RESEARCH REPORTS

Knowledge and Awareness of Polycystic Ovarian Syndrome and Its Determinants Among Undergraduates Aged 18–45 at the Maldives National University

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ABSTRACT *Polycystic Ovarian Syndrome (PCOS) is a common endocrine disorder affecting 1 in 7 women of reproductive age. Despite its prevalence, there is a notable lack of knowledge about PCOS globally, underscoring the need for greater awareness to support informed decision-making. This study aimed to evaluate the knowledge and awareness of PCOS and its determinants among undergraduates aged 18-45 at the Maldives National University (MNU). A descriptive cross-sectional survey was conducted among students, with 305 participants responding to the survey, achieving an 85% response rate. Stratified probability sampling was employed to recruit eligible participants. Data were collected via Google Forms from May to August 2024. Participants were predominantly aged 18-24 (56.4%), with females comprising 72.9% of respondents. Among female participants, 33.9% had been medically diagnosed with PCOS, while 78% knew someone with the condition. Social media (65.4%) and healthcare professionals (64.9%) were the primary sources of information. Recognised symptoms included irregular periods (95.4%), while family history (83.0%) was the most commonly identified risk factor. Stress (92.8%) and infertility (88.5%) were highlighted as significant psychological impacts and long-term complications, respectively. Blood tests (80.3%) and medical history (78.3%) were frequently cited diagnostic tools, while exercise (91.8%) and a balanced diet (88.9%) were emphasised as key treatment strategies. Knowledge was highest for symptoms (67.8%) and lowest for risk factors (58.7%) and long-term complications (50.7%). Significant associations were found between PCOS awareness and both field of study and marital status (p<0.001), while age (p=0.806) and educational status (p=0.76) showed no significant impact. With an overall knowledge score of 62.3%, the findings indicate a moderate yet insufficient understanding of PCOS among MNU undergraduates, highlighting the need for targeted educational interventions.*

Keywords: Polycystic Ovarian Syndrome, PCOS knowledge, PCOS awareness, Reproductive health education, Reproductive health

Introduction

Polycystic Ovarian Syndrome (PCOS) is one of the most common yet under-recognized endocrine disorders affecting women of reproductive age, with implications that extend beyond gynecological health. The significance of women's health is vast, encompassing physical, mental, and social well-being. It is crucial for reproductive health, preventive care, hormonal balance, mental wellness, and chronic illness management (Short & Zacher, 2022;

Koirala et al., 2023). Women's health also impacts healthy ageing, family and community health, and economic and social empowerment (Siristatidis et al., 2021). Addressing these aspects promotes gender equity and public health, ultimately improving overall societal health outcomes (Short & Zacher, 2022).

Polycystic Ovarian Syndrome (PCOS) affects 1 in 7 women of reproductive age worldwide (Yadav et al., 2023). It is characterised by hyperandrogenism and anovulation, leading to disruptions in endocrine, reproductive, and metabolic functions (Jaber et al., 2022). This condition, marked by multiple ovarian cysts and insulin resistance (Goh et al., 2022), impacts 4-20% of women globally and is a leading cause of anovulatory infertility (Zaitoun et al., 2023; Lentscher & Decherney, 2020).

PCOS manifests through symptoms such as irregular periods, hirsutism, acne, and acanthosis nigricans (Alotaibi & Shaman, 2020), alongside metabolic issues like insulin resistance, weight gain, and fatigue. It is associated with an increased risk of hypertension, diabetes, and cardiovascular diseases (Yadav et al., 2023; Jakhar et al., 2023), as well as gynaecological symptoms and a higher likelihood of cancers (Neven et al., 2018; Zehravi et al., 2021).

PCOS is a multifactorial condition influenced by both genetic and environmental risk factors. Genetic predisposition plays a significant role, with Memon et al. (2020) reporting that 22-40% of premenopausal women with a first-degree relative diagnosed with PCOS are at higher risk. Obesity is another major risk factor, with Zeidan et al. (2022) noting that an elevated BMI is linked to PCOS in up to 28.3% of cases. Additionally, Budharam et al. (2020) and Abdelghani et al. (2023) highlight that lifestyle factors such as sedentary behaviour, stress, poor diet, and socioeconomic status contribute to the risk of developing PCOS. These findings underscore the complex interplay of genetic and environmental factors in PCOS aetiology.

Diagnosis of PCOS primarily relies on the Rotterdam Criteria, which require the presence of at least two of the following three criteria: oligo-/anovulation, hyperandrogenism, and/or polycystic ovaries on ultrasound (Christ & Cedars, 2023; Kostroun et al., 2023). An alternative diagnostic approach, proposed by the 2018 International Evidence-Based Guideline Criteria, suggests using Anti- Müllerian hormone (AMH) levels as an adjunct or alternative to ultrasound (Teede et al., 2023).

Management strategies for PCOS vary, with lifestyle modifications forming the cornerstone of treatment. These include adopting a healthy diet, engaging in regular exercise, and managing stress (Goh et al., 2022; Singh et al., 2023). Pharmaceutical interventions, such as ovulation-inducing drugs, contraceptives, and Metformin, are commonly used to manage symptoms and fertility concerns (Akre et al., 2022; Neven et al., 2018; Rizvi et al., 2023). Furthermore, addressing mental health concerns through psychological counselling is crucial for improving overall well-being (Rababa'h et al., 2022; Witchel et al., 2019).

Understanding PCOS and its management is critical for improving health outcomes. However, knowledge about the condition varies based on factors such as age, education level, field of study, and marital status. Jabeen et al. (2022) and Rajkumar et al. (2022) found that older and more educated individuals, particularly those in health-related fields, exhibit better knowledge of PCOS. Additionally, married women tend to have greater awareness due to increased health-seeking behaviours related to reproductive health concerns (Jaber et al., 2022; Souheil & Chahine, 2022). Enhanced awareness and education can facilitate early diagnosis,

improve management, and reduce stigma, thereby improving quality of life for those affected (Muhaidat et al., 2023; Upadhye & Shembekar, 2017; Rizvi et al., 2023; Ismayilova & Yaya, 2022). Addressing knowledge gaps through targeted education and public health initiatives is essential for better health outcomes.

Despite these significant health implications, there remains a substantial knowledge gap about PCOS, particularly among young females, leading to underdiagnosis and mismanagement (Di Lorenzo et al., 2023). Addressing this gap is essential for empowering individuals with the knowledge needed to manage their health proactively (Hilman & Dale, 2018; Memon et al., 2023). Assessing the awareness level among undergraduates at the Maldives National University (MNU) will help identify knowledge gaps and inform targeted educational campaigns, ultimately improving reproductive and overall health outcomes for women affected by or at risk of PCOS in the Maldives. Effective health education and awareness can facilitate informed health-seeking behaviours, better symptom management, and improved quality of life for those with PCOS.

Methodology

Study Design and Setting

The study follows the STORBE checklist for reporting observational research. It is designed as a descriptive cross-sectional survey with a quantitative approach and is conducted at the Maldives National University (MNU) in Malé, Maldives. Participants were recruited from various schools and faculties within MNU, including the Faculty of Education (FE), Faculty of Arts (FA), Faculty of Engineering, Science & Technology (FEST), Faculty of Health Sciences (FHS), Faculty of Hospitality & Tourism Studies (FHTS), Faculty of Shariah and Law (FSL), MNU Business School (MNUBS), School of Nursing (SN), and School of Medicine (SOM).

Study Participants

The study participants were recruited from the aforementioned faculties based on the following inclusion criteria: (a) Maldivian nationals aged 18-45 (both genders, (b) currently enrolled in a course offered at any faculty of MNU in Malé and (c) willing to participate voluntarily. Exclusion criteria included (a) non-Maldivian nationals and (b) students enrolled in courses at regional campuses of MNU (specifically L. Gan, G.Dh. Thinadhoo, S. Hithadhoo, and H.Dh. Kulhudhufushi).

Sampling Technique and Sample Size

A stratified sampling technique was employed, dividing the overall sample into subgroups based on the different faculties at MNU. Participants were then conveniently sampled from each faculty. The sample size was determined using G*Power, ensuring a 95% confidence level and a 5% margin of error. Based on the total student enrolment across all faculties, the required sample size was calculated to be 355 out of a total population of 4,649 students. Table 1 provides a breakdown of the sample size for each faculty. The sample size for each the stratum = size of entire sample/population size* layer size.

Table 1 Sample Size for Respective Faculties

Name of the Faculty	Population (No. of undergraduate students enrolled)	Sample size for each faculty
Faculty of Arts	186	14
Faculty of Education	200	15
Faculty of Engineering, Science & Technology	400	31
Faculty of Health Science	1087	83
Faculty of Hospitality & Tourism Studies	385	29
Faculty of Shariah and Law	237	18
MNU Business School	812	62
School of Nursing	1147	88
School of Medicine	1795	15
Total	4649	355

Research Instruments

The study used a self-administered questionnaire designed in Google Forms due to its efficiency, cost-effectiveness, and high response rate. The questionnaire was in English and were adapted from Jakhar et al. (2022). The questionnaire was pretested among 15 participants to assess clarity and logistics. The reliability of the questionnaire was ensured using the Content Validity Index (CVI), where an expert panel of five healthcare professionals evaluated the relevance and clarity of each item. Items meeting a CVI benchmark of 0.80 or higher were retained, while questions scoring lower were removed.

The questionnaire consisted of two main sections. Section I collected socio-demographic data, including age, marital status, employment status, field of study, education level, enrolled course, and current year of study. Section II focused on PCOS-related knowledge and was further divided into two sections. Section II-A assessed general familiarity with PCOS, including family history and sources of information. Section II-B evaluated knowledge of PCOS, covering signs/symptoms, risk factors, psychological effects, complications, diagnostic tools, and management strategies. Each question in Section II-B will had three answer options: agree, disagree, or neutral. All questions were mandatory, and responses were recorded accordingly.

Data Collection Method

Data collection commenced after obtaining ethical clearance from the MNU Research Ethics Committee and the National Health Research Council (NHRC/2024/15). A pretested, self-administered questionnaire, consisting of open-ended, close-ended, and multiple-choice questions, was used. The questionnaire was distributed via a Google Forms link through social media platforms (Facebook and Viber) and student emails. An information sheet and consent form outlining the

study's objectives and ensuring informed consent were attached. Data collection took place from May 2024 to August 2024, and responses were closed after August 2024.

Data Analysis

Data analysis was conducted using SPSS software version 22.0. Initially, the data was cleaned, categorised into themes, and entered into an Excel document. Descriptive analysis was performed using mean values, percentages, and standard deviations to summarise socio-demographic information and questionnaire responses. For inferential analysis, the Chi-square test was used to examine relationships between demographic factors (age, marital status, employment status, field of study, and educational level) and PCOS knowledge scores.

The questionnaire included 60 knowledge items, scored from 0 to 60, covering the following areas: signs/symptoms (18 items), risk factors (10 items), psychological effects (10 items), long-term complications (10 items), diagnostic tools (5 items), and management strategies (7 items). Scores were categorised as: poor knowledge (0-30) or adequate knowledge (31-60). Each knowledge item had three response options (agree, disagree, neutral). Agree responses were classified as correct, neutral and disagree responses were classified as incorrect. Responses were scored with 1 point for correct answers and 0 points for incorrect answers. This comprehensive approach was used to assess and categorise categorise the level of knowledge and awareness of PCOS within the sampled population.

Results

The survey received 305 responses, with participants' mean (SD) age being 24.86 years (5.23). The survey had a high response rate of 85.9%. The participants were predominantly female (72.9%), majority aged 18-24 years 56.39%), and single (59%). Most were students (50.8%) in healthcare-related fields (58.7%) and pursuing a degree (40.3%).

The study found a high prevalence of PCOS (33.4%) among participants. Additionally, 78% of respondents reported knowing someone previously diagnosed with PCOS. Table 2 presents a detailed breakdown of participants' demographic information.

Table 2 Demographic Characteristics of the Participants

Variable	Levels	Frequency (%)
Age	18-24	172 (56.93)
	25-31	100 (32.79)
	32-38	29 (9.51)
	39-45	4 (1.31)
Gender	Male	83 (27.1%)
	Female	222 (72.9%)
Marital Status	Single	180 (59%)
	Married	116 (38%)
	Divorced	9 (3%)
	Widowed	0 (0%)

Employment Status	Student	155 (50.8%)
	Self-employed	21 (6.9%)
	Full-time employee	118 (38.7%)
	Unemployed	11 (3.6%)
Field of study	Healthcare	179 (58.7%)
	Non-health care	126 (41.3%)
Current level of education	Foundation	69 (22.6%)
	Diploma	106 (34.8%)
	Degree	123 (40.3%)
	Master's	7 (2.3%)
Have you been diagnosed with PCOS?	Yes	102 (33.4%)
	No	143 (46.9%)
	Not sure	60 (19.7%)
Do you know anyone who has been previously diagnosed with PCOS?	Yes	238 (78%)
	No	67 (22%)

Table 3 presents participants' knowledge and awareness of PCOS. The majority (83.6%) were familiar with the term, while 9.8% had no awareness, and 6.6% were uncertain. Regarding the nature of PCOS, 63.9% perceived it is a manageable condition, 10.2% believed it to be curable, 2.6% considered it fatal, and 23.3% were unsure.

Table 3 Participants' PCOS Knowledge and Awareness

Question		Levels	Frequency (%)
1.Have you ever heard of the term polycystic ovarian syndrome (PCOS)?		Yes	255 (83.6%)
		No	30 (9.8%)
		Not sure	20 (6.6%)
2. What type of condition is PCOS?		Fatal	8 (2.6%)
		Curable	31 (10.2%)
		Manageable	195 (63.9%)
		Not sure	71 (23.3%)

Sources of Information
In terms of source of information, social media and health professionals were the most common (approximately 60% each), followed by friends (50%) and family (40%). College and health campaigns were less frequently mentioned, while other were minimal. Figure 1 illustrates the sources of information about PCOS.

Figure 1 Sources of Information about PCOS
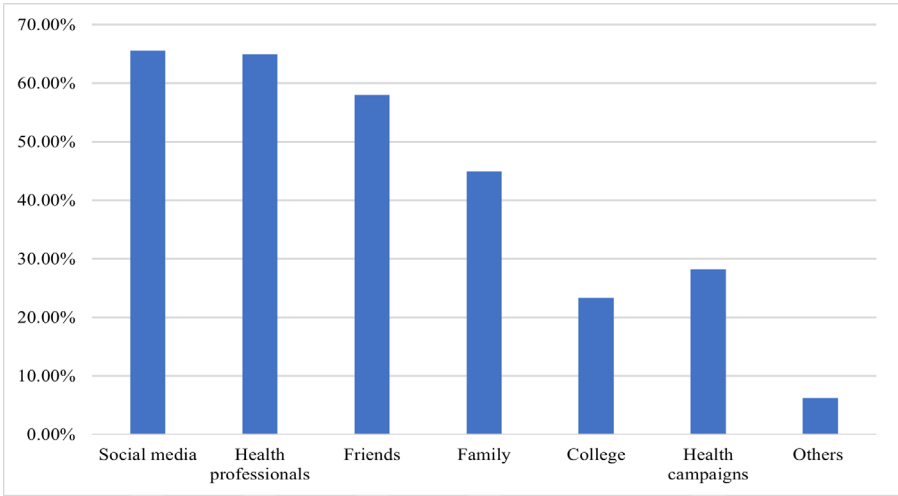
Knowledge about PCOS

Table 4 Current levels of PCOS among the study population

Key elements for Knowledge of PCOS	Total elements	Mean	Percentage of Total score
Signs & Symptoms	18	12.2	67.8%
Risk Factors	10	5.87	58.7%
Psychological Impacts	10	6.18	61.8%
Long-term complications	10	5.07	50.7%
Diagnostic Tools	5	3.62	72.4%
Treatment Options	7	4.43	63.3%
Knowledge score	60	37.4	62.3%

Table 4 provides a detailed overview of knowledge surrounding PCOS across six critical areas. "Diagnostic Tools had the highest knowledge level at 72.4%, indicating an understanding of how PCOS is identified, followed by Signs and Symptoms at 67.8%. Treatment Options and Psychological Impacts were moderately understood, with 63.3% and 61.8% knowledge levels, respectively. However, there is a noticeable gap in understanding Risk Factors and Long-term Complications, with 58.7% and 50.7% knowledge levels respectively. Overall, the total knowledge score across all categories is 62.3%, suggesting a fair understanding of PCOS.

Relationship between Age and Knowledge Score

The 39-45 age group had the largest percentage of adequate knowledge (66.2%). However, the p-value of 0.806 indicates no statistically significant relationship between age and PCOS knowledge scores, suggesting that knowledge levels do not

significantly differ across the age categories studied.

Relationship between Field of Study and Knowledge Score

Students from healthcare backgrounds (67.9%) had adequate knowledge of PCOS, while 32.1% had poor knowledge. The p-value (< 0.001) indicates a statistically significant difference in PCOS between these two groups. This suggests that individuals with a healthcare background are significantly more likely to have a better understanding of PCOS than those from non-healthcare fields.

Relationship between Marital Status and Knowledge Score

Among 180 respondents, including single individuals, 63.1% had adequate knowledge, while 36.9% have poor knowledge. The p-value (< 0.001) indicates a statistically significant difference in PCOS knowledge between marital and single participants. These findings suggest that single individuals tend to have better awareness of PCOS compared to married and divorced respondents.

Table 5 Relationship between Age, Marital Status and Field of Study and Knowledge Score of PCOS

Variable	Levels	PCOS Knowledge Score	P-value	
Age		Adequate Knowledge (%)	Poor Knowledge (%)	
	18-24 (n=172)	63.1	36.9	0.806
	25-31 (n=100)	56.7	43.3	
	32-38 (n=29)	54.8	45.2	
	39-45 (n=4)	66.2	33.8	
Marital Status	Single (n=180)	63.1	36.9	<0.001*
	Married (n=116)	57.6	42.4	
	Divorced (n=9)	38.5	81.5	
	Widowed (n=0)	-	-	
Field of study	Healthcare (n=179)	67.9	32.1	<0.001*
	Non-health care (n=126)	49.4	50.6	
Note: *p-value is significant (<0.05)				

Discussion

The study's main findings were that the study participants' awareness and knowledge of PCOS were adequate. However, there are areas that can be addressed to improve awareness among the study participants.

Sociodemographic Factors and PCOS Knowledge

The study found no significant correlation between age and PCOS knowledge (p=0.806). Both younger (18-24 years) and older (39-45 years) age groups demonstrated high levels of knowledge (63.1% and 66.2%, respectively). This finding aligns with Alshdaifat et al. (2021), suggesting that while university education plays a critical role in knowledge acquisition, age alone is not a significant predictor of PCOS awareness. Rajkumar et al. (2022) and Malekzadeh et al. (2023) further support this, highlighting that awareness often increases with age and experience, particularly as individuals become more attuned to health issues related to to reproductive and general health issues.

The relationship between marital status and PCOS knowledge was significant (p<0.001), indicating that married individuals generally had higher awareness, likely due to regular healthcare engagements (Jaber et al., 2022; Souheil & Chahine, 2022). However, in the present study single respondents had slightly higher knowledge scores (63.1%) compared to their married counterparts (57.6%). This discrepancy could be due to frequent discussions about PCOS among peers and family members, as observed by Malekzadeh et al. (2023). Conversely, Arsalan et al. (2021) found no significant link between marital status and PCOS knowledge, suggesting that other factors may influence knowledge acquisition.

A significant positive correlation was found between field of study and PCOS knowledge (p<0.001). Participants from healthcare backgrounds (58.7%) had notably higher knowledge compared to those from non-healthcare backgrounds (41.3%). These findings align with findings from Jabeen et al. (2022), emphasising that healthcare education significantly enhances PCOS awareness. Healthcare professionals play a primary role in disseminating PCOS information, which reinforces the importance of specialised education in increasing awareness (Goh et al., 2022; Bohsas et al., 2024).

The study indicated that education level was not significantly associated with PCOS knowledge (p=0.706). Despite higher education levels, participants' overall knowledge remained relatively low, mirroring findings from Aljuaid et al. (2023) and Rao et al. (2020), which suggest that higher education does not necessarily equate to better awareness of PCOS. In contrast, Jaber et al. (2022) found a positive association between higher education and PCOS knowledge, indicating that while higher education may encourage proactive health information-seeking, PCOS education remains underrepresented in academic curricula.

General Assessment of PCOS Awareness and Knowledge

The study found that 83.6% of respondents were familiar with the term "PCOS," reflecting a reasonable level of general awareness. However, a significant number of participants were uncertain about their diagnosis due to incomplete screenings, highlighting a substantial gap in early detection and diagnosis (Kumar et al., 2023; Wang et al., 2022). The high proportion (78%) of respondents who knew someone with PCOS underscores its relevance and the need for continued awareness efforts.

Sources of Information Regarding PCOS

Healthcare professionals were identified as the primary source of PCOS information for 64.9% of respondents, consistent with findings from Kaundel et al. (2023). This contrasts with studies where family and friends played a more significant role (Malekzadeh et al., 2023). The significant role of healthcare providers underscores their importance in disseminating PCOS information, although reliance on non-professional sources, such as the Internet and social circles, varies across studies (Alshdaifat et al., 2021; Upadhye & Shembekar, 2017).

Knowledge Gaps and Management Strategies

The study's overall PCOS knowledge score was 62.3%, indicating a moderate understanding of the condition. Awareness was highest for signs and symptoms (67.8%) and diagnostic tools (72.4%) but significantly lower for risk factors (58.7%) and complications (50.7%). These findings highlight critical knowledge gaps, particularly regarding long-term risks and complications, as also noted by Jaber et al. (2022) and Teede et al. (2023). Participants demonstrated strong awareness of lifestyle management strategies, including diet (88.9%) and exercise (91.8%), but there was considerable reliance on herbal remedies (50.2%), reflecting cultural preferences (Arabiat et al., 2022; Rababa'h et al., 2022).

In summary, while PCOS awareness among MNU undergraduates is relatively high, significant gaps remain, particularly in understanding long-term complications and risk factors. The role of healthcare professionals in PCOS education is pivotal. However, broader educational initiatives and improved access to screening are necessary to address these gaps and enhance early detection and management. Future research should focus on evaluating the effectiveness of educational interventions and increasing awareness at both institutional and community levels.

The study's findings should be considered in light of its limitations. Most participants had a diagnosis of PCOS or knew someone with the condition, which is likely the primary reason for the high level of awareness and knowledge observed in this study. Additionally, as the research was conducted at a single educational institution, the findings may not be generalisable to a broad audience. Future research should include a more diverse demographic beyond MNU undergraduates, covering a wide segment of the Maldivian population.

Conclusion

PCOS is a silent disorder that poses a serious threat to women's physical and mental well-being. (Coffin et al., 2023). The findings from the assessment of knowledge and awareness of PCOS among MNU undergraduates highlight significant disparities in understanding various aspects of the condition, emphasising the need for targeted educational interventions. While diagnostic tools and symptoms are relatively well understood, notable gaps remain in knowledge regarding risk factors and long-term complications. Social media and healthcare professionals were identified as the primary sources of information on PCOS. Addressing these gaps through enhanced educational efforts is crucial for improving health outcomes and promoting proactive management of PCOS among young women (Rizvi et al., 2023). By bridging these knowledge gaps, we can foster informed health-seeking behaviours and empower women to make better decisions regarding their reproductive health (Upadhye & Shembekar, 2017).

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