something bad happening to me or my parents	125	35.1	133	37.4	98	27.5
I worry about going to school	266	74.7	73	20.5	17	4.8
I am anxious	174	48.8	133	37.4	49	13.8
I get really frightened for no reason at all	231	64.9	87	24.4	38	10.7
I am afraid to be alone in the house	184	51.6	107	30.1	65	18.3
It is hard for me to talk with people I don't know well	116	32.6	168	47.2	72	20.2
People tell me that I worry too much	254	71.4	66	18.5	36	10.1
I am afraid of having anxiety (or panic) attacks	180	50.6	100	28.1	76	21.3
I worry about what is going to happen in the future	95	26.7	146	41.0	115	32.3
I am scared to go to school	300	84.3	41	11.5	15	4.2
I worry about things that have already happened	106	29.8	155	43.5	95	26.7
I feel nervous when I am with other children or adults, and I must do something while they watch me	93	26.1	144	40.5	119	33.4
I am shy	101	28.4	147	41.3	108	30.3

Table 6: Frequency Distribution of Studied Students Psychological Health Problems regarding Depression related to their Usage of Digital Technology (n=356).

Depression Items	Never		Sometimes		Often	
	No	%	No	%	No	%
I feel low mood, sadness, feeling down, depressed.	78	21.9	179	50.3	99	27.8
I feel irritable and lose temper easily.	102	28.7	148	41.6	106	29.8
I have sleep difficulties such as trouble falling asleep and lying awake in bed.	123	34.6	133	37.4	100	28.1
I feel decreased interest in: (Going out with friends, doing schoolwork, doing hobbies or sports or recreation).	160	45.0	114	32.0	82	23.0
I have feelings of worthlessness, hopelessness, letting people down and not being a good person.	175	49.1	121	34.0	60	16.9
I feel tired, fatigued, low in energy, hard to get motivated, must push to get things done and want to rest or lie down a lot.	112	31.5	145	40.7	99	27.8
I have trouble concentrating, can't keep mind on schoolwork, hard to focus when reading and getting "bored" with work or school.	105	29.5	147	41.3	104	29.2
I feel that life is not very much fun, not feel good and not get pleasure from fun things as usual.	184	51.7	119	33.4	53	14.9
I feel that appetite is not good as it used to be, and I lost weight.	226	63.5	61	17.1	69	19.4
I feel guilty and blame myself all the time for my weaknesses and mistakes.	56	15.7	157	44.1	143	40.2

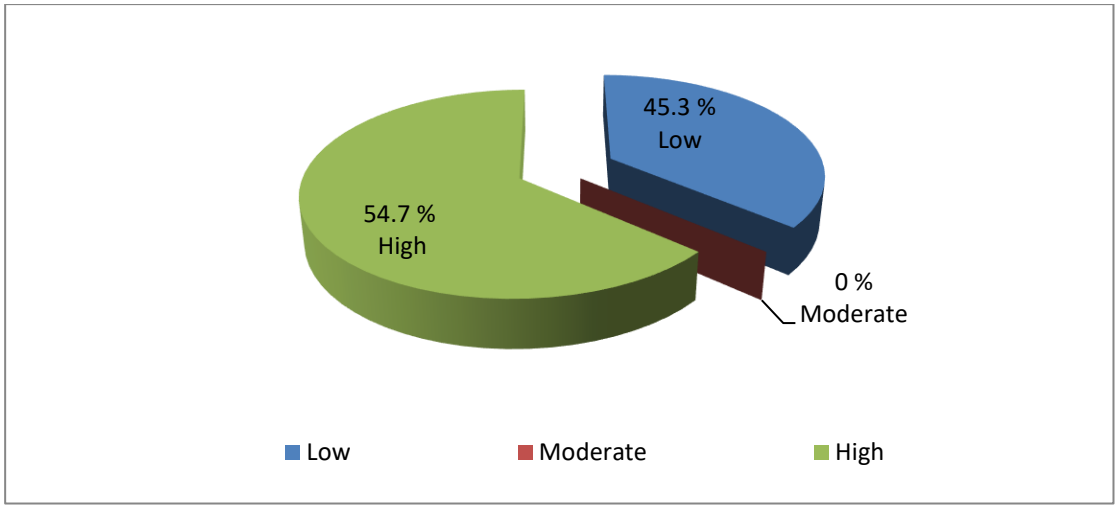

Figure 4: Percentage of Studied Students regarding their Physical Activity (n=356).

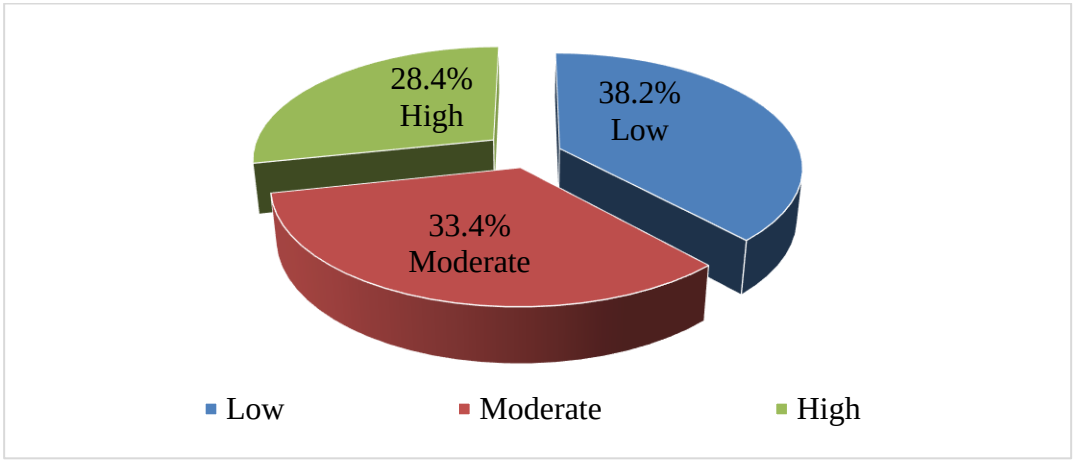

Figure 5: Percentage Distribution of Studied Students regarding Total Psychological Health problems related to their Usage of Digital Technology (n=356).

Table 7: Frequency Distribution of Studied Students Social Health Problems regarding Loneliness related to their Usage of Digital Technology (n=356).

Loneliness items	Never		Sometimes		Often	
	No	%	No	%	No	%
I lack companionship	199	55.9	107	30.1	50	14.0
There is no one I can turn to	213	59.8	91	25.6	52	14.6
I feel alone	202	56.8	82	23.0	72	20.2
My interests and ideas are not shared by those around me	222	62.3	60	16.9	74	20.8
I feel left out	209	58.7	99	27.8	48	13.5
My social relationships are superficial	253	71.1	8	2.2	95	26.7
No one really knows me well	178	50.0	118	33.1	60	16.9
I feel isolated from others	187	52.5	105	29.5	64	18.0
I am unhappy being so withdrawn	257	72.2	50	14.0	49	13.8
People are around me but not with me	175	49.1	107	30.1	74	20.8
I feel in harmony with the people around me	48	13.5	151	42.4	157	44.1
I feel part of a group of friends	68	19.1	101	28.4	187	52.5
I have a lot in common with the people around me	61	17.1	148	41.6	147	41.3
I am an outgoing person	99	27.8	25	7.0	232	65.2
There are people I feel close to	41	11.5	159	44.7	156	43.8
I can find companionship when I want it	69	19.4	151	42.4	136	38.2
There are people who really understand me	56	15.7	158	44.4	142	39.9
There are people I can talk to	45	12.6	126	35.4	185	52.0

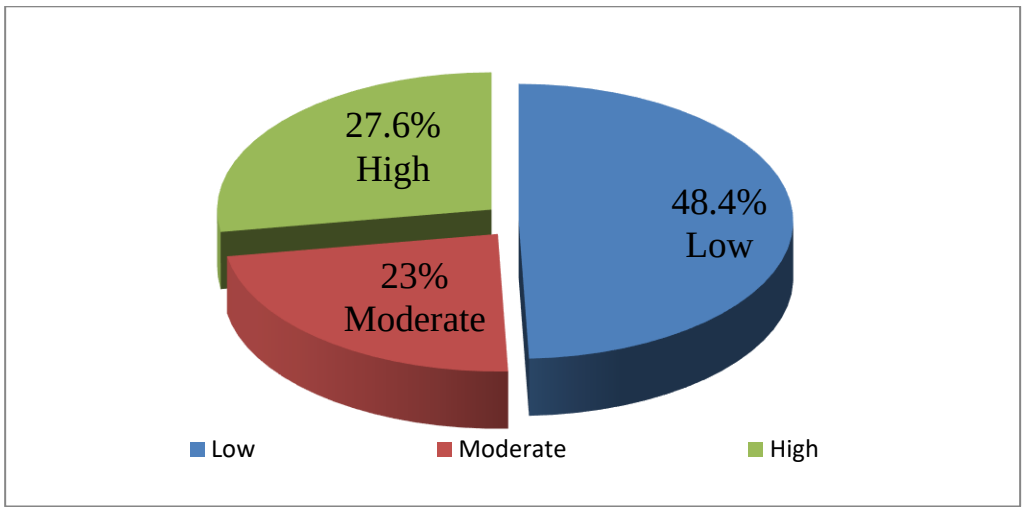

Figure 6: Percentage Distribution of Total Social Health Problems for Studied Students (n=356).

Table 8: Relation between Preparatory Students' Usage of Digital Technology and Bio-Psychosocial Health Problems (n=356).

Bio-psychosocial health problems	Usage of digital technology				χ^2 Test	P value
	Appropriate Usage(n=169)		Excessive Usage(n=187)			
	No	%	No	%		
Body Mass Index (BMI)						
Underweight (n=97)	48	28. 4	49	26.2	1.279	0.734
Normal weight (n=191)	86	0.9	105	56.1		
Overweight (n=54)	27	16	27	14.4		
Obesity (n=14)	8	4.7	6	3.2		
Physical symptoms						
Low (n=142)	71	19.9	71	19.9		
Moderate (n=97)	87	24.4	10	2.8	137.7	
High (n=117)	11	3.1	106	29.8		
Energy and physical activity level					50.67	0.000**
Low (n=161)	55	2.5	106	56.7		
High (n=195)	114	67.5	81	43.3		
Psychological health problems					74.411	0.000**
Low (n=136)	103	8.9	33	9.3		
Moderate (n=119)	43	12.1	76	21.3		
High (n=101)	23	6.5	78	21.9		
Social health problems					68.44	0.000**
Low (n=98)	76	21.3	22	6.2		
Moderate (n=82)	46	12.9	36	10.1		
High (n=176)	47	13.2	129	36.2		

** Highly statistically significant at $p \leq 0.001$

Table 9: Relation between Preparatory Students' Excessive Usage of Digital Technology and Demographic Characteristics (n=356).

Demographic characteristics	Usage of digital technology				χ^2	P value
	Appropriate usage(n=169)		Excessive usage(n=187)			
	No	%	No	%		
Age/ years						0.059
12-<14	107	0.1	95	26.7	5.66	
14-<16	58	6.3	86	24.2		
≥16	4	.1	6	1.7		
Sex			101	28.4		0.45
Male	98	7.5	86	24.2	0.57	
Female	71	9.9				
Grade					6.92	0.031*
First	67	8.8	51	14.3		
Second	54	5.2	64	18		
Third	48	35	72	20.2		
Birth order					7.53	0.023*
First	68	9.1	50	14		
Second	43	2.1	54	15.2		
Third or more	58	16.3	83	23.3		
Number of family members					1.81	0.611
Three	3	.8	3	0.8		
Four	12	.4	21	5.9		
Five	50	.4	52	14.6		
More than five	104	9.2	111	31.2		
Father's educational level					9.79	0.044*
Not read and write	13	.7	4	1.1		
Read and write	26	.3	24	6.7		
Basic education	25	4.6	19	5.3		
Secondary education	52	4.9	68	19.1		
University and more	53		72	20.2		
Mother's educational level					2.77	0.597
Not read and write	10	.8	9	2.5		
Read and write	31	.7	27	7.6		
Basic education	22	.2	20	5.6		
Secondary education	54	15.2	60	16.9		
University and more	52	4.6	71	19.9		
Father's occupation						
Employee	163	5.8	184	51.7	1.36	0.243
Unemployed	6	.7	3	0.8		
Mother's occupation						
Housewife	137	38.5	136	38.2	3.45	0.063
Employee	32	9	51	14.3		
Family income						
Sufficient	111	31.2	116	32.6		
Sufficient and save	7	4.3	11	3.1	0.821	0.663
Insufficient	51		60	16.9		

* Statistically significant at $p \leq 0.05$

However, these results were in contrast with the findings of Hussien, (2022) [27] who indicated that, the incidence of excessive digital technology among students decreased with grade level. From the investigator point of view, the reasons for increasing digital technology usage among higher grades due to increased digital technology exposure; Students in higher grades often encounter more opportunities to use digital technology, social and peers' factors; If their peers use digital technology excessively, their become more likely to engage in similar behavior and generally older students have a higher level of technological proficiency compared to younger students. Regarding gender, male preparatory students reported higher levels of technology use compared to female counterparts, although the difference was not statistically significant. This finding was in line with previous study by Hussien, (2022) [27] who consistently reported gender differences in technology use patterns, with males typically engaging in more excessive technology use. In addition to the findings of Ozturk and Ayaz, (2021) [28] who found that male students were 1.9 times more likely than female students to engage in excessive usage, indicating that gender is a risk factor for excessive digital technology use. Possible explanations for this gender disparity may include differences in interests, social norms, or access to technology. However, these findings were in contrast with another study in Ontario, Canada by Sampasa et al., (2022) [47] entitled "Problem technology use, academic performance, and school connectedness among adolescents" (n=4837) who reported that, females were more likely to report using technology for a longer duration and report problem technology use symptoms than male counterparts. Regarding birth order, a statistically significant relationship between birth order of the student in the family and excessive use of digital technology was observed. Our results indicated that the incidence of the excessive use of digital technology among students increased with birth order. These results were consistent with the previous results by Kwak et al., (2022) [30] who stated that, lack of parental, managerial support and control was associated with increased digital technology usage time. From the investigator point of view, the reasons for that may be differences in parenteral attention, monitoring and rules. Generally, parents tend to be more restrictive with their first child and gradually become more permissive with subsequent children. In addition, the last child in the family is more likely to be a spoiled child and all his/her requests are met especially regarding the usage of digital technology. Regarding educational level of father, the incidence of the excessive use of digital technology among students increased with the higher educational level of father. These results were in contrast with Ozturk and Ayaz, (2021) [28] who stated that, the risk of excessive use of digital technology was significantly higher in students whose mothers' educational level was high. According to the investigator, it can be interpreted that parents with higher education may tend to have busy lifestyle and demanding carers or work commitments that limit their ability to monitor their children's digital technology use. Students take control of their own screen time and spend more time using digital technology seeking entertainment. In addition, role modelling and parenting attitude toward digital technology usage affect students' pattern of digital technology usage.

5. Conclusions

In the light of results of the current study and answers to research questions, it could be concluded that: The prevalence of the excessive usage of digital technology in a sample of Al-Azhar preparatory institutes' students was high. Slightly more than half of the studied students were excessive users of digital technology. More than one quarter of studied students reported using technology for 3 to 5 hours per day and nearly one fifth of them reported using it for more than 5 hours per day. Also, more than one tenth of students reported using digital technology at bedtime for 3 to 5 hours. The majority of studied students owned smart phone and used it more than other technological devices. The most common bio-psychosocial health problems among studied preparatory students were physical symptoms such as headache 36.8%, nervousness 36.2%, sleeping problems 20.8%, neck pain 41.3%, back pain 39.9%, eye symptoms like tears 334% and eye redness 25.3%, digestive symptoms like forget to eat while using digital technology 34.5%, physical inactivity 45.3%, psychological health problems including anxiety and depression 28.4% and social health problems including loneliness 27.6%. Moreover, there were highly statistically significant relation between usage of digital technology and bio-psychosocial health problems. Also, there was statistically significant relation between preparatory students' usage of digital technology and their demographic characteristics as grade, birth order and father's educational level.

Recommendations

From the findings of the current study, the following recommendations are suggested:

- Raising awareness among preparatory students about the potential health risks associated with excessive digital technology use.
- Educational programs and counseling sessions on balanced and mindful approach for digital technology usage should be developed and implemented to promote healthier habits among students.

For further researches

- Apply further research about health problems of digital technology usage among students in other settings or generalization.
- Intervention studies focusing on reducing excessive digital technology use and its impacts on students' health outcomes in different settings and large scale.

Declarations

Competing interests

There is no conflict of interests.

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