JOURNAL OF
EMERGING INVESTIGATORS

Article

COVID 19 and the perceived impacts on adolescents' and young adults' mental health: A quantitative survey

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SUMMARY

The COVID 19 pandemic has led to more than 6.5 million deaths worldwide at present. Social restrictions focused on reducing the spread of the virus among the public, coupled with the pandemic itself before have had continuous detrimental impacts on mental health. The radical changes that young people had to go through due to this pandemic are likely a contributing factor to the potential changes in their mental health and wellbeing. The aim of this study was to explore to what extent the COVID 19 pandemic has affected young people's mental health and wellbeing. We hypothesized that the COVID 19 pandemic would overall have a negative perceived impact on young adults' mental health. We conducted an online survey which included the short General Health Questionnaire (GHQ-12) and received 102 valid responses. We found that overall young adults perceived the pandemic to be detrimental to many areas of their wellbeing, with females and those aged 18–19 and 22–23 years old being most significantly impacted.

INTRODUCTION

SARS-Cov-2 first came to international attention in 2020. The COVID 19 pandemic began in Wuhan, China and has led to more than 6.5 million deaths worldwide at the time of writing this study (1). Due to it being a public health emergency, governments worldwide had to take serious actions, such as imposing mask mandates, social distancing rules, country-wide lockdowns, distance learning, and numerous other mitigation efforts. These restrictions were focused on reducing the spread of the virus among the public; however, people's mental health has been negatively impacted by these preventative efforts and the pandemic itself over time. (2).

Previous studies on recent public health emergencies have exemplified the extensive impacts that such situations and their associated public health measures can have (3,4). Hawryluck, *et al.* discovered through a web survey that 129 people quarantined in Toronto during the SARS epidemic demonstrated a high prevalence of psychological distress with nearly 30% showing symptoms of depression and posttraumatic stress disorder (PTSD). (4). Pfefferbaum, *et al.* recommended the promotion of mental and behavioral health in Influenza A virus subtype H1N1 mitigation efforts, recognizing the impacts such public health crises and their measures can have on the mental wellbeing of people (4). Even during the COVID 19 pandemic, various studies have been conducted gauging the effects of the pandemic on the mental health of people within countries, such as the United Arab Emirates (UAE), and between countries, such as a comparison study between Germany and the United Kingdom (UK) (5, 6). Studies have also focused on specific groups within the population, e.g., adults and children in Italy and healthcare workers (7, 8).

A study by the World Health Organization suggested that the pandemic has impacted young adults especially (9). The radical changes faced by young adults due to this pandemic are likely to be a contributing factor to potential changes in their mental health and wellbeing. Despite increasing global attention to this issue, there has been little research conducted on this topic in the UAE. Therefore, we conducted this study to investigate the effect of the COVID 19 pandemic on the mental health and wellbeing of young adults in the UAE. Gauging the effects of the pandemic on the mental health of young adults will not only serve as an important consideration for future public health emergencies but will also highlight if there is a need for immediate mental health support in certain sections of society. Given that young adults go through important periods of transition and life events, for example, taking exams, finishing school, and starting university, the social restrictions relating to COVID 19 may affect this population differently.

The aim of the study was to explore to what extent the COVID 19 pandemic has affected young people's mental health and wellbeing. We hypothesized that young adults would report that the COVID 19 pandemic has overall had a negative perceived impact on their mental health. We further hypothesized that the impact would vary between different groups of young adults, with the most severely impacted age group being 18–19 years old, as this group was in a transition period between school and university during the first year of the pandemic.

RESULTS

We invited young adults to complete an online questionnaire that asked to what extent various facets of their lives and wellbeing had been impacted by lockdowns and the pandemic. We also asked participants to complete the 12-Item General Health Questionnaire (10). The GHQ-12 is a measure of current mental health gauging respondents' confidence and behavior through Likert or Binary methods.

Perceived Impact of COVID 19 (Q1)

To answer the question of how the impact of the COVID 19 pandemic on the mental health of young adults differs among different age groups, the first part of the survey focused on participants' perception of their learning, social connection, and mental health since the beginning of the pandemic. The

results of these questions were cross tabulated against age and gender using Chi-squared tests, which revealed some interesting findings. The age group of 20–21 wasn't included in this cross-tabulation as no responses were collected. In line with the hypotheses, across all 6 of the pandemic impact questions more than 50% indicated a negative impact from the pandemic, answering yes (that there was a symptom present) to each of the pandemic impact questions **(Figure 1)**. The most perceived negative effects were focused on education, with more than 80% of participants agreeing the pandemic had disrupted their learning and that they were finding it harder to focus when distance learning. Of those who had issues with learning during the pandemic (N=83), more than 80% (N=70) indicated that their mental health had been impacted.

The responses by age categories for these questions are shown in **Table 1**. The chi-squared tests indicated that there were no significant differences by age group for the pandemic's effect on participants' ability to stay connected with friends, difficulty maintaining a routine, or likelihood of feeling lonely or isolated.

However, we found age to be a significant factor (p=0.027) in whether participants felt that their learning had been disrupted by the pandemic. We also determined age was a significant element in whether participants found it hard to focus on distance learning (p=0.006) and the overall impact the pandemic had on participants' mental health (p=0.004). Participants aged 24–25 were more likely to indicate that they did not have issues with disrupted learning (75%) or distance learning (75%), while also indicating that the pandemic did not have an overall impact on their mental health (100%). This contrasted with younger age groups who predominantly felt there had been impacts, with ages 18–19 and 22–23 significantly standing out in these aspects. 90.9% of 18–19-year-old and 85.7% of 22–23-year-old participants felt that the pandemic disrupted their learning, and 100% of the participants of both of these age groups found it difficult to focus during online learning. Additionally, 100% of the 22–23-year-old participants indicated that the pandemic impacted their mental health and 81.8% of the 18–19-year-old reported the same, making them the two most severely impacted age groups among those surveyed.

The chi-squared tests comparing males and females showed that females were more likely to report challenges with staying connected with their friends than males (p=0.002); however, there were no other gender differences **(Table 2)**.

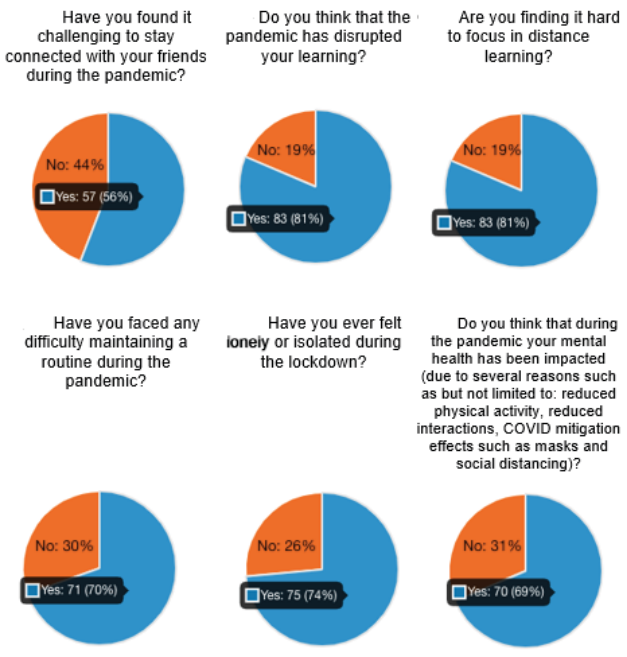

Figure 1: Pie charts showing the percentage and number of yes/no responses for each of the 6 COVID-19 pandemic impact questions asked in an online survey to candidates (n=102) aged 18-25 across 11 countries.

Current Mental Health Measured Using the GHQ-12

The GHQ-12 questionnaire was used to measure the current mental health condition of participants. The GHQ-12 formulates a score from 0–12 (added using binary method), with a higher score indicating worse mental health. While the overall disparities in the frequency of GHQ-12 scores obtained by male and female participants are evident in **Figure 2b**, **Figure 2a** shows how the total GHQ-12 scores do not follow a normal distribution curve and are instead spread asymmetrically. This meant that a normal ANOVA test could not be performed necessitating a Kruskal-Wallis test, which showed that the variation between the two groups (males and females) was statically significant. The overall mean GHQ-12 score was 5.76 (standard deviation of 3.91) and the median was 6 **(Table 3)**.

Median is a measure of central tendency that shows the middle value of the GHQ-12 scores for each category, while the IQR is a measure of spread that is calculated by subtracting the total GHQ-12 scores of the 25th percentiles from the 75th (Q3-Q1) for each category of participants. Females showed significantly higher average scores of 7.18 (SD= 3.69), compared to males with an average score of 4.83 (SD= 3.77) (p-value=0.0028, Kruskal-Wallis test). As seen in similar studies, such as from Pierce, *et al.*, the proportion of those with significant mental distress were determined as those having a GHQ-12 score of 4 or more (11). When using a threshold of 4 or more on the GHQ-12, 75.6% of females in this study were above the threshold, and 52.83% of males were above this threshold.

DISCUSSION

The aim of this study was to explore to what extent the COVID 19 pandemic has affected young people's mental health and wellbeing based on their recollections when surveyed. Consistent with our hypothesis, we found adolescents' and young adults' mental health was perceived to be worse overall following the pandemic and social isolation. However, the results of this study are most representative of the age groups 16–19 as there were only a small number of participants over 19 years old.

The overall GHQ-12 score totals were statistically analyzed to determine the mean overall score to be 5.76, with a standard deviation of 3.91. This indicates a reasonably high GHQ score according to the thresholds set by Goldberg, the user's guide and the original GHQ manual, which is 1 or 2 if using the binary method (10). These results suggest that at the time of this survey, the pandemic has significantly negatively impacted the mental health of young adults. This is in line with the proposed hypothesis; however, a larger sample size

Have you found it challenging to stay connected with your friends during the pandemic? **Chi-Squared = 2.804 p value = 0.423**	Age	Yes	No
	16–17	57.50%	42.50%
	18–19	45.46%	54.54%
	22–23	71.43%	28.57%
	24–25	25%	75%
Do you think that the pandemic has disrupted your learning? **Chi-Squared = 9.200 P value = 0.027**	Age	Yes	No
	16–17	82.50%	17.50%
	18–19	90.91%	9.09%
	22–23	85.71%	14.29%
	24–25	25%	75%
Are you finding it hard to focus in distance learning? **Chi-Squared = 12.606 P value = 0.006**	Age	Yes	No
	16–17	80.00%	20.00%
	18–19	100.00%	0.00%
	22–23	100.00%	0.00%
	24–25	25%	75%
Have you faced any difficulty maintaining a routine during the pandemic? **Chi-Squared = 3.926 P Value = 0.270**	Age	Yes	No
	16–17	71.25%	28.75%
	18–19	72.73%	27.27%
	22–23	71.43%	28.57%
	24–25	25%	75%
Have you ever felt lonely or isolated during the lockdown? **Chi-Squared = 6.231 P Value = 0.101**	Age	Yes	No
	16–17	76.25%	23.75%
	18–19	63.64%	36.36%
	22–23	85.71%	14.29%
	24–25	25%	75%
Do you think that during the pandemic your mental health has been impacted (due to several reasons such as but not limited to: reduced physical activity, reduced interactions, COVID 19 mitigation effects such as masks and social distancing)? **Chi-Squared = 13.198 P Value = 0.004**	Age	Yes	No
	16–17	70.00%	30.00%
	18–19	81.82%	18.18%
	22–23	100.00%	0.00%
	24–25	0%	100%

Table 1: Cross-tabulations and Chi-Squared findings of perceptions of impact of the pandemic.

would be necessary to indicate whether this is representative of the population.

Most survey responses were retrieved from three countries: in descending order, the UAE, the UK, and India. The stringency of the lockdown in these three countries were similar during the peak of the pandemic (April 2020) with India having the highest Oxford Stringency Index (100.00), followed by the UAE (89.81) and the UK (79.63), falling within similarly high categories of government pandemic response stringency (12). This may explain the similar survey responses obtained from participants belonging to these countries.

These results also support the hypothesis that the impact of the pandemic varies between different groups of young adults, as the data suggests that young females faced more significant mental health impacts due to the COVID 19 pandemic compared to young males. Female participants had higher average GHQ-12 scores overall (7.18 compared to 4.83 for males) and a greater proportion of those with significant mental distress. Pierce, et al. found that before the pandemic, 32% of females and 17.6% of males had significant levels of mental distress (GHQ-12 score above 4) (11). Comparing these pre-pandemic values to our own, we found that the pandemic increased mental distress by 43.56% for females and 35.23% for males.

We also looked at the number of people who met a threshold of four or more GHQ-12 symptoms, comparing

Have you found it challenging to stay connected with your friends during the pandemic? **Chi-Squared = 10.009** **p value = 0.002**	Gender	Yes (%)	No (%)
	Male	41.5	58.5
	Female	73.3	26.7
Do you think that the pandemic has disrupted your learning? **Chi-Squared = 0.019** **p value = 0.890**	Gender	Yes (%)	No (%)
	Male	81.1	18.9
	Female	82.2	17.8
Are you finding it hard to focus in distance learning? **Chi-Squared = 0.019** **p value = 0.890**	Gender	Yes (%)	No (%)
	Male	81.1	18.9
	Female	82.2	17.8
Have you faced any difficulty maintaining a routine during the pandemic? **Chi-Squared = 1.490** **p value = 0.222**	Gender	Yes (%)	No (%)
	Male	64.2	35.8
	Female	75.6	24.4
Have you ever felt lonely or isolated during the lockdown? **Chi-Squared = 3.270** **p value = 0.071**	Gender	Yes (%)	No (%)
	Male	66.0	34.0
	Female	82.2	17.8
Do you think that during the pandemic your mental health has been impacted (due to several reasons such as but not limited to: reduced physical activity, reduced interactions, COVID mitigation effects such as masks and social distancing)? **Chi-Squared = 2.758** **p value = 0.097**	Gender	Yes (%)	No (%)
	Male	62.3	37.7
	Female	77.8	22.2

Table 2: Cross Tabulation of responses to pandemic impact questions against gender for each question (N = 98: participants who preferred not to disclose their gender (4 respondents) were not considered in these calculations).

this with studies such as from Pierce, Matthias et al. (11). We found 75.6% of females in this study in 2022 scored above this threshold, as compared to 24.8% (2014–2015), 25.5% (2015–2016), 24.2% (2016–2017), 29.8% (2017–2018), 32.0% (2018–2019), and 44.0% in April 2020 for 16–24-year-old females reported in other studies (11). As for 16–24-year-old males, all corresponding percentages were lower than females with 15.3% (2014–2015), 14.0% (2015–2016), 15.6% (2016–2017), 17.3% (2017–2018), 17.6% (2018–2019), 27.1% (April 2020) as compared to 52.83% in 2022 (in this study).

This indicates how the pandemic has had a bigger impact on females' mental health than males'. Such outcomes have also been noticed in other similar studies performed on young adults which determined that females were more likely to have worse mental health during the pandemic (11). This may be due to various exacerbating factors such as pregnancy (however this would generally be low for this age group of 16–25 years of age), or low incomes as mentioned in another study (13). Teenage girls have poorer mental health than boys on average, and this evidence that COVID 19 increases the inequalities in mental health difficulties is concerning (14).

A few questions were also posed to participants to gain a general view of the overall mental wellbeing of young adults, showing whether the impact of COVID 19 has been positive or negative. It was noted that most participants indicated the pandemic had significant effects on their lives, as more than 50% of the participants agreed to the questions regarding problems faced during the pandemic. It also affected most participants' perception of their mental health. This shows how, in general, the pandemic was perceived to have a significant impact on the mental health of young adults, whether that impact may be in the form of weaker social connections, disrupted learning, uncertain routines or other ways. An average percentage of 71.8% answered "yes" for the questions about the detrimental impacts of the pandemic, supporting the hypothesis of an overall negative effect on the

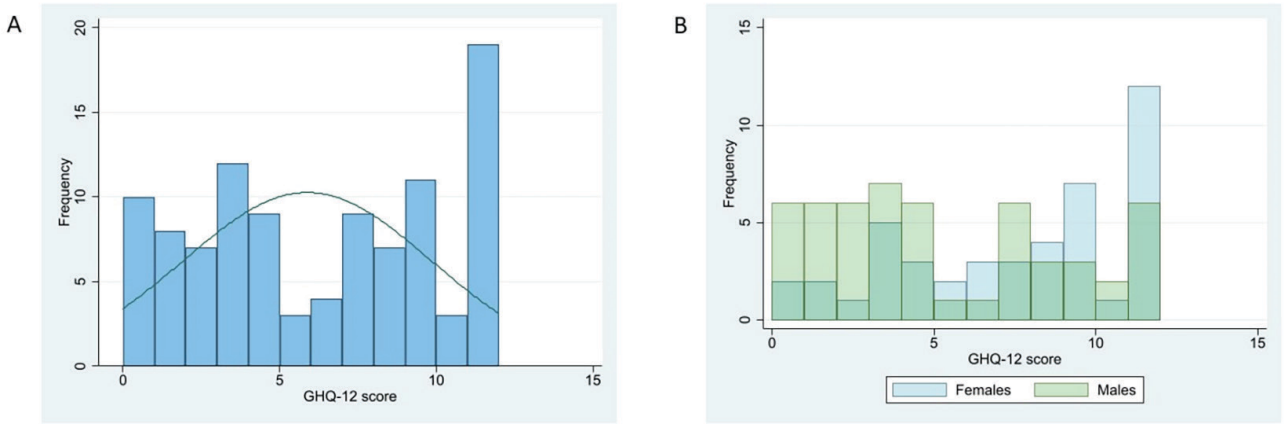

Figure 2: Histogram showing the frequency of each GHQ-12 score. (A) Histogram showing the frequency of total GHQ-12 scores across the study added using binary method (0–0–1–1), compared to the normal distribution bell curve (B) Histogram showing the frequency of each GHQ-12 score from 0 to 12 obtained by both males and females in the study.

mental health of young adults due to the pandemic.

These results are in line with the claims made by similar studies such as Liang and colleagues where it was concluded that 40.4% of the 584 youth described having psychological problems (15). Furthermore, a study by Zhou and colleagues found that among the 8079 participants of the study, nearly 40% exhibited symptoms of depression and anxiety. (16). These findings support the results concluded by this study, evidently suggesting that the pandemic did have, overall negative impacts, on the mental health of young adults.

This study further hypothesized that the most severely impacted age group would be 18–19-year-olds as they were in a transition period between high school and university during the first year of the pandemic. Participants within the age group 24–25 were less impacted by the pandemic compared to other age groups, as all cross tabulations revealed that most respondents of this age answered with "no" to the 6 pandemic impact questions illustrating the minimal impact that the pandemic has had on their mental wellbeing **(Table 1)**. However, there were not many participants in this older age group so we cannot be sure that these findings are robust, although the consistent pattern of results across the questions gives us some confidence that this is an accurate reflection. Participants aged 18-19 and 22-23 were found to be the most severely impacted by the pandemic. While the former age band was hypothesized to face the most impactful effects of the pandemic on their mental health due to their transition from school to university during the first year of the pandemic, 22–23-year-old participants also stood out with alarming results. This may have been due to travel restrictions imposed during the pandemic which could have made it difficult for university students of this age group of to stay connected with friends and family, impacting their mental health, as supported by a response to the survey which stated "increased feelings of loneliness" as a potential reason for the negative impacts of the pandemic (17).

	All	Females	Males
Median	6	8	6
IQR	6	7	6
Mean	5.76	7.18	4.83
Standard Deviation	3.91	3.69	3.77

Table 3: Median and inter-quartile range (IQR) of GHQ-12 scores of male and female participants.

However, this study also had a few limitations that must be considered for future investigations into similar research questions. Firstly, it was assumed that the participants of the study were enrolled in school, university, or another educational institution at some point during the pandemic and hence would be eligible to answer questions regarding learning being impacted during this time. However, this may not be entirely true as there was no question to confirm the attendance of an educational institution by the respondent during the pandemic. Hence, this is a vital limitation to this study. As an important extension of this limitation, it would also need to be confirmed how many of the 18–19-year-old participants who were speculated to have undergone a transition from school to university (which could have exacerbated the mental health impacts seen in this age group) did in fact make this shift, as this would help better gauge the extent to which this change in lifestyle affected mental health conditions. Furthermore, due to no responses from participants in the age group of 20–21, the study could not reflect the effects on their mental well-being. Therefore, studies into this age group would be necessary.

Lastly, mental well-being could also be impacted by proximity to friends and family, which is another factor that could be considered in future studies. For example, a study could be conducted to investigate how staying in a nuclear family during the pandemic would compare against living alone, in terms of the impact it has on the mental health of young adults.

In conclusion, we found that the younger end of our sample of young adults perceived serious detrimental impacts of the pandemic on learning, maintaining a routine, social connectedness, and mental health, with females being more heavily impacted compared to males.

MATERIALS AND METHODS

Design and Measures

An online survey allowing international participation

was used to collect perceptions of a varied sample of participants on the impact of COVID 19. The survey consisted of 22 questions (excluding the consent form), including 3 demographic questions. Some of the questions were designed by the students leading the study based on their background research and informed by discussions with peers (the pandemic impact questions), and we also included a validated measure of mental health symptoms, the General Health Questionnaire-12 (9). The pandemic impact questions asked were: "Have you found it challenging to stay connected with your friends during the pandemic?", "Do you think that the pandemic has disrupted your learning?", "Are you finding it hard to focus in distance learning?", "Have you faced any difficulty maintaining a routine during the pandemic?", "Have you ever felt lonely or isolated during the lockdown?", "Do you think that during the pandemic your mental health has been impacted (due to several reasons such as but not limited to: reduced physical activity, reduced interactions, COVID 19 mitigation effects such as masks and social distancing)?", and "If you have answered yes to the previous question, please explain how your mental health has been impacted? Feel free to add any other comments or thoughts you may have relevant to the topic".

Recruitment

Participants were recruited online through snowballing, using social media, and networks the researcher had already established. Snowballing refers to the accumulation of participants from a small population who then identify other potential participants. The snowballing technique is beneficial to recruit further participants for the study. It was hoped that a minimum sample of 50 participants from varied countries would be reached.

Interested potential participants were given a short overview of the study through the information sheet, followed by the consent form. They were made aware of the purpose of the research being conducted. When potential participants clicked the survey link, the first page comprised an information sheet explaining the topic matter in more detail, including what was expected from them. The information sheet also informed potential participants about how to withdraw their data. The survey questions were considered sensitive for some participants as they ask about mental health, however people considering participation were fully informed that this was the topic of the survey. The participants were not obligated to answer all the survey questions.

The data were stored on a password-secured online account, which only the researchers had access to through the researchers' institution. Consent form data and identifying information were separated and stored independently from the main dataset, which was anonymized. Consent forms were stored in a password-protected file in a separate folder and will be deleted when the results are published or a maximum of five years after data were collected.

Demographics

The survey collected a total of 111 responses between 24th January 2022 and 17th February 2022. Of the 111 responses, 102 were valid as 9 individuals did not give consent and so were redirected to the end of the survey, without their responses being recorded (valid response rate of 91.89%). The majority of the responses were from the UAE, alongside international responses from countries including the UK, India, United States of America, Andorra, Spain, Singapore, Kuwait, Oman, Saudi Arabia, and Canada. This was determined by analyzing the responses to the demographic question, "Which country were you residing in during the COVID 19 pandemic?" The survey was answered by 53 males (52%) and 45 females (44%) with 4 (4%) of participants preferring not to reveal their gender.

Age Group (years)	Number of Responses
16–17	80
18–19	11
20–21	0
22–23	7
24–25	4

Table 1: Number of respondents in each age group.

The majority (78%) of the participants that answered the survey were 16–17 years old followed by 18–19 years old (11%), with ages 22–23 and 24–25 taking up 7% and 4% respectively **(Table 4)**. There were no responses from participants in the age group of 20–21.

Analysis

Descriptive information about participants' country of residence, gender, and age were explored.

The responses made by the different age groups for the first part of the survey (Yes/No questions) were analyzed using chi-squared statistics and cross-tabulated to

investigate whether different age groups or genders perceived different impacts of the pandemic. GHQ by age wasn't analyzed due to the small number of responses under certain age brackets.

To answer the question of which strata of young adults were most affected by the COVID 19 pandemic, GHQ-12 was utilized. The GHQ-12 is a reliable and validated measure that captures current mental health, with particular focus on issues with confidence, social dysfunction, anxiety, and depression (18). Questions are based upon the respondent's recent experiences of their behavior and possible symptoms, rated on a four-point scale (0–3) (less than usual, no more than usual, rather more than usual, or much more than usual). The most common scoring types used are the bimodal (0–0–1–1), also known as binary, and Likert scoring methods (0–1–2–3). In this study, the overall GHQ-12 scores were added using the binary method (also known as the GHQ scoring method). This score then generates a total score ranging from 0 to 12, with higher scores indicating worse symptoms. It is widely used as a quick screening instrument by clinicians and researchers due to its simplicity and good levels of validity and reliability.

GHQ-12 responses given by males and females were split and compared to each other. A histogram was constructed

with the frequency of the GHQ-12 total scores being plotted and the distribution obtained was not normal **(Figure 2)**. Hence, the non-parametric Kruskal-Wallis (equality of populations rank) test was performed.

Received: July 19, 2022
Accepted: December 5, 2022
Published: July 31, 2023

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