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Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

ACKNOWLEDGEMENT

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Breaking Barriers in Mental Health: Novel Targets and Therapies for Depression and Anxiety

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Depression and anxiety are among the most prevalent mental health disorders, posing significant challenges to individuals and society. Despite the widespread use of selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs), many patients fail to achieve full remission or encounter debilitating side effects. This underscores an urgent need for innovative therapeutic approaches that go beyond traditional monoaminergic systems, targeting new pathways and mechanisms involved in these complex disorders.

Recent advances have highlighted promising therapeutic targets, including the glutamatergic system. Ketamine, an NMDA receptor antagonist, has demonstrated rapid and sustained improvements in mood, inspiring the development of drugs that modulate glutamate transmission. Other systems, such as neuropeptides like oxytocin and vasopressin, are gaining attention for their roles in emotional regulation, while the endocannabinoid system offers potential for regulating mood and stress response [1].

Another recent study have shown that ketamine may offer significant benefits for individuals with psychiatric conditions such as treatment-resistant bipolar depression. Evidence suggests that even a single dose of intranasal ketamine can produce swift antidepressant effects, offering an alternative option for patients unresponsive to standard treatments [2]

These novel approaches bring significant challenges with them. The safety profile of new agents must be rigorously evaluated to avoid unintended consequences, and regulatory barriers can delay the availability of innovative therapies. Moreover, the heterogeneity of depression and anxiety, influenced by genetic, environmental, and social factors, highlights the need for personalised medicine. Future research must prioritise understanding these differences to optimise treatment outcomes for diverse populations.

The exploration of novel targets and drugs signals a paradigm shift in the treatment of depression and anxiety, moving away from a one-size-fits-all approach toward tailored interventions. These advancements bring renewed hope to millions of patients worldwide, promising more effective, rapid, and sustainable relief. With ongoing research and careful clinical translation, these innovative therapies have the potential to transform mental health care in the coming decades.

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Original Article

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Knowledge, Attitudes, and Practices of Undergraduate Nursing Students Toward Evidence-Based Practice: A Cross-Sectional Study in Khyber Pakhtunkhwa, Pakistan

Saad Ur Rahman[1], Syed Babar Ali[1*], Shaier Khan, Abdullah[1], Laila Imtiaz[1], Irum Naz[1], Hajira Ubaid[1], Muhammad Ismail[1] and Hanif Ullah[1]

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ABSTRACT

Evidence-based practice (EBP) in nursing is the collective utilization of best evidence, clinical expertise, and patient preference. Limited studies were found regarding the EBP of nursing students. **Objectives:** To assess the knowledge, attitude, and practice (KAP) regarding EBP among undergraduate nursing students in District Mardan and to explore the relationship between demographic variables and students' attitudes and practices toward EBP. **Methods:** A descriptive cross-sectional design was employed, involving 111 4th-year undergraduate nursing students selected through a one-stage cluster sampling technique. Data were collected using a structured questionnaire comprising demographic details and the Students' Evidence-Based Practice Questionnaire (S-EBPQ), which was scored on a seven-point Likert scale. The internal consistency of the S-EBPQ was validated using Cronbach's Alpha ($\alpha = 0.82$). Data were analyzed using SPSS version 26.0, with independent t-tests and one-way ANOVA applied to examine the relationship between demographic variables and EBP attitudes and practices. **Results:** The analysis revealed that 70.2% of students exhibited a moderate level of EBP, with 48.4% demonstrating a highly positive attitude towards EBP. While no significant association was found between demographic variables and practice scores, the religious group variable was significantly associated with attitude scores ($p = 0.006$). Gender, though not significant, approached the significance threshold ($p = 0.078$). **Conclusions:** This study contributes to the limited body of research on EBP among nursing students in Pakistan, particularly in Khyber Pakhtunkhwa. It highlights the importance of demographic factors, especially religious background, in shaping students' attitudes toward EBP, suggesting the need for tailored educational interventions.

INTRODUCTION

Evidence-based practice (EBP) involves delivering comprehensive, high-quality care founded on the most current research and knowledge, rather than relying on traditional methods, advice from colleagues, or personal beliefs [1]. One of the recently published books elaborates on the term EBP as it is the use of the best evidence available to make decisions and to provide quality care [2]. With this, the clinical expertise and patient preferences differentiated EBP from research utilization [3]. The way to adopt evidence-based nursing is through five steps: asking a clear question, acquiring evidence by looking into the literature, comparing it for valid and reliable rationale, making decisions based on the most reliable and recent information, and evaluating the outcome of the implementation [4]. The attitude of upcoming graduates toward EBP, the knowledge they keep about it, and its utilization in practice are explored by nursing researchers worldwide. EBP has become essential for nursing professionals to support their practice [5,6]. The attitude of senior nursing students who are actively involved with the Registered Nurses in preparing the care plan and its implementation under supervision are evaluated in different studies [7,8]. The nursing administration would support and facilitate the application of knowledge to prepare nursing students for its implementation in clinical rotations [9,10]. The delivery of knowledge through

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workshops and regular training courses are effective interventional strategies for improving EBP in critical care settings [11]. The education and training not only deliver the knowledge but also enhance the attachment of the nurses and nursing students' attitude to EBP [12]. A study conducted in Qatar found that half of the nurses were unfamiliar with the term "EBP." [13]. The knowledge of EBP when delivered at the undergraduate level leads to minimizing the barriers and increases the use of EBP [12]. Numerous studies highlight the involvement of nurses and nursing students in evidence-based practice (EBP) within Pakistan. The bachelor's degree nurses are more determined and aware of EBP and its implementation than diploma nurses in Lahore [14]. The study conducted in Multan reported the higher attitudes and beliefs of nurses toward EBP with the indication that most nurses are interested in improving their skills to carry out EBP [15]. A study found that poor research knowledge, lack of time, unsupportive administration, and limited resources hinder evidence-based practice (EBP). Furthermore, registered nurses reported low engagement in EBP. [16]. On the contrary, the study in the Government Hospital Lahore indicated a satisfactory level of awareness about EBP with poor implementation at the bedside [17]. EBP has become a priority topic for researchers in these decades such as empirical studies in Asia and Africa [12]. Studies must offer solid literature to develop nursing curricula on evidence-based practice during appropriate transitions. [18]. Furthermore, a few studies related to this context in Pakistan especially in Khyber Pakhtunkhwa make this study more significant.

This study aimed to fill the gap in the literature by assessing the knowledge, attitude, and practice of nursing students in the region of Khyber Pakhtunkhwa, Pakistan.

METHODS

The study targeted undergraduate nursing students who had completed their clinical rotations at a tertiary care hospital in District Mardan. A descriptive cross-sectional study was conducted across nursing colleges in District Mardan, Khyber Pakhtunkhwa, Pakistan, during 3 months from May to July 2024. The sample size was determined using the RaoSoft sample size calculator, assuming a 7% margin of error, a 95% confidence level, a population size of 250, and a response distribution of 50%, resulting in a calculated sample size of 111. To enhance the generalizability of the findings and for feasibility, a one-stage cluster sampling technique was employed. Nursing colleges within District Mardan were selected through simple random sampling, and then all 4th-year students from the selected colleges were included in the study. The research instrument was structured into two primary sections: (1) demographic data, which included variables such as age, gender, semester, latest semester GPA, college name and status, and academic status; and (2) the Student Evidence-Based Practice Questionnaire (S-EBPQ), which comprised 21 items rated on a seven-point Likert scale. The questionnaire was divided into four subscales: practice of EBP (6 items), attitude toward EBP (3 items), retrieving and reviewing evidence (7 items), and sharing and applying EBP (5 items). The S-EBPQ, originally developed by Upton & Upton in 2006, was utilized in this study with formal permission from the original authors. It was already used for the same study domain globally. The tool was employed as it was with the addition of the first section that contains participant demographics as mentioned above and uses simple synonyms that are locally utilized in Pakistan. Each subscale was categorized into three equal intervals based on the equal interval classification method by U.S Census Bureau, 1997. The internal consistency of the S-EBPQ was evaluated using Cronbach's Alpha, which yielded a value of 0.82, indicating a high level of reliability and internal consistency across the items. Ethical approval for the study was secured from the Institutional Review Board (IRB) of MTI Mardan (No.494/BKMC). Following this, permission was obtained from the relevant authorities at the selected nursing colleges, and the questionnaires were manually distributed to students during their class sessions. Prior to data collection, students were provided with detailed information regarding the study, and consent was obtained from those who agreed to participate voluntarily. The collected data were analyzed using SPSS software, version 26.0. Demographic variables and data from the research instruments were input into the software, and the information was converted into numerical and categorical formats to ensure confidentiality. Total scores and equal intervals were calculated using Microsoft Excel, 2020. The overall results were presented descriptively, with demographic variables summarized in tabular form. The results derived from the research instruments were also presented in tables. A significance level of $p \leq 0.05$ was adopted for all statistical tests. To explore the relationships between demographic variables and students' attitudes and practices toward EBP, two tests were conducted. The one-way ANOVA was applied to compare the CGPA variable with the practices and attitude scores while the independent t-tests were applied to compare the practices and attitude scores with the gender, religious group, and student affiliation variables of the participants.

RESULTS

The questionnaires were distributed among the students, resulting in a total of 124 responses. Table 1 provides a demographic profile of the participants, detailing variables such as gender, age, religious group, student affiliation, and CGPA. Among the 124 respondents, 79 were male, and 45 were female. The majority of the participants identified as Muslim. Statistical analysis revealed that over half of the students were enrolled in private institutions, while 40.3%

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were attending government colleges. Additionally, the mean and standard deviation for both age and CGPA were calculated and are presented in Table 1.

Table 1: Demographic Profile of study participants

Variables		Frequency (%age)
Gender	Male	79 (63.7%)
	Female	45 (36.3%)
Religious group	Muslim	122 (98.4%)
	Christian	2 (1.6%)
Student Affiliation	Govt institutes	50 (40.3%)
	Private institutes	74 (59.7%)
		Mean ± SD
Age (yrs.)		22.46 ± 0.966

The analysis of the S-EBPQ revealed that the majority of students (70.2%) demonstrated a moderate level of EBP with 19.4% of high-level and 10.5% of low-level EBP. A significant portion of the students (48.4%) displayed a highly positive attitude toward EBP while 37.1% moderate positive and 14.5% marked a negative attitude toward EBP. Most students (68.5%) rated their ability to retrieve and review evidence at a moderate level as well as 18.5% high level and 12.9% low-level retrieve and review the EBP. Additionally, 54.0% of the participants scored highly in the sharing and application of EBP with 38.7% moderate level and 7.3% low level of sharing and applying the EBP (Table 2).

Table 2: Knowledge, Attitude, and Practice of Nursing Students Regarding EBP*

Subscale Practice	Frequency (%)
Practice	
Low level	13 (10.5%)
Moderate level	87 (70.2%)
High level	24 (19.4%)
Total	124 (100.0%)
Attitude	
Negative Attitude	18 (14.5%)
Moderative Positive Attitude	46 (37.1%)
High Positive Attitude	60 (48.4%)
Total	124 (100.0%)
Retrieving and Reviewing	
Low level	16 (12.9%)
Moderate level	85 (68.5%)
High level	23 (18.5%)
Total	124 (100.0%)
Sharing and Applying	
Low level	9 (7.3%)
Moderate level	48 (38.7%)
High level	67 (54.0%)
Total	124 (100.0%)

To explore the relationship between demographic characteristics and students' practices regarding EBP, a mean comparison analysis was conducted. The independent t-test was applied to assess the differences in practice scores across gender, religious group, and student affiliation, while one-way ANOVA was used to compare these scores with CGPA. The practice scores were compared across gender, religious group, student affiliation, and CGPA, with no significant values found. Notably, the calculated p-value for gender was 0.078, which is close to the significance threshold of ≤ 0.05 (Table 3).

Table 3: Mean Comparison of Practice Score with Participant's Demographics

Variables	Total	Practice Score (Means ± SD)	p-value
Gender			0.078
Male	79	2.06 ± 0.606	
Female	45	2.13 ± 0.405	
Religious Group			0.611
Muslim	122	2.10 ± 0.536	
Christian	2	1.50 ± 0.707	
Student Affiliation			0.853
Govt Institutes	50	2.14 ± 0.495	
Private Institutes	74	2.05±0.571	
CGPA			0.119
Below 3	43	1.95±0.575	
3.0 to 3.5	71	2.17±0.534	
Above 3.5	10	2.10±0.316	

Independent t-test and one-way ANOVA test applied,p-value ≤ 0.05

Similarly, a mean comparison analysis was implemented with an independent t-test and one-way ANOVA test with the same criteria to show the relationship between demographics and student's attitudes toward EBP. The analysis revealed that the religious group was a significant factor, with a p-value of 0.006. However, no other demographic variables, including gender, showed significant associations with students' attitudes toward EBP. Similar to the practice scores, gender was also found to be statistically insignificant but was close to the threshold p-value (Table 4).

Table 4: Mean Comparison of Attitude Score with Demographics

Variables	Total	Attitude Score (Means ± SD)	p-value
Gender			0.917
Male	79	2.24 ± 0.720	
Female	45	2.51 ± 0.695	
Religious Group			0.006
Muslim	122	2.36 ± 0.705	
Christian	2	1.00 ± 0.000	
Student Affiliation			0.427
Govt Institutes	50	2.48 ± 0.735	
Private Institutes	74	2.24 ± 0.699	
CGPA			0.080
Below 3	43	2.23 ± 0.718	
3.0 to 3.5	71	2.34 ± 0.736	
Above 3.5	10	2.80 ± 0.422	

Independent t-test and one-way ANOVA test applied, p-value ≤ 0.05

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DISCUSSION

On analysis, the data revealed that nursing students have a moderate level of EBP while in them, highly positive attitudes toward EBP and a high level of sharing and applying the knowledge of EBP were found. Although the association of gender with the practice scores is not significant, the data analysis revealed that male students are reported to do EBP more than female students. In the previous literature, the author points out the positive attitude of nursing students toward EBP at Columbia [19]. The same was reported in Australia which has a positive attitude among students toward EBP [20]. Moreover, a survey shows a positive relationship between attitude with nursing student competence [8]. The current study's finding of highly positive attitudes is on the other side opposed to the studies in Kosovo that reported lower attitudes [12]. According to the study findings of the moderate level practice of students, no such study rules out a high level of practice of undergraduate students as they have moderate and low evidence-based nursing practice [10,15]. While the previous literature suggests that EBP is necessary for undergraduate students [21]. In this study, the knowledge of the participants is categorized by retrieving and applying it in practice. The previous researchers have different findings of knowledge regarding EBP. The study in Lahore and Jordian nurses shows less awareness related to EBP [17,18]. A study conducted on graduated nurses describes that more than half of them did not know the term EBP [13]. Yet, young nurses are reported to have more Knowledge of evidence-based nursing which is the same as the current study finding where participants scored moderate to high to share, retrieve, and apply the Knowledge of EBP [6]. The association of religious groups with attitude was found in the current study while most of the previous studies show insignificance with many demographics except a few of them. A study conducted on graduated nurses in Bahrain reported a significant association of knowledge regarding EBP with a working setting [22]. At the undergraduate level, studies are more focused on assessing and analyzing knowledge, practice, and attitude levels. Furthermore, the study participants all belong to the institutes in one district. Also, the participant's religious groups are not enough to generalize these findings to them. This study is limited to the assessment of student's knowledge attitude and practice level. Other study designs needed to be applied in this domain and take a large enough sample size that contains participants from different regions and different religious groups. Moreover, the role of the institute, hospital policy, and administration also provides a gap for further study concerning EBP among undergraduate nursing students.

CONCLUSIONS

In conclusion, the study reports moderate to high levels of knowledge, highly positive attitudes, and a moderate level of practice among nursing students regarding EBP. The religious group was found significant in the study. Furthermore, the nursing literature is developed in this context in the Khyber Pakhtunkhwa. The findings can be used in policy-making for educational and administration purposes that certainly improve the nursing practice.

Authors Contribution

Conceptualization: SBA, SK
Methodology: SUR, LI, IN
Formal analysis: A, LI, HU, MI, SBA, SK
Writing, review and editing: SK, SUR, HU

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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Association of Hikikomori Syndrome Symptoms and Internet Addiction in Young Adults

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ABSTRACT

Hikikomori syndrome is no more a Japanese phenomenon as it has been rapidly spreading across the globe, especially in South Asian countries. Among those individuals who tend to confine themselves within the walls of their homes, internet addiction has turned out to be a major component further fueling the isolation. **Objectives:** To explore the association between internet addiction and Hikikomori symptoms and to assess gender differences in Hikikomori symptoms and internet addiction. **Method:** This cross-sectional research study assessed 318 individuals attending a private university in Lahore. The participants for this study were selected through a non-probability purposive sampling technique and included 23% men and 75% females, and 1.6% selected '3'(rather not say) while two respondents did not provide gender information. Structured measures with well-established psychometric features were used to collect data. **Results:** Participants who felt socially isolated and lacked emotional support might have stronger internet addiction ($p<0.05$). Meanwhile, there weren't big differences between men and women in how isolated they feel ($p>0.05$), but men scored significantly higher than women on the socialization and emotional support domain ($p<0.05$). Men also tended to be more addicted to the internet than women ($p<0.01$) in the present study. However, demographic variables when correlated with Hikikomori and internet addiction, showed varying patterns of association. **Conclusions:** It was concluded that findings provided significant insights into internet addiction and socialization, isolation and emotional support dimensions of hikikomori syndrome in young adults in Lahore.

INTRODUCTION

The two major psychological consequences of pandemic restrictions were noted to be the higher incidence rates of hikikomori symptoms [1] and internet addiction particularly among young adults [2]. The term Hikikomori emerged in the late 1970s and became extremely popular by the end of the 80s and 90s decades primarily to describe the cases of social withdrawal among young adults in Japan [3] but later was observed in many other countries [4] including the increasing incident rates among Asian countries [5] which makes it relevant to study this new silent pandemic in Pakistan as well. Hikikomori describes a phenomenon where young adults continuously withdraw from social situations, isolating themselves at home for prolonged periods; sometimes lasting years [6]. This withdrawal is typically marked by disinterest in school or work and minimal interaction with family and friends. It's a complex issue influenced by psychological, sociocultural, and economic factors, contributing to its development and endurance [7]. Determining the precise prevalence of Hikikomori poses a considerable challenge due to data limitations globally. Estimates vary but with figures ranging from over one million cases to approximately 410,000 cases, studies have reported over 14,000 consultations related to Hikikomori within a single year, highlighting the substantial number of individuals seeking assistance for this phenomenon [6]. Hikikomori has turned out to be an emerging and distinctive condition marked by profound social withdrawal, indicating its relevance in contemporary

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discourse on mental health and social behaviour [7]. Psychological factors, notably mood and personality, were common triggers for Hikikomori, especially among teens. Social and cultural influences were significant in most countries, except Bangladesh and Iran. Parental influences were also termed notable however Japanese psychiatrists valued psychosis, mood, and personality equally, while others emphasized mood and personality, especially in teens [8]. Individuals suffering from this disorder hinder familial interaction; they immerse themselves in extensive internet usage, reserving outdoor activities solely for dire necessities. A significant portion of Hikikomori individuals devote more than 12 hours daily to computer activities leading over half of these individuals at the risk of internet addiction [9, 10]. Internet addiction is characterized as a behavioural disorder which is a result of excessive and compulsive use of the internet through various formats resulting in individuals neglecting their mental and physical health while also experiencing withdrawal symptoms [11]. The American Psychiatric Association's decision to include Internet use disorder in the Diagnostic and Statistical Manual for Mental Disorders (DSM-5) highlights the seriousness with which internet addiction is regarded clinically. This recognition aligns with findings that internet addiction shares similarities with substance-related addictions, evidenced by symptoms like mood modification, salience, tolerance and withdrawal [12]. Hikikomori typically manifests later, around the average age of 22.3 years, suggesting a potential progression from earlier withdrawal tendencies to more severe isolation [10]. In contrast, internet addiction in adolescence, particularly among boys, could be influenced by factors such as greater access to technology, peer influences, and societal expectations regarding online engagement [12, 13]. Boys may be more prone to extreme internet usage due to a combination of cultural norms, social pressures, and specific interests or activities available online [13]. The widespread internet addiction worsens this isolation, leading to psychological distress and withdrawal from society. Consequently, Hikikomori arises as a manifestation of these complex societal shifts, where individuals retreat from real-world interactions into the safety of their virtual worlds [14]. Specific socio-economic circumstances in Japan and other Asian-Pacific nations, such as intense academic pressure and limited employment prospects, intensify feelings of alienation and disengagement from society, amplifying the widespread of Hikikomori [8]. Internet addiction has been linked to measured levels of depression and signs of being socially isolated [12]. In many cases, social isolation symptoms have resulted in shame from the families of the individuals which hinders the need to seek help [15]. For those individuals who are already experiencing withdrawal symptoms, the internet acts as a deadly contributing factor by further deteriorating their emotional, social and physical well-being as these individuals find solace in the internet, fostering feelings of isolation and largely affecting socialization tendencies [16, 17]. As traditional social structures have evolved and emphasized individualization, communal ties weaken, leaving individuals, especially young people, feeling disconnected and marginalized [18]. The breakdown of traditional social bonds and emphasis on personal autonomy exacerbate feelings of isolation, paving the way for Hikikomori [19]. Individuals at times find it challenging to navigate new situations or social environments due to their fear of failure and rejection. This fear leads them to withdraw from social interactions as a way of protecting themselves from potential negative outcomes, their withdrawal serves as a defence mechanism against the perceived threats of failure and rejection in social settings [20].

This study aims to explore the association between Hikikomori and internet addiction in young adults and assess gender differences for both Hikikomori and internet addiction among young adults.

METHODS

A cross-sectional study was employed using non-probability convenient sampling technique to select the sample of 318 participants attending a private university in Lahore. The sample size was calculated using g-power analysis. Participants were enrolled in undergraduate and postgraduate courses as regular students. The sample included 73 men, and 238 women whereas 7 individuals did not reveal their gender. The sample's age was between 17 and 26 years [M=21.55 ± 2.02 years]. All participants signed an informed consent form containing information on the participant's rights, and the description and purpose of the research. A demographic form was designed for this study and recorded the general information of all the participants which included information about age, gender, year of study, family system, monthly income, impact of internet consumption and the number of hours spent on the internet. The Hikikomori symptoms were assessed by using the 25-item Hikikomori questionnaire (HQ-25) recording responses on 25 statements through 4 point Likert scale. HQ-25 had 3 subscales including socialization, isolation, and emotional support with internal consistency reported to be 0.94, 0.88 and 0.89 respectively and validity indices ranging from 0.81 to 0.88. The cut-off score was 42, a score above 42 used as an indicator of high risk of hikikomori syndrome [21]. To assess the internet addiction tendencies in participants, the Internet Addiction Test (IAT) was used. IAT is 20 items scale and respondents rate each question on a 5-point Likert scale with the internal consistency reported to be 0.91. The scoring categories were determined using the response description guidelines provided by the authors, a score above 31 indicated internet

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addiction [22]. The design and procedures were finalized keeping in mind the ethical standards and the procedures were approved by the concerned ethical and research review board of the Department of Psychology Forman Christian College and University, Lahore through letter number EERC-116-11-2022. The data were collected between August and October 2023 and all the participants filled out the questionnaires in English language and followed the same sequence of questions. All the measures were taken to keep the information anonymous and confidential and participants were thanked for their time. Special considerations were taken into account particularly seeking formal permission before using the study measures, informed consent was sought after sharing the ethical standards, particularly regarding voluntary participation, the right to withdraw, confidentiality and privacy and the right to know the results with the participants. The data were analyzed using statistical software of SPSS IBM version 23.0. Descriptive analysis included the calculation of frequencies, percentages, mean and standard deviations, these procedures helped summarize the demographic characteristics and main study variables. The association between hikikomori symptoms score, internet addiction and demographic variables was assessed through correlation analysis, whereas, a t-test was run to assess the gender-wise score differences in hikikomori symptoms scores and internet addiction score.

RESULTS

A descriptive analysis of the demographic characteristics of the respondents revealed that 26% percent of respondents lived in joint families and 74% lived in nuclear families. On average the time respondents spend on the Internet is 7.7 ± 1.90 hours a day and 53% reported that the Internet negatively affected their studies and other aspects of life (Table 1).

Table 1: Demographic Characteristics of the Participants

Subscale Practice	F (%)
Gender	
Men	73 (%)
Female	238 (%)
Family system	
Nuclear	235 (74%)
Joint	83 (26%)
Duration of Internet Use	
Less than 3 hours a day	59 (19%)
Up till 6 hours a day	131 (41%)
More than 6 hours a day	128 (40%)
Dysfunctional Impact of Internet Use	
Yes	168 (53%)
No	150 (47%)

Women participants outnumbered men significantly in this sample. Participants who spent up till 6 or more than six hours a day is almost same, whereas, majority of the participants acknowledged that the use of internet adversely impacted their lives.

Table 2: Correlation between Hikikomori and Internet Addiction

Variables	1	2	3	4
Socialization	-	-	-	-
Isolation	0.712**	-	-	-
Emotional Support	-0.428**	0.316*	-	-
Internet Addiction	-0.225*	0.265**	0.112	-

**p<0.01(2-tailed), *p<0.05

Almost 31 percent of participants scored above the cutoff point of hikikomori syndrome with men making most of the participants in moderate risk of hikikomori syndrome category. The moderate inverse correlation between socialization and IAS total scores suggests that individuals who score higher on socialization tend to have a slightly lower tendency towards internet addiction. A moderate positive correlation between isolation and IAS suggested a stronger internet addiction among those who are more socially isolated. Individuals with higher perceived emotional support had a lower tendency towards internet addiction, but this association was insignificant (Table 2).

Table 3: Correlation of Hikikomori Symptoms, Internet Use and Demographic Variables

Variables	Income	Age	Family Systems	Daily Internet Use	Perceived Impact of Internet Use
Socialization	-0.18*	-0.17*	-0.20*	-0.26*	-0.18*
Isolation	-0.27*	-0.20*	0.23*	0.24*	0.28*
Emotional Support	-0.19*	-0.31*	-0.18*	-0.20*	-0.32**
IAS	0.57**	-0.42**	0.38**	0.33**	-0.29**

**p<0.01, *p<0.05(2-tailed)

The analysis of the relationship between Hikikomori symptoms and demographic variables revealed interesting trends. The weak negative correlation observed between socialization, emotional support and monthly family income (p<0.05) suggests that those with higher income were less social. Similarly, an inverse correlation between isolation and monthly family income (p<0.05) indicated that lower income was associated with more isolation. These findings suggest that monthly family income appeared to be a significant correlate of Hikikomori symptoms in this sample. Age also showed an inverse correlation with all dimensions of Hikikomori symptoms, indicating that younger age was associated with restricted socialization, more isolation and lack of emotional support. Meanwhile, those living in the nuclear family system had lower scores on socialization and emotional support; participants of nuclear family systems were more likely to experience more isolation, however. People who socialize more tend to perceive less negative impact of internet use on their daily

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lives (p<0.05). Those experiencing more isolation tend to perceive a greater negative impact from internet use on their daily lives, particularly on studies. Individuals with better emotional support available were observed to have related lower perceived negative impact of internet use on daily life (p<0.01). Individuals with higher socialization levels (p<0.05) and better emotional support showed lower daily internet consumption. However, stronger feelings of isolation were associated with more daily internet consumption (p<0.05). Meanwhile, a significant negative correlation showed that those who perceived internet use to hurt their lives had lower levels of internet addiction (p<0.01)(Table 3).

Table 4: Hikikomori Symptoms Scores of Men and Women

Measure	Gender	Mean ± SD	T	Df	p-value	95% CI	Cohen's d
Socialization	Men*	21.93 ± 5.772	3.78	309	0.0002	1.32 - 4.21	0.496
	Women**	19.16 ± 5.387					
Isolation	Men	15.89 ± 4.783	1.294	309	0.19	-0.46 - 2.24	0.177
	Women	15.00 ± 5.244					
Emotional Support	Men	12.63 ± 3.661	4.130	309	0.000	0.97 - 2.74	0.535
	Women	10.77 ± 3.271					

Note.* Men (n=73), ** Women (n=238)

Further study presents the gender-wise distribution of main scores indicating that the scores of men and women revealed mixed trends; the difference in scores of isolation (p>0.05) was not strong enough to meet the usual standards for statistical significance. However, scores on socialization and emotional support conclusively suggested significant differences in men and women on these two dimensions (Table 4).

Table 5: Internet Addiction Differences between Men and Women

Measure	Gender	Mean ± SD	T	Df	p-value	95% CI	Cohen's d
IAS	Men	50.63 ± 17.921	4.043	309	0.0001	4.83-13.98	0.535
	Women	41.22 ± 17.230					

Table 5 indicated that there was a statistically considerable difference in IAS scores of men and women (p<0.001) indicating that men tend to have higher levels of internet addiction tendencies as compared to women

DISCUSSION

For years Hikikomori syndrome has been defined as a culturally specific phenomenon restricted to a few countries and or racial groups [6]. However recent years have seen a significant presentation of the Hikikomori symptoms in other countries as well particularly after covid-19. A strong positive association was observed between Hikikomori symptoms and internet addiction in the present sample which aligned well with the findings of other studies that particularly observed these two phenomena among high school and university populations [23]. The reason might be that Hikikomori syndrome and internet addiction share similarities in symptoms primarily the lack of interest in everything followed by isolation. However, internet addiction involves tolerance and withdrawal symptoms, while functional impairment is presumed to stem from the addiction. For this overlap, previous studies have reported that up to 56% of Hikikomori individuals may be at risk of Internet addiction, with 9% diagnosed as addicted to the internet in South Korea [15]. This also supports the findings of the present study which revealed a significant association between these two variables. Individuals experiencing Hikikomori symptoms retreat into isolation as a form of passive rebellion against societal expectations, often seeking solace in the virtual world. This exacerbates their real-life challenges and sometimes the individuals get excessively engaged with online platforms, to cope with mood swings and escape reality [17] and those patterns of association were noted in the findings of the present study. The data from recent studies suggests gender disparity in internet addiction, with men being more likely to be addicted to the internet compared to women as several studies found that a higher proportion of male respondents exhibited dependent or pathological internet usage compared to females [24]. Present study findings also align with the idea that males are more prone to internet addiction compared to females. However, some studies found no significant gender differences in internet usage and or addiction. The discrepancy in findings could be the result of variations in methodology, sample characteristics and the methods of data collection [11]. The researches were conducted in sociocultural contexts significantly different from the Pakistani context, these contextual variations must have led to score variations. Another reason might be that internet access is more readily available to men compared to women contributing to higher scores of internet addiction. Increased internet use is also correlated with socialization scores as well in males as they may find solace in the internet to socialize which in turn leads to high scores on isolation as well [25]. Several studies link Hikikomori symptoms and internet addiction with various factors like psychological triggers, cognitive dysfunctions, age, gender and familial dynamics, and lack of social support which further explains how individual experiences and broader social contexts shape these two phenomena. Families which overprotect and over-indulge with their children economically or emotionally result in their kids experiencing social withdrawal [18, 19] this can be easily applied to the Pakistani cultural context as a collectivistic culture where families indirectly contribute to social withdrawal in an attempt to protect children,

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whereas lack of social support from family's result in social isolation linked with internet addiction [16]. This is highlighted in the present findings which linked hikikomori and internet addiction with family dynamics. Another study conducted in Pakistan observed higher hikikomori symptoms in those between 22 and 25 years of age [26] but current findings showed an opposite trend, the difference might be attributable to differing sample characteristics. In the present analysis, significant gender differences were evident when it comes to Hikikomori, as men reported to have significantly higher scores which correlates with findings of other studies reporting that men tend to score higher on Hikikomori symptoms [27]. Social isolation was the only dimension where men and women showed small differences in their scores, this diverged from the findings of studies conducted in other countries. The present study is one of the initial studies providing information on hikikomori symptoms in Pakistan. Despite some of the limitations involved in the study, the findings will help provide preliminary information on this new social disorder becoming prevalent at a very fast pace.

CONCLUSIONS

It was concluded that Hikikomori symptoms are associated positively with internet addiction in young adults and reveal significant gender differences. These findings will help understand the typography of hikikomori and design management strategies to counter its adverse impacts on young adults.

Authors Contribution

Conceptualization: AN, HS
Methodology: AN, HS, AS, SS
Formal Analysis: KI, IS, HS, AS
Writing Review and Editing: AN, HS, AS, KI, IS, SS.

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Knowledge and Attitude Regarding Nosocomial Infections among Nursing Students in Private Institute in Khyber Pakhtunkhwa

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ABSTRACT

Nosocomial infections are a severe global health challenge with the worst happening in low- and middle-income countries. It contributes to morbidity, mortality, and healthcare costs. Prevention education among healthcare professionals, most especially nurses and nursing students, is the backbone of reducing their prevalence. **Objective:** To assess nursing students' knowledge and attitudes toward HIAs to bridges that gap by improving training with effective infection control practices within the health care setting. **Methods:** A cross-sectional descriptive study was carried out on 80 nursing students with simple random sampling from a private nursing institute in Pakistan. Their knowledge and attitudes toward Healthcare-Associated Infections (HAIs) were assessed through structured, validated questionnaire. **Results:** The knowledge assessment showed 63% had poor knowledge regarding HAI, 30% had fair knowledge, and 7% showed good knowledge. Among the questions, the question that elicited the highest correct response was for the general definition of HAI at 78%, while prevention strategies elicited only 27% correct responses. Regarding attitudes, 70% students gave a negative attitude toward HAI, and 27% gave a fair attitude, while only 3% reflected a positive attitude. **Conclusions:** Nursing students lacked knowledge and have negative attitudes toward HIAs. The study highlighted targeted educational interventions to build nurses' knowledge and attitudes toward HAIs. Better adherence of infection control protocols can be ensured by improving training programs, leading to a reduced burden of HAIs in healthcare settings.

INTRODUCTION

A nosocomial infection or Healthcare-Associated Infections (HAI) is an infection acquired in a healthcare facility that was not present at the time of a patient's admission. These infections are also called "hospital-acquired infections"[1]. A HIA is an infection or illness one acquires after spending 48 hours or more in the hospital following admission. HIAs lead to prolonged hospital stay, long-term incapacity, increased resistance of pathogens to antimicrobials, enormous additional costs for health systems, huge costs to patients and their families, and unnecessary deaths [2]. HIAs are one of the most important problems of the health care system, and one of the top goals of a hospital's quality management system is the efficient control of hospital infections. The list of possible adverse events for which adequate corrective and preventive measures are elaborated should include hospital infections, considering concern about the safety of patients and the quality of the services reduced [3]. HIAs are one of the most significant causes of many health problems and expenditures among patients and hospitals. Hand hygiene compliance acts as an important tool for the effective control and prevention of transmission of HIAs. It remains unfortunate that unestablished knowledge and attitude towards hand hygiene among students and unavailability of some basic facilities for hand hygiene pose a risk in the transmission of HIAs [4]. One of the studies

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showed that one of the main reasons of HAI are the lack of knowledge, attitudes, and behavioral intention regarding hand hygiene among medical and nursing students [5]. HIAs prevalence rates in developed countries are 7%, and in underdeveloped countries 10% and, in Iranian hospitals, 4.6% [6, 7]. Moreover, a study revealed that knowledge and performance of nursing students, as future nurses, play a great role in controlling HIAs [6]. However, it would also be important to identify their level of knowledge to correct any deficiencies they face [8]. A research study concluded that the sum of the average score of student nurses' awareness on the HIA knowledge level was beyond the moderate level [9]. Another study highlighted that there is a need for frequent education and training programs in primary training time to retain knowledge about HIAs and reinforce the principles of standard precautions and hand hygiene [10]. It is observed in a study that knowledge regarding HIAs among students of health care and control measures has been adequate. However, more practical components of hand hygiene and standard precautions in future educational approaches would be better effective [11]. Knowledge and practices of nursing staff were also good beside nursing students, according to facility types, participants knowledge level in private hospitals was better compared to public hospitals, but practice levels are higher among the participants from public hospitals [12]. Nursing and health care professionals in general possess good knowledge and a positive attitude towards HIAs, as well as infection control practices. However, scarcity of literature has been found in the local Pakistani context on this topic.

The study bridged that gap by assessing nursing students' knowledge and attitudes toward HIAs for improved training with effective infection control practices within the health care setting.

METHODS

A descriptive cross-sectional study was conducted in a private nursing institute, in Khyber Pakhtunkhwa Pakistan, among nursing students. The study period for this study was three months, spanning from August to October 2024. During this time, data were collected, analyzed, and findings were documented. The structured questionnaire was distributed via Google Forms, ensuring ease of access and cost-effectiveness. Participants completed the survey after providing informed consent. This study focused on the knowledge and attitudes regarding nosocomial infections among nursing students in a private institute in Khyber Pakhtunkhwa. The selection of a private institute allowed for an in-depth analysis within a specific academic and training environment, offering valuable insights into the educational standards and awareness levels in such settings. The simple random sampling technique was utilized and finally 80 participants were recruited. A structured, and validated questionnaire was used for assessing knowledge and attitude of nursing students toward HIAs. The questionnaire has two main components the first, part is about demographic information, and the second part is about the knowledge and attitude regarding HAI. Those questions included some topics on the aspect of HIA. Every question holds two choices of false and true that is, 0 and 1 respectively. The knowledge level had been divided into three categories that are poor, fair, and good. Scores less than 50% represented inadequate knowledge, 50-75% fair knowledge, and above 75% good knowledge. Then, the questionnaire had five attitude statements regarding HIA. The answer scale used was Likert-type, with five points, which the scale was running as "Strongly Agree (5) to Strongly Disagree (1)". Attitudes were ranked to be one of three levels based on score. A score of 12 or less indicated poor attitude, scores from 13-18 represented fair attitude, and scores from 19-25 signified good attitude. The sample size of 80 participants, determined using OpenEpi software and eligibility criteria, may limit the generalizability of the findings. A larger sample size could provide more robust and representative data. The study was conducted at a single private nursing institute in Khyber Pakhtunkhwa, which may not fully capture the diversity of nursing students' knowledge and attitudes in other institutions or regions. As nursing students only from selected institute were approached, nursing from other institutes were not considered. Google Forms was chosen for data collection due to its accessibility, cost-effectiveness, and ease of distribution across geographically dispersed participants. A Google Forms online questionnaire was distributed through WhatsApp. Information about the study, its aims, and guidelines for answering the questionnaire were given to participants. The respondents were taken through a completed online questionnaire upon seeking consents. This study took three months from September to November 2024. Repetition of responses was an issue controlled by the number of times a participant took the survey. Data were analyzed with SPSS version 26.0. For all of the above-mentioned study variables which are approximately normally distributed, mean and standard deviation were calculated. For those variables that were not normally distributed, median along with Interquartile Range (IQR) was calculated. For categorical variables, frequencies with percentages were calculated for them. Chi-square or Fisher's exact test was applied to assess association with demographic variables.

RESULTS

It had 80 nursing students, of which 45% (n=36) were the second years, and the rest 55% (n=44) were third years. Gender distribution was according to a few female students, since 85% (n=68) were males and only 15% (n=12) were females. Age ranged from 17 to 25 years. More specifically, 25% (n=20) were aged 17 to 19 years, 55% (n=44)

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were aged 20 to 22 years, and the rest 20% (n=16) were aged 23 to 25 years.

Table 1: Demographic Data of participants

Category	N (%)
Year of Study	
2nd Year	44 (55%)
3rd Year	55 (45%)
Gender	
Male	68 (85%)
Female	12 (15%)
Age Range	
17 to 19	20 (25%)
20 to 22	44 (55%)
23 to 25	16 (20%)

The knowledge score on the assessment scale ranged from 1 to 10. The percentage of correct responses for each knowledge question varied, with the highest (78%) correct answer for the general definition of HIA; however, other topics, such as the prevention strategies of HIA, received very low (27%) correct response rates. The vast number of students demonstrated poor knowledge of HIA, as 63% (n=50) fell in poor knowledge, 30% (n=24) had fair knowledge, and only 7% (n=6) showed good knowledge which is shown in the table 02.

Table 2: Level of Knowledge among study participants

Level of Knowledge	N (%)
Good Knowledge	6 (7%)
Fair Knowledge	24 (30%)
Poor Knowledge	50 (63%)

Table 03 showed the attitude of students toward HIA, which is generally negative. In fact, among the students, 70% (n=56) demonstrated a negative attitude about HIA, while 27% (n=22) had a fair attitude, and only 3% (n=2) held a positive attitude toward HIA. The questionnaire used in this study was adopted and validated from the study by Hamukonda, S., Emvula, O., and Mbapaha, C. (2024), titled "Undergraduate Nursing Students' Knowledge and Practices Towards the Prevention of Nosocomial Infections," published in the Indiana Journal of Agriculture and Life Sciences, 4(1), 21-26. The references for this validated questionnaire have been cited in the article to ensure transparency and acknowledgment of the original source. The sample size of 80 participants was determined using OpenEpi software based on a rigorous statistical technique, ensuring representativeness and reliability. The selection of private nursing colleges in KPK was justified by the presence of over 150 such institutes, making it a relevant and diverse population for the study.

Table 3: Level of Attitude among study participants

Level of Attitude	N (%)
Positive Attitude	2 (3%)
Fair Attitude	22 (27%)
Negative Attitude	56 (70%)

DISCUSSION

This study broadly assesses the knowledge and attitudes of nursing students toward nosocomial infections and stresses areas of strength and gaps that need to be improved in the prevention and management of hospital-acquired infections. In comparison with the research carried out globally, many fantastic insights can be seen regarding a strong point of view regarding both prevailing methods and areas open for the development of infection control in healthcare settings. In contrast to earlier research suggesting that participant's knowledge related to HIAs was satisfactory and well accepted learning infection control procedures, this study has found an evident gap: the participants had limited knowledge and a bad attitude toward infection control measures [2, 13]. This difference may indicate some barriers in the present educational approach or in the environment that hinders the understanding and perception of these students about practices in infection prevention. However, another the study found that although 55.7% of the nurses had satisfactory knowledge, general knowledge levels remained suboptimal even at higher qualifications. Nurses in bachelor degrees scored higher knowledge, comprehended the risks of infections and display positive attitudes. Although the participants showed positive attitudes and their general knowledge did not reach satisfactory levels [14, 15]. Similarly in the current study, 63% nursing students portrayed poor knowledge and 63% had negative attitude regarding HIAs. These alignments across both studies point out a critical gap in education, indicating the need for enhanced training efforts to improve knowledge and attitudes both among practicing nurses and nursing students. Another study showed that most of the respondents showed moderate levels of knowledge and practice with nominal variance; attitude, however, was seen to have a remarkably higher level, and the difference was statistically significant, but these findings indicate poor knowledge and negative attitudes among students [16]. This disparity underscores the need to target educational improvement of knowledge and attitudes at clinical standards. Furthermore, this study established that there were significant knowledge and practice gaps of HAI among the students. Contrary to this, previous studies reported that students on undergraduate training in nursing students presented with knowledge and practice of hand hygiene-a critical prevention measure for

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HIAs, which was attributed to appropriate exposure to relevant information [17]. This therefore means that such interventions reinforcing fundamental infection control practices, such as hand hygiene, can better improve students' composite infection control practices and fill the gaps established in the current study. In addition, a study indicates that participants generally have good knowledge and attitudes toward HAI control, with room for improvement through educational seminars and awareness programs to strengthen adherence to barrier measures, while this study contrasts sharply in which observed poor knowledge and negative attitudes among students about HAI underscoring a critical need for targeted education to address these gaps [18]. Unlike the results of this study, which indicated poor knowledge and a negative attitude towards HIA among students, a study in the Tehran hospitals on the paramedical staff reported good levels of knowledge, attitude, and performance with respect to nosocomial infections [19]. Furthermore, a study regarding Central Line-Associated Bloodstream Infection (CLABSI), a form of HAI, which shows that out of 54.9% with poor knowledge, 74% practiced according to the standard and 85% had positive attitudes toward infection prevention. This shows that despite their unawareness, nurses have practiced the principles and were hopeful, probably owing to in-service training and professional experience, Conversely, in this present study, the students proved ignorant and continued to be careless with adverse psychological attitudes towards HAI, which is a need for proper education and training so that they can better understand and enforce infection control measures [20]. Strengthening a comprehensive infection-control training program in nursing curricula can have a significant impact on the greater facilitation of students' understanding and attitudes toward HIAs. Thus, the more skilled and knowledgeable the nursing students become, the more the patient safety improves and the quality of care in hospitals increases, therefore contributing to fewer cases of hospital-acquired infections. This study identifies a crucial gap in nursing students' knowledge and attitudes around Hospital-Acquired Infections (HAIs). Most students had poor understanding (63%) and negative attitudes (70%) on infection prevention and control. Addressing these inadequacies will better educate nursing students for clinical practice, ultimately increasing patient safety and lowering the prevalence of HAIs in healthcare settings.

CONCLUSIONS

This study highlighted significant gaps in nursing students' knowledge and attitudes toward Healthcare-Associated Infections (HAIs) in a private nursing institute in Khyber Pakhtunkhwa, Pakistan. Most participants demonstrated poor knowledge (63%) and negative attitudes (70%) toward HAIs, despite their critical role in infection prevention and control. These findings emphasize the urgent need for targeted educational interventions and practical training to enhance knowledge and foster positive attitudes among nursing students. Improving these aspects is crucial for effective infection control practices and reducing the burden of HAIs in healthcare settings. However, potential limitations include reliance on participants' internet access and digital literacy, which may affect response rates and data accuracy. The findings may have limited generalizability due to the unique characteristics of private institutions, such as differences in resources, curriculum, and student demographics. Future research involving diverse institutions, including public and private settings across various regions, is recommended to provide a more comprehensive understanding and enhance the applicability of the results. In conclusion, addressing the gaps in nursing students' knowledge and attitudes about nosocomial infections requires integrating targeted modules, hands-on training, and continuous assessments into the curriculum. Policy interventions such as mandatory infection control certifications, standardized guidelines, and partnerships with healthcare institutions can further enhance their preparedness. These steps will ensure nursing students are better equipped to prevent and manage nosocomial infections effectively.

Authors Contribution

Conceptualization: AAA
Methodology: TA
Formal analysis: AAA, AA, S
Writing, review and editing: SUF, AD, KZ, NS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Knowledge, Attitude and Practice of Breast Cancer among Female Students: A Cross-Sectional Study from Pakistan

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ABSTRACT

Breast cancer is a significant global health concern, with early detection being critical for improving survival rates. **Objective:** To evaluate the Knowledge, Attitudes, and Practices (KAP) regarding breast cancer among female university students. **Method:** Data were collected through structured questionnaires administered to a representative sample of students. **Results:** The study showed a positive attitude among female students regarding Breast Cancer (BC): 80% believed BC could be prevented, 67% recognized family history as a risk factor, 77% felt comfortable discussing BC with doctors, and 93% emphasized public education. However, significant gaps in practices were observed: 46% never attended BC awareness sessions, 28% never adopted preventive lifestyle changes, 36% did not seek medical advice for breast changes, 73% never had a mammogram, and 30% never performed breast self-examinations. **Conclusion:** These findings underscore the need for improved education and practical interventions to enhance BC awareness and early detection behaviors.

INTRODUCTION

Breast Cancer (BC) is an uncontrolled growth of epithelial cells lining the ducts or lobules of the breast. It is a heterogeneous medical disease that can vary in its characteristics, behavior, and treatment response. The risk factors of BC include family history and genetic mutations (e.g., BRCA1 and BRCA2), exposure to estrogen and progesterone, previous radiation therapy, increasing age, and dense breast tissue. The symptoms include the development of a lump, changes in size and shape of the breast, puckering, nipple discharge, and redness. BC can be diagnosed through mammography, ultrasound, and biopsy. The treatment options include surgery, radiation therapy chemotherapy, hormone therapy, and targeted therapy [1-3]. BC is the most common cancer worldwide. BC is a global health problem affecting millions of women and it is the leading cause of death among women. The 5-year survival rate for breast cancer exceeds 90% in high-income countries, compared to 66% in India and 40% in South Africa [4]. In Pakistan, BC accounts for the highest incidence among cancers, with 34,038 cases (23% of the total 148,041 cases). BC is also the leading cause of cancer-related deaths, contributing to 16,232 fatalities (16.1% of the total 101,113 deaths) [5]. The risk factor contributing to such a high number of cases might be associated with late-stage diagnosis, cultural taboos, limited access to healthcare, and insufficient awareness which contributes to delayed detection [6-9]. Therefore, raising awareness among young women, especially university students, is essential for promoting a culture of early detection and prevention. Knowledge, Attitude, and Practice (KAP)

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studies help reduce the morbidity and mortality of diseases including BC. Knowledge about understanding risk factors and symptoms of BC is essential to changing the attitude which is about beliefs and willingness to act on breast cancer awareness and if one is determined then adopt practice modification of behaviours like self-examinations or seeking medical advice. Previously conducted KAP studies from Pakistan reported alarming low levels of knowledge among women about Pakistan. For example, a recently conducted systematic and meta-analysis pooled data of 9766 females across Pakistan reported that only 47% were aware of risk factors, 41.8% were aware of symptoms 38% were aware of treatment options, 28.7% performed self-examination of breasts and only 15% of women underwent a clinical examination of the breast [9]. Female university students are a suitable demographic group for targeted awareness initiatives. As an educated group in a formative stage, they could adopt preventive habits and share knowledge within their communities. However, there has been limited research on their awareness, attitudes, and practices related to breast cancer in Pakistan. This study aimed to assess the knowledge, attitude, and practices of BC among female university students.

METHODS

This descriptive cross-sectional study using stratified random sampling was carried out from 1st October 2024 to 30th October 2024 among tertiary educational institutions of Sindh among adult participants. The sample size was calculated using an online software. A pre-tested online questionnaire was designed to collect the data. The questionnaire was distributed using WhatsApp and Facebook. The first part of the questionnaire contained the aims and objectives of the research and participants were asked if they agreed with the aims and objectives of the study, they could proceed to a section about their consent to participate in the study. The questionnaire did not contain any identifiable information to ensure the privacy of the respondents. The first section contained demographic factors such as age, marital status, university, department, residence, ethnicity, mother's education, father's education, profession, and income. The second section of the questionnaire contained information about the knowledge. There were 15 questions to assess the knowledge about BC. The knowledge section included questions 1) Have you heard of BC? 2) Do patients in BC suffer from lumps in the chest, pain, skin changes, or nipple discharge? 3) Do BCs attack the human body at above 20 ages to onwards? 4) Are BCs can be found only in women? 5) Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors of BC? 6) Do women should perform breast self-examination every month? 7) Can BC be treated if detected early? 8) Does cancers can be treated by antibiotics? 9) Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments? 10) Can BC spread to other body parts if not treated? 11) Are women with dense breast tissues at higher risk of BC? 12) Does a mammogram (a machine used especially for chest X-rays) help detect BC? 13) Does obesity increase the risk of BC? 14) Does breastfeeding decrease the risks of BC? 15) Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of BC? Participants were given 3 options such as "yes", "no" or "do not know" to record their responses. The Cronbach's alpha value was 0.718, indicating an acceptable internal consistency reliability level for the measurement scale used to assess knowledge. The third section of the questionnaire contained information about the attitude. There were 7 questions to assess the attitude about BC. 1) Do you believe BC can be prevented? 2) Do you believe that having a family history of BC increases your risk? 3) Do you feel comfortable discussing BC with your doctors? 4) Do you think that awareness of BC is necessary in the public education systems? 5) Do you believe that BC is a serious health issue in your community? 6) Do you think BC treatment should be accessible to every community? 7) Should you participate very willingly in the BC screening programs? The participants were asked if they strongly agree, agree, neutral, disagree and strongly disagree with the question statement. The fourth section of the questionnaire contained information about the practice. There were 7 questions to assess the practice of the BC. 1) Have you ever performed breast self-examination? 2) Are you afraid of having BC ever? 3) Have you ever had a mammogram? 4) Do you seek medical advice when you notice any changes in your breasts? 5) Are you afraid of wearing black blouses, black gowns, black shawls, and black clothes of any type to avoid BC? 6) Have you ever practiced lifestyle changes like smoking, alcohol, food, and lipid consumption after hearing about this dangerous disease? 7) Have you ever attended any BC awareness sessions? The participants were given options such as always, frequently, sometimes, rarely and never to record their response to the practice question statement. Informed consent was recorded from all participants of the study. The data was analyzed using the Statistical Package for Social Science (SPSS) (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. version 23. The Likert scale was used to analyze the responses. The mean, frequencies, and percentage were computed for demographic variables and chi-square was computed for the association of demographic factors with knowledge about the risk factors of the BCs. The threshold for statistical significance was set at p value of 0.05.

RESULTS

Five hundred ten (510) participants were contacted and 480 (94.11%) recorded their answers. Then 10 (1.96%)

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questionnaires were excluded because of incomplete data provided by participants. The final study sample comprised 470 (92.15%) participants. The mean age of the study participants was 22.16±4.06 years. Second-year and 4th year students who participated were in the majority in this study. Fifty-Four percent of students were pursuing nursing as a major. Fifty-four percent of students belong to rural areas, 61.5% were non-hostellers, and 60% of the students were Sindhi (Table 1).

Table 1: Basic Demographic Characteristics of Study Participants

Factors	Frequency (%) / Mean ± SD
Class	
First Year	91 (19%)
Second Year	122 (16%)
Third Year	77 (16%)
Fourth Year	131 (29%)
Pass Out	43 (9%)
Field of Study	
Nursing	257 (54.68%)
Non-Nursing	213 (45.32%)
Area	
Urban	215 (46%)
Rural	255 (54%)
Current Residence	
Hosteller	181 (39.5%)
Non-Hosteller	289 (61.5%)
Ethnicity	
Sindhi	311 (66.1%)
Urdu	159 (33.8%)
Age (Years)	22.16 ± 4.06

Knowledge-wise distribution of data showed that 87.4% of the participants have heard of BC 10% did not hear about BC 2.8% were unaware of BC. Do patients with BC suffer from lumps in the chest, pain, skin changes, and nipple discharge? Eighty percent of participants recorded their responses as yes 8.1% of participants recorded their responses as no and 11.1% were unaware. Does BC attack the human body at above 20 ages to onwards? 64% of the participants recorded their responses as yes, 14% of the participants recorded their responses as no, and 21.9% of participants were unaware. Can BCs be found only in women? 67% of the participants recorded their responses as yes 24.5% of the participants recorded their responses as no, and 8.5% of the participants were unaware. Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors for BC? 74.9% of the participants recorded their responses as yes, 9.8% of the participants as no, and 15.3% were unaware. Do women should perform breast self-examination every month? 82.1% of the participants recorded their responses as yes 8.3% of the participants recorded their responses as no, and 9.6% of the participants were unaware. Can BCs be treated if detected early? 86.8% of the participants recorded their responses as yes, 5% of the participants recorded their responses as no, and 8.1% of the participants were unaware. Can antibiotics treat BC? 32.3% of the participants recorded their responses as yes, 38.2% of the participants recorded their responses as no 29.4% of the participants were unaware. Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments? 84.5% of the participants recorded their responses as yes, 4.5% of the participants recorded their responses as no, and 11.1% of the participants were unaware. Can BCs spread to the other parts of the body if not treated? 67.4% of the participants recorded their responses as yes, 13.8% of the participants recorded their responses as no, and 18.7% of the participants were unaware. Are women with dense breast tissues at a higher risk of BC? 58.1% of the participants recorded their responses as yes, 7.2% of the participants recorded their responses as no, and 34.7% of participants were unaware of it. Is a mammogram (a machine used especially for chest x-ray) helpful in detecting BCs? 68.9% of the participants recorded their responses as yes 16.2% of the participants recorded their responses as no, and 22.8% of the participants were unaware. Does obesity increase the risk of BC? 52.8% of the participants recorded their responses as yes, 16.2% of participants recorded their responses as no, and 31.2% of the participants were unaware. Does breastfeeding decrease the risks of BC? 60.9% of the participants recorded their responses as yes, 13.8% of the participants recorded their responses as no 25.3% were unaware. Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of BC? 81.1% of the participants recorded their responses as yes, 6.8% of the participants recorded their responses as no 12.1% of the participants were unaware (Table 2).

Table 2: Percentage of Responses about Knowledge of Breast Cancer among University Students. Percentage is taken from Samples (N=470) (100%)

Q. No.	Items	Yes (%)	No (%)	Don't Know (%)
KNQ1	Have you heard of breast cancer?	87.4%	9.8%	2.8%
KNQ2	Do patients with breast cancer suffer from lumps in the chest, pain, skin changes, and nipple discharge?	80.9%	8.1%	11.1%
KNQ3	Does breast cancer attack the human body at above 20 ages to onwards?	64%	14%	21.9%
KNQ4	Can breast cancers be found only in women?	67%	24.5%	8.5%
KNQ5	Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors for breast cancer?	74.9%	9.8%	15.3%
KNQ6	Do women should perform breast self-examination every month?	82.1%	8.3%	9.6%
KNQ7	Can breast cancers be treated if detected early?	86.8%	5.1%	8.1%
KNQ8	Can antibiotics treat breast cancer?	32.3%	38.3%	29.4%

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KNQ9	Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments?	84.5%	4.5%	11.1%
KNQ10	Can breast cancers spread to the other parts of the body if not treated?	67.4%	13.8%	18.7%
KNQ11	Are women with dense breast tissues at a higher risk of breast cancer?	58.1%	7.2%	34.7%
KNQ12	Is a mammogram (a machine used especially for chest x-ray) helpful in detecting breast cancers?	68.9%	8.3%	22.8%
KNQ13	Does obesity increase the risk of breast cancer?	52.8%	16.2%	31.2%
KNQ14	Does breastfeeding decrease the risks of breast cancer?	60.9%	13.8%	25.3%
KNQ15	Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of breast cancer?	81.1%	6.8%	12.1%

The study assessed factors influencing breast cancer awareness among participants, focusing on age, study year, field of study, and residence. Age showed no significant impact on awareness, with similar levels observed between participants aged 18–22 years and those over 22 years (p=0.14). A borderline association was noted between awareness and study year, suggesting that senior students, particularly those in their fourth year, exhibited higher awareness levels (p=0.061). The field of study emerged as a significant factor, with nursing students demonstrating substantially greater awareness compared to non-nursing students (p=0.004). However, no significant differences were observed between rural and urban participants regarding awareness levels (p=0.391). These findings highlighted the importance of educational background in shaping breast cancer awareness and suggest the need for targeted interventions to improve knowledge among non-nursing students and earlier-year cohorts (Table 3).

Table 3: Demographic Factors Associated with Awareness of Breast Cancer among Study Participants

Factors	Aware	Unaware	Chi-Square	p-Value
Age				
18-22 Years	115	30	2.15	0.14
>22 Years	237	88		
Study Year				
First	75	16	9.02	0.061
Second	85	37		
Third	57	20		
Fourth	108	29		
Pass Out	27	16		
Major				
Nursing	206	67	8.351	0.004
Non-Nursing	146	51		
Residence				
Rural	157	58	0.73	0.391
Urban	195	60		

In Table 4, demographic factors related to awareness of Breast Cancer (BC) among study participants were analysed by dichotomizing responses to the question: "Are factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure considered risk factors for BC?" into 2 variables that were aware based on their response yes and unaware based on their responses no or do not know. The major-wise distribution of data showed that participants who were studying nursing as a major were more aware compared to others (chi square=8.351 p value=0.004). All other factors were non-significant. Most participants believed that BC could be prevented, with 48.1% agreeing and 32.1% strongly agreeing. A smaller proportion were neutral (15.1%), disagreed (3.8%), or strongly disagreed (0.0%). When asked whether having a family history of BC increases risk, 41.5% of participants agreed, and 26.6% strongly agreed. Meanwhile, 18.1% were neutral, 11.7% disagreed, and 2.1% strongly disagreed. Most participants expressed comfort in discussing BC with doctors, with 42.8% agreeing and 35.5% strongly agreeing. Others were neutral (14.3%), disagreed (5.1%), or strongly disagreed (2.3%). Nearly all participants supported the inclusion of BC awareness in public education, with 25.5% agreeing and 68.1% strongly agreeing. Few were neutral (4.3%), disagreed (1.3%), or strongly disagreed (0.9%). Most participants recognized BC as a serious health issue in their community, with 33.6% agreeing and 58.5% strongly agreeing. Only 6.0% were neutral, while 1.1% disagreed and 0.9% strongly disagreed. Participants overwhelmingly supported making BC treatment accessible to all communities, with 33.6% agreeing and 49.6% strongly agreeing. Some were neutral (9.8%), disagreed (4.3%), or strongly disagreed (2.8%). Many participants expressed willingness to participate in BC screening programs, with 39.4% agreeing and 38.2% strongly agreeing. Others were neutral (16.0%), disagreed (4.3%), or strongly disagreed (2.1%) (Figure 1). A substantial proportion of participants reported that they had "never" performed a breast self-examination (30.6%). Additionally, 11.3% reported performing self-examinations "rarely," 26.8% "sometimes," 10.4% "frequently," and 20.9% "always." Fear of developing BC varied among participants, with 16.0% reporting they were "never" afraid, 10.6% "rarely," 24.7% "sometimes," 10.6% "frequently," and 38.1% "always". Most participants (73.6%) indicated they had "never" undergone a mammogram. Smaller percentages reported undergoing mammograms "rarely" (7.9%), "sometimes" (7.7%), "frequently" (4.0%), and "always" (6.8%). When noticing changes in their breasts, 36.4% of participants stated they "never "A substantial proportion of participants reported seeking medical advice. In comparison, 9.1% did so "rarely," 19.4% "sometimes," 8.7% "frequently," and 26.4% "always." Regarding the belief that wearing black clothing

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could increase the risk of BC, 56.6% of participants reported they "never" held this belief. In comparison, 9.1% reported it "rarely," 13.6% "sometimes," 6.0% "frequently," and 14.7% "always". In terms of adopting lifestyle changes such as quitting smoking, reducing alcohol intake, and modifying diet, 28.3% of participants reported "never" practicing such changes, 8.5% did so "rarely," 13.0% "sometimes," 10.6% "frequently," and 39.6% "always." Attendance at BC awareness sessions was mixed, with 46.0% of participants stating they had "never" attended such sessions, 8.3% "rarely," 19.4% "sometimes," 7.4% "frequently," and 18.9% "always" (Table 4).

Table 4: Summary of Survey Results on Breast Cancer Awareness, Beliefs, and Practices Among Participants

Category	Response	Percentage (%)
Awareness of BC Risk Factors	Nursing majors more aware (p = 0.004)	N/A
Belief: BC Can Be Prevented	Agree	48.10%
	Strongly Agree	32.10%
	Neutral	15.10%
	Disagree	3.80%
	Strongly Disagree	0.00%
Family History Increases BC Risk	Agree	41.50%
	Strongly Agree	26.60%
	Neutral	18.10%
	Disagree	11.70%
	Strongly Disagree	2.10%
Comfort in Discussing BC with Doctors	Agree	42.80%
	Strongly Agree	35.50%
	Neutral	14.30%
	Disagree	5.10%
	Strongly Disagree	2.30%
BC Awareness in Public Education	Agree	25.50%
	Strongly Agree	68.10%
	Neutral	4.30%
	Disagree	1.30%
	Strongly Disagree	0.90%
BC as a Serious Health Issue	Agree	33.60%
	Strongly Agree	58.50%
	Neutral	6.00%
	Disagree	1.10%
	Strongly Disagree	0.90%
BC Treatment Accessibility	Agree	33.60%
	Strongly Agree	49.60%
	Neutral	9.80%
	Disagree	4.30%
	Strongly Disagree	2.80%
Participation in BC Screening Programs	Agree	39.40%
	Strongly Agree	38.20%
	Neutral	16.00%
	Disagree	4.30%
	Strongly Disagree	2.10%
Frequency of Breast Self-Examination	Never	30.60%
	Rarely	11.30%
	Sometimes	26.80%
	Frequently	10.40%
	Always	20.90%
Fear of Developing BC	Never	16.00%
	Rarely	10.60%
	Sometimes	24.70%
	Frequently	10.60%
	Always	38.10%
Undergoing a Mammogram	Never	73.60%
	Rarely	7.90%
	Sometimes	7.70%
	Frequently	4.00%
	Always	6.80%
Medical Advice for Breast Changes	Never	36.40%
	Rarely	9.10%
	Sometimes	19.40%
	Frequently	8.70%
	Always	26.40%
Belief: Black Clothing Increases BC Risk	Never	56.60%
	Rarely	9.10%
	Sometimes	13.60%
	Frequently	6.00%
	Always	14.70%
Lifestyle Changes (e.g., Smoking, Diet)	Never	28.30%
	Rarely	8.50%
	Sometimes	13.00%
	Frequently	10.60%
	Always	39.60%
Attendance at BC Awareness Sessions	Never	46.00%
	Rarely	8.30%
	Sometimes	19.40%
	Frequently	7.40%
	Always	18.90%

DISCUSSION

The findings of this study showed that while a significant portion of study participants had high levels of awareness regarding BC, its risk factors and symptoms and gaps were identified in attitudes and prevention practices. A study conducted on female students of universities reported that 97% of the female students had heard about the BC, 78% of the females had good knowledge of breast self-examination, 43% of the females knew how to perform breast self-examination and only 24.9% performed breast self-examination [10]. A study conducted on medical and non-medical undergraduate students assessed awareness scores and noted a limited understanding of breast cancer, mammography, and early detection, with medical students demonstrating significantly higher awareness levels compared to non-medical students. The findings of another study from Pakistan indicated that over 55% of students had an acceptable level of knowledge. When

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categorized by the education sector, about 70% of health students and 40% of non-health students demonstrated an acceptable knowledge level [11]. A study conducted on preclinical and clinical students of Lahore reported that 38.7% of participants, reported rarely checking their breasts, while 33.1% felt confident and 8.6% felt very confident about detecting changes. Half (50.0%) had never noticed any changes, but 77.4% stated they would consult a doctor within a week or less if they found one [12]. This study indicated an overall positive attitude among female students about BC. Eighty percent of the study population agreed that BC could be prevented. Sixty-seven percent of the participants agreed that having a history of breast cancer increases their risk. Seventy-seven percent of participants agreed they would feel comfortable discussing BC with their doctor. Ninety-three percent of participants agreed that awareness of BC is necessary in the public education system. Ninety-one percent of the study participants believed that BC is a serious public health concern in their community. Eighty-three percent of the participants agreed that breast cancer treatment should be available to all and 77% of the participants agreed that breast cancer could be willing to participate in BC screening programs [13-15]. These findings indicated a substantial difference in practices among females about the BC. Forty-six percent of participants never attended a breast cancer awareness session. Twenty 28% never practiced lifestyle changes recommended for preventing BC [16]. Nineteen percent of participants feared wearing black color clothes because they were afraid of BC. Thirty-six percent of the females never sought medical advice on whether they notice changes in breast cancer. Seventy-three percent never had a mammogram. Thirty-eight percent never appeared afraid of breast cancer. Thirty percent of participants 30% never performed the best self-examination [17-19]. The demographic factors associated with breast cancer (BC) awareness among study participants analysed responses to a dichotomized question regarding the recognition of key risk factors for BC, including obesity, smoking, alcohol consumption, family history, and radiation exposure. Participants were categorized as "aware" if they responded "yes" and "unaware" if they responded "no" or "do not know." The table highlights differences in awareness based on demographic characteristics, with significant findings noted for nursing majors being more aware compared to others. Non-significant associations for other demographic factors are also reported [20].

CONCLUSIONS

The analysis revealed that nursing majors had significantly greater awareness of breast cancer risk factors compared to participants from other disciplines. However, awareness among the broader demographic groups remained limited, with no significant associations observed for other factors. These findings underscored the need for targeted educational initiatives to enhance awareness of breast cancer risk factors across diverse populations.

Authors Contribution

Conceptualization: SIS
Methodology: HBC, AM
Formal analysis: HBC
Writing, review and editing: WA, AM, A, AAS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

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Prevalence of Ovarian Cyst Diagnosed on Ultrasonography in Females of Reproductive Age Visiting Tertiary Care Hospital

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ABSTRACT

Ovarian cyst is most common in females of reproductive age ranging from 18-44 years. An ovarian cyst can cause many complications e.g. ovarian cyst accidents include cyst rupture, hemorrhage, and torsion thus timely diagnosis and treatment are important to lessen patient suffering. **Objective:** To calculate the prevalence of ovarian cyst diagnosed on ultrasonography in females of reproductive age visiting tertiary care hospital. **Methods:** This descriptive study was conducted in the radiology department of CMH Lahore Hospital from September to December 2023. All the individuals who fulfilled the inclusion/exclusion criteria were enrolled. A detailed history was taken from all patients including age, difficulty urination, pregnancy, pain and associated symptoms. Data entry and analysis were done by SPSS version 26. **Results:** The mean age was 30.25 years. All females were of reproductive age. Abdominal pain was the most common symptom in this study 52.1% (113). The second most common symptom discovered was irregular periods in which the frequency of female patients was 65 (30%). There were 217 females in this study. Out of 217, 137 (63.1%) were normal and 80 (36.9%) had ovarian cyst. So according to this study prevalence was 36.9%. **Conclusions:** Ultrasound is an effective, non-invasive and Radiation safe modality for the diagnosis and detection of prevelance of ovarian cysts in females of reproductive age. The most common symptom in females was abdominal pain and irregular periods. Ovarian cysts were present in one-third of the target population. The frequency of benign cysts was higher than malignant cysts.

INTRODUCTION

A fluid-filled sac of ovaries known as an ovarian cyst can form when a follicle fails to release an egg. Premenopausal and postmenopausal women are predicted to have an ovarian cyst prevalence of 8% to 18%, which varies greatly from the overall population [1]. Simple cyst is widespread in premenopausal women, with follicles and corpus luteal cysts being the most common [2]. An ovarian cyst may be discovered by chance, during imaging prompted by symptoms, or after a pelvic mass was discovered during evaluation. Common types of adnexal cysts are dermoid cysts, simple cysts, endometriomas and hemorrhagic cysts. Other adnexal cysts that could be present are follicular cysts, corpus luteum cysts and mucinous cystadenoma, serous cystadenocarcinoma, mucinous cystadenocarcinoma, para tubal cysts, granuloma, hydrosalpinx, ectopic, theca lutein cyst are common among post-menopausal women [3]. Dermoid cysts, one of the most prevalent benign ovarian tumors, are said to occur up to 20% of the time. They show up on a bilateral basis 10%–15% of the time [4]. Dermoid cysts are the most frequent ovarian tumors that appear during pregnancy, usually in the second trimester [5]. In premenopausal women, the overall incidence of a malignant ovarian cyst is roughly 1–3 per 1000 [6]. With a prevalence of 0.2% to 2%, big ovarian cysts are uncommon during pregnancy, while corpus luteum and theca-lutein cysts typically heal on their own between 14 and 16 weeks of gestation [7]. One-sided, free-moving, cystic, well-defined, and ascites-free ovarian

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cysts are more likely to be benign. Conversely, bilateral malignant ovarian tumors with firm consistency, ill-defined margins, and ascites were discovered. Because ovarian tumors are invisible until they reach a specific size [8]. Ovarian benign, ovarian malignant, non-ovarian, gynecological, non-ovarian non-gynecological, and a further subgroup of pregnancy-specific diseases are all included in the aetiological classification. The first-line imaging technique for assessing adnexal masses is ultrasound [9]. All ovarian cysts have a 24% frequency of endometriomas. Fibroblasts grow rapidly, which is a characteristic of ovarian endometrioma. The typical endometrioma is characterized by a unilocular cyst with uniform low-level echogenicity (ground-glass echogenicity) [10, 11]. Endometriomas' look can be indistinguishable from that of HOCs at the start of their creation. Endometriomas accumulate more hemorrhagic debris over time, which is responsible for their classic look (of a unilocular cyst with fluid content expressing ground glass echogenicity) [12]. Clinical settings regularly see hemorrhagic ovarian cysts (HOCs). Except for a small number of circumstances where surgical intervention is indicated, the bulk of them eventually disappear over time [13]. Cyst rupture can occasionally be uncomfortable and require surgery to heal. The chance of other negative outcomes, like hypovolemic shock, can be increased by hemoperitoneum brought on by burst hemorrhagic ovarian cysts [14]. The most common germ cell tumor is mature cystic teratoma, which is made up of one or more of the three primitive germ cell layers. They differ in terms of size and presentation [15]. Ultrasound is useful in the diagnosis of ovarian pathology. Color Doppler can be used to assess the vascularity of a lesion [16]. Because of its real-time nature, USG is a highly cost-effective technique Because of its portability and low cost, it can be used for point-of-care imaging at the bedside, in emergency rooms, rural clinics, and poor countries [17]. Surgery is recommended for larger, symptomatic cysts. Ovarian cysts or adnexal masses during pregnancy are a frequent occurrence, with reported prevalence ranging from 1% to 5.3 [18]. Ovarian cyst complications can occur, including cyst rupture, bleeding, and twisting. The most common causes of pelvic pain during the first trimester are hemorrhagic ovarian cysts, ovarian torsion, and ectopic pregnancies [19]. It is now simpler to differentiate between benign and malignant ovarian tumors thanks to new imaging techniques. A quick and noninvasive first-choice test for assessing ovarian lesions is Transvaginal Ultrasonography (TVS). The use of color doppler made it possible to identify cases of malignant cysts. Furthermore, the Centers for Disease Control and Prevention survey revealed a 22% prevalence for control [20]. Ovarian cysts often do not require treatment and shrink on their own after one to two months; however, if they distort, bleed, or rupture, they may pose major issues.

This study aimed to calculate the prevalence of ovarian cysts found on ultrasonography in females visiting tertiary care hospitals who are of reproductive age. The diagnostic method of ultrasound is non-invasive and radiation-safe.

METHODS

Descriptive cross sectional study was conducted from September to December 2023 on females of reproductive age between 18 to 44 years at diagnostic department of combined Military hospital Lahore. Known probability sampling technique was employed. The study was conducted at CMH Lahore medical college teaching hospital after the approval of ethical review committee having case no of 666/ERC/CMH/LMC. All the patients who fulfill the inclusion and exclusion criteria were enrolled after taking consent. Who are symptomatic or asymptomatic of pelvic pain were included. Women who came for follicular tracking scans and women with 3rdtrimester pregnancy were excluded. Detailed history was taken from all the patients including age, sex, duration of pain and associated symptoms lie abdominal swelling, pain, bleeding, irregular period. The sample size was 403 and data from 217 women of reproductive age was collected. Age ranging from 18-44years. Sample size based on sensitivity calculated by this formula [21]. **$Z21\text{-}a/2 \times SN \times (1\text{-}SN)/ L2 \times Prevalence$.** Where n= required sample size, SN= sensitivity taken as 92%, α=size of the critical region (1-α is the confidence level), Z 1-α/2 = 1.96 at 95% confidence interval, L= taken as 0.05. There were total 217 patients from which data was collected and 137 had normal sonographic characteristic and 80 had ovarian cyst all the examinations were performed using Toshiba Xario, (5-12MHz) curvilinear transducer and transvaginal transducer (5-7MHz). The patients were then being scanned by ultrasound. Full bladder was required for better examination of ovaries. Data were entered and analyzed through SPSS version 26.0. For descriptive analysis, frequencies and percentages were computed for the qualitative data. While mean and standard deviation were calculated for the quantitative data. Every outcome was computed at 95% confidence interval and p value less than or equal to 0.05 will be considered significant.

RESULTS

The data was collected from total of 217 patients. Out of total 217 Females patients visiting the tertiary care hospital from September to December 2023, the prevalence of ovarian cyst diagnosed on ultrasonography is 36.9. Table 1 Illustrates patient age groups ranging from 20 to >40.

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Table 1: Age Group of Patients(Years)

Variables	Category	Frequency (%)
Age Group of Patients in Years	<20	24 (11.10)
	21-25	42 (19.4)
	26-30	50 (23)
	31-35	49 (22.6)
	36-40	33 (15.2)
	>40	19 (8.8)
	Total	217 (100)

Figure 1 showed prevalence of ovarian cyst which is 36.87%.

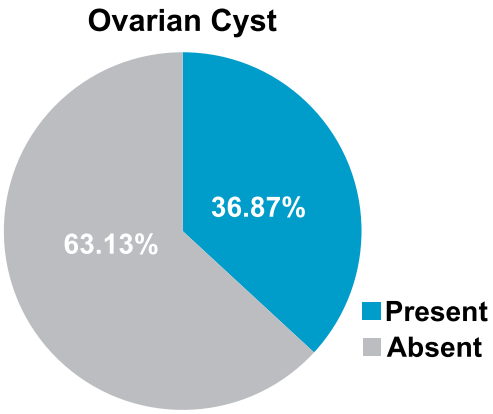

Figure 1: Prevalence of Ovarian Cysts

Figure 2 showed distribution of ovarian cyst types. There were total 217 patients in the study from which 137 had normal sonographic characteristics and 80 had ovarian cysts. Females with simple ovarian cysts were 32 (14.7%). Patients with hemorrhagic ovarian cyst were 23 (10.6%). There were 18 (8.3%) patients of PCOS, 3 (1.4%) of dermoid cyst, 2 (0.9%) of patients had mucnious cystadeno-carcinoma. Complex cysts were only 2 (0.9%).

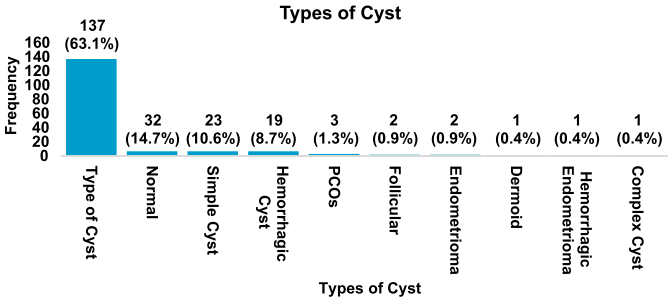

Figure 2: Distribution of Ovarian Cysts Types

Table 2 showed clinical symptoms of ovarian cyst in relation to frequency or percentage. There were total 217 patients. The patients of ovarian cysts in which pain was present were 113 (52.1%) and in which pain was absent were 104 (47.9%). Patients who felt difficulty in urination were 10 (4.6%) and who did not feel difficulty in urination were 207 (95.4%). Among the patients 50 (23%) were pregnant and 167 (77%) were non-pregnant. Females who presented with irregular period in the study were 65 (30%) and 152 (70%) had no irregular periods. Patients in which abdominal swelling was present were 15 (6.9%) and in 202 (93.1%) abdominal swelling was absent.

Table 2: Clinical Symptoms of Ovarian Cyst

Clinical Symptoms		
Variables	**Options**	**Frequency (%)**
Pain	Absent	104 (47.9)
	Present	113 (52.1)
Difficulty urinating	No	207 (95.4)
	Yes	10 (4.6)
Bleeding	No	190 (87.6)
	Yes	27 (12.4)
Pregnancy	No	167 (77)
	Yes	50 (23)
Irregular period	No	152 (70)
	Yes	65 (30)
Abdominal swelling	No	202 (93.1)
	Yes	15 (6.9)
Total		217 (100)

Table 3 showed ovarian volume of right or left ovaries and size of ovarian cyst. There were 171 patients with normal ovarian volume of both ovaries. 6-12ml which was the most common ovarian volume found in both ovaries. Only 2 patients (1%) who had right or left ovarian volume of 19-26ml and only 4 (1.8%) patients had ovarian volume of 33-40ml. The patients in which size of ovarian cyst was 1-3cm were 11 (5.1%). 3-6cm was most common size in females, had frequency of 53 (24.4%). And ovarian cysts with size of 2-5mm had frequency of 14 (6.5%), 5-30cm had frequency of 2 (0.9%).

Table 3: Ovarian Volume and Ultrasound Features of Ovarian Cysts

Ovarian Volume	Right Ovarian Volume Frequency (%)	Left Ovarian Volume Frequency (%)	Other Findings Frequency (%)
Normal	171 (78.8)	171 (78.8)	None: 137 (63.1)
6-12 ml	43 (19.8)	43 (19.8)	1-3 cm: 11 (5.1)
19-26 ml	1 (0.5)	1 (0.5)	3-6 cm: 53 (24.4)
33-40 ml	2 (0.9)	2 (0.9)	2-5 mm: 14 (6.5)
Total	217 (100)	217 (100)	5-30 cm: 2 (0.9)

Table 4 displayed the findings of ovarian cyst on ultrasounds. According to this data, out of the 217 patients who were included in the study, 137 (63.1%) were normal and 80 (36.7%) had ovarian cysts. Ovarian cysts were present in 35 patients (16.6%) in the right ovary and 40 patients (18.4%) in the left. Bilateral ovarian cysts were present in just 5 female cases.

Table 4: Ultrasound Findings of Ovarian Cysts

Findings	Category	Frequency (%)
Ovarian Cyst	Absent	137 (63.1)
	Present	80 (36.9)
Ovary Involved	None	137 (63.1)
	Right	35 (16.6)
	Left	40 (18.4)
	Bilateral	5 (2.3)
Total		217 (100)

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DISCUSSION

Gurung *et al.*, Conducted a descriptive study at Kathmandu Medical College Teaching Hospital for two years from 1 January 2011 to 31 December 2012 [22]. The purpose was the histopathological study of ovarian cystic lesions in Nepal. The goal of the study was to identify the morphologic range of ovarian cystic lesions. The Pathology Department received and processed a total of 135 cases of ovarian cysts. Slides stained with hematoxylin and eosin were analyzed. 119 instances (88.15%) of the 135 ovarian cystic lesions were unilateral, while 16 cases (11.85%) were bilateral. Mature cystic teratoma incidence was highest (30%) among ovarian cystic tumors. Mature cystic teratomas were the benign tumors that were most frequently seen. But in this study only 5(2.3%) ovarian cysts were bilateral and 75(35%) were unilateral. And in this study simple cysts (14.7%) were more frequent. And had the highest frequency [22]. Ismail conducted a study in 2005 investigated the lateralization of ovarian cystic teratomas, with a specific focus on their higher incidence on the right side, as observed through sonographic imaging [23]. It emphasized the importance of ultrasound in detecting these cysts and discusses potential embryological or anatomical reasons for the right-sided predominance. The aim of the study was to determine the incidence of right-sided ovarian cystic teratoma. The primary data were obtained over two decades and include both retrospective and prospective review. The researcher looked at 270 cases of ovarian cystic teratoma. Ovarian dermoids were identified on the right ovary more frequently than the left ovary in this series. The results show that 195 dermoids (72.22%) were detected on the right ovary, 47 dermoid (17.41%) were found on the left side, and 28 dermoids (10.37%) were found bilaterally. According to the findings, unilateral dermoids are more common on the right side. But in this study only 35 patients (16.6%) had cysts in the right ovary and 40 patients (18.4%) in the left. Bilateral ovarian cysts were present in just 5(2.3%) female cases [23]. Sohu *et al.*, conducted a study in 2022 evaluated the accuracy of ultrasound in differentiating between benign and malignant ovarian cysts. It correlated clinical findings with imaging data, highlighted the diagnostic value of sonography in ovarian pathology and its role in guiding treatment strategies [24]. This was an observational research, the study was carried out in the Department of Radiology, Ghulam Muhammad Mahar Medical College, Sukkur. The study's goal was to look into the clinical link of ovarian cysts, whether malignant or benign, with ultrasound reports. Ninety-five individuals with an unintentional diagnosis of ovarian mass and symptoms of stomach pain, palpable mass, and menstrual cycle irregularities were included as participants. The average age was 42 years, with 62.3% of the women in reproductive age and the rest in menopause. 70% had abdominal pain, whereas 2% were asymptomatic. But in this study patients with symptoms of abdominal pain, difficulty urinating, bleeding, pregnancy, irregular period was included. Mean age was 30 years; this study includes women of reproductive age ranging from 18 to 44 years. In this study 52.1% women has abdominal pain [24]. Study limitations: It is important to recognize the limitations of interest. First of all, sample size was 403 people. Due to time constraints, only 217 patient's data were collected. Second Data should be conducted from multiple setups.

CONCLUSIONS

Ultrasound is an effective, non-invasive and radiation safe modality for the diagnosis and detection of prevalence of ovarian cysts in females of reproductive age. The most common symptom in females was abdominal pain and irregular periods. Ovarian cysts were present in one-third of the target population. The frequency of benign cysts was higher than malignant cysts. A pelvis ultrasound combined with a doppler scan is the modality of choice to diagnose ovarian cysts.

Authors Contribution

Conceptualization: TE
Methodology: TE
Formal analysis: AR
Writing, review and editing: TE, FB, YK, FS, RA, ZA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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