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Original Research

Factors affecting the patient's knowledge, experience and medication adherence with isotretinoin: A cross sectional study among Jordanian patients

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Abstract

Aim: This study aims to evaluate the factors affecting the patient's knowledge, experience and medication adherence with isotretinoin. **Methods:** This cross-sectional study, conducted in Jordan from October 2023 to February 2024, utilized Google Forms to create a self-administered online survey for data collection. Multiple-linear regression analysis was conducted to study the predictors affecting knowledge, experience (using SKINDEX-16 scale) and adherence of patients to isotretinoin (using LMAS-14 scale). **Results:** A total of 147 responses were included in the final analysis. The majority of the study participants were females (133, 90.5%), holding bachelor's degree (126, 85.7%), single (116, 78.9%) and living in urban areas (118, 80.3%). Study participants demonstrated a moderate level of knowledge (mean score was 14.25±3.97 out of 22), a positive experience, and adherent to isotretinoin (mean score was 4.61±2.48). The knowledge score about isotretinoin was positively affected by female gender, university education, living in urban areas, and previous experience with isotretinoin use. While patient experience with isotretinoin was positive, increasing the participant's age. Regarding medication adherence, it was positively affected by previous experience with isotretinoin and the doctor-patient communication score. **Conclusion:** These findings emphasize the need for tailored interventions to improve education, communication, and support, ultimately enhancing treatment outcomes and patient satisfaction with isotretinoin therapy. Future research could explore longitudinal trends and additional factors affecting medication adherence in this context.

Keywords: knowledge, experience, adherence, isotretinoin, Jordan

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INTRODUCTION

Skin disorders have consistently exerted a significant adverse impact on individuals' lives[1], with acne valgaris emerging as the most prevalent among them[2]. According to a systematic review conducted by Vos et al. (2012) as part of the Global Burden of Disease study, acne vulgaris stands as the eighth most widespread disorder globally, affecting individuals of all ages and genders worldwide[3]. The prevalence is notably higher during adolescence, peaking in puberty[4]. This condition significantly influences patients' quality of life, particularly on emotional, social, and psychological levels[5]. The spectrum of acne vulgaris treatment encompasses various approaches, ranging from topical therapies such as retinoids, benzoyl peroxide, and antibiotics, to oral antibiotics, combined therapies, and oral isotretinoin[6].

Oral isotretinoin, a synthetic retinoid derived from vitamin A, stands as a highly effective treatment for moderate to severe acne, providing long-term remission and improving skin appearance and quality of life[6,7,8]. This medication targets various acne-related processes, including inhibiting sebaceous gland activity, reducing sebum production and inducing comedolytic effects[6,9]. Notably, research highlights its impact on inflammatory markers, proposing the systemic immune-inflammatory index (SII) as a valuable indicator of its anti-inflammatory effects[10].

Despite its efficacy in treating acne, isotretinoin is accompanied

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by a spectrum of side effects, ranging from mild to potentially life-threatening[11]. Notably, dryness in the skin, nose, and eyes is emphasized[8], with ocular adverse effects common and often linked to alterations in the corneal surface or lacrimation abnormalities, resulting in insufficient moisture and dry eyes[3]. Additional side effects encompass pruritis, photosensitivity, dysglycemia, and psychological disorders, including depression[8,12]. Additionally, elevating the concentration of liver enzymes such as aspartate transaminase (AST) and alanine transaminase (ALT)13. Further considerations involve identifying specific baseline cholesterol and triglyceride levels that are highly sensitive and specific in detecting grade 1 abnormalities at the one-month follow-up[10]. However, the most substantial concern lies in isotretinoin's teratogenicity, posing an estimated 20-35% risk to infants exposed to the medication[9].

In a Jordanian study, it was found that over one-third of patients failed to attend monthly follow-up appointments or inform their physicians before using other medications alongside isotretinoin[11]. Furthermore, a recent study in Jordan found that patients had a moderate level of knowledge about isotretinoin at baseline, suggesting a partial understanding of its potential risks. Given the widespread use of isotretinoin in Jordan and the potential associated risks[14], there is a crucial need to assess awareness and comprehension among patients nationwide. Emphasizing the limited safety profile of isotretinoin therapy underscores the importance of enhancing patient awareness regarding its optimal usage. Utilizing the Arabic version of SKINDEX-16[1] to assess quality of life for patient care, this study aims to evaluate the factors affecting the patient's knowledge, experience and medication adherence with isotretinoin.

METHODS

Study Design

This cross-sectional study, conducted in Jordan from October 2023 to February 2024, used Google Forms to create an online survey for data collection. The survey aimed to reach the general public in Jordan and maximize participant enrollment, facilitated by a recruited data collector. Participants completed an online, self-administered questionnaire after consenting to participate in the study and meeting specific criteria. To be eligible, participants had to be 18 years or older, residing in Jordan, currently using isotretinoin, and willing to join the study. Those under 18 years old, living outside Jordan, not using isotretinoin, or declining to participate were excluded. Convenient random sampling was employed, with questionnaires distributed via social media platforms and an online link shared with the general Jordanian populace for participation.

Sample size

Following Tabachnick and Fidell's guidelines for determining sample size in analysis, it is recommended to target 5–20 subjects per predictor[15]. As this study encompasses 10 independent variable levels, adhering to the guideline of 10 subjects per predictor suggests a minimum sample size of 140 is suitable. To address potential missing responses and unforeseen issues, it was decided to augment the sample size to 150.

Study tool development

The study originated in English and was subsequently translated into Arabic to ensure comprehensibility among the intended population. Field experts assessed the face and content validity of the questionnaire, and minor linguistic adjustments were made based on their feedback. Additionally, a pilot study involving 10 participants was conducted to evaluate the comprehension and clarity of the questions in alignment with the research objectives and to validate the effectiveness of the data collection method. The questionnaire comprised five sections. The first section covered sociodemographic data, while the second focused on isotretinoin use, including prescription details and prior treatments. The third section assessed participants' knowledge of isotretinoin's adverse effects, usage instructions and the sources of information about isotretinoin. It also included the Skindex-16 Scale to evaluate skin-related quality of life[1]. The fourth part explored medication adherence using the Lebanese Medication Adherence Scale-14 (LMAS-14)[16]. The final section comprised the Doctor-Patient Communication (DPC) Questionnaire[17].

Medication adherence scale

The Lebanese Medication Adherence Scale-14 (LMAS-14), validated in Arabic, was employed in this study to evaluate adherence to isotretinoin[18]. The scale encompasses various domains, including occupational factors such as forgetfulness during busy periods (e.g., intensive work or travel), social factors such as being invited to meals, dietary restrictions due to potential food-medication interactions, and delays in replacing an empty pillbox. Additionally, psychological factors are assessed, including side effects, changes in clinical condition, and behavioral adjustments, alongside improvements in lab results. Annoyance factors, like the burden of multiple pills and enduring chronic treatment, are also considered. Lastly, economic aspects such as health insurance coverage and medication expenses are examined[16]. With 14 items, each rated on a 4-point Likert scale from zero (indicating high adherence) to three (indicating low adherence), the cut-off of 6 was adopted, classifying patients as adherent (<6) and nonadherent (score ≥ 6), with higher scores indicating better adherence[18,19]. The scale demonstrated high reliability in this study, with a Cronbach's alpha coefficient of 0.98.

Patient-doctor communication

Assessing the quality and effectiveness of doctor-patient communication was accomplished using the Doctor-Patient Communication scale[17]. This scale comprises 15 items, each presenting four response options: 'No', 'Possibly no', 'Possibly yes', and 'Yes'. Responses are rated on a Likert-type scale from 1 to 4, with higher scores denoting improved communication between the doctor and patient. In this study, the scale exhibited high reliability, indicated by a Cronbach's alpha coefficient of 0.98.

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Ethical approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of the Faculty of Pharmacy, Applied Science Private University, Amman, Jordan (approval number:2023-PHA-62). Each respondent received a copy of the study's information and a consent form to be completed online before beginning the questionnaire, if they wished to proceed.

Statistical analysis

The data, initially collected via Google Forms, were processed in an Excel spreadsheet before being subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) version 24.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics, including mean and standard deviation for continuous variables, were computed, while the Shapiro-Wilks test was employed to assess normality. Frequencies and percentages represented categorical variables. To explore associations, simple linear regression was used to examine the relationships among knowledge, experience, medication adherence scores, and their predictors. A threshold of $p < 0.250$ was set to determine eligibility for multiple linear regression analysis, with statistical significance defined at $p < 0.05$.

RESULTS

Sociodemographic characteristics and isotretinoin use

A total of 150 responses were received for the questionnaire. Three responses were excluded from the final analysis due to incompleteness. The majority of the study participants were females (133, 90.5%), held bachelor's degrees (126, 85.7%), were single (116, 78.9%), and lived in urban areas (118, 80.3%). Almost half of the participants were students (72, 49.0%), and the mean age was 24.2±5.3 years. The majority of the study sample used isotretinoin according to physician recommendations (140, 95.2%) and had no prior experience with this medication (88, 59.9%). About 128 participants had tried topical acne preparations before, and more than 80% didn't respond to them. More than half of the participants had used isotretinoin for less than 1 or up to 6 months (81, 55.1%), and the mean daily dose was 29.2±13.2 mg (Table 1).

Participants' knowledge about isotretinoin

In general, study participants demonstrated moderate knowledge of isotretinoin. The mean score of knowledge was 14.25±3.97 out of 22. Most participants knew that isotretinoin could cause skin dryness and sun allergy (>70%). Participants acknowledged that isotretinoin use is recommended with a fatty meal (70, 47.6%), skin sunblock (144, 98.0%), and plenty of water (144, 98.0%; Table 2).

Figure 1 shows that most participants depend on doctors as their main source of information (137, 93.2%), followed by experience transfer from previous patients (108, 73.5%) and the internet (99, 67.3%).

Participants' experience and skin quality of life with isotretinoin using the Skindex-16 Scale

Participants reported a positive experience with isotretinoin use (Table 3). As the majority experienced a low level (score <50) of skin side effects (itching, burning, and pain). The same scores for the psychological side effects (feeling of frustrations, embarrassment, anger, depression, etc.).

Table 1. Sociodemographic characteristics and isotretinoin use of study participants (n=147)

Variable	**Measures**	
	Mean	**SD**
o **Age (years)**	24.2	5.3
o **Body weight**	63.1	11.9
Gender	**n**	**%**
o Male	14	9.5
o Female	133	90.5
Educational level		
o School level	9	6.1
o Diploma	1	0.7
o Bachelor	126	85.7
o Postgraduates	11	7.5
Marital status		
o Single	116	78.9
o Married	28	19
o Divorce	3	2
Residential Area		
o Urban	118	80.3
o Rural	29	19.7

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Major		
o Health	22	15
o Non-health	26	17.7
o Unemployed/retired	27	18.4
o Students	72	49
Do you use isotretinoin according to physician prescription?		
o Yes	140	95.2
o No	7	4.8
Do you have prior experience with isotretinoin?		
o No, it's the first time I've used the medicine	88	59.9
o Yes, I have taken medication before	59	40.1
Have you tried topical medications or antibiotics for acne before isotretinoin?		
o Yes	128	87.1
o No	19	12.9
If yes, was there any response from treatment?*		
o Yes, partially	20	15.6
o Not at all	108	84.4
Duration of usage		
o Less than or equal to six months	81	55.1
o More than six months	66	44.9
Daily Dose of Isotretinoin (mg): Mean ±SD	29.2±13.2	

*percentages were calculated based on the number of participants who answered previous question "yes"=128. SD: Standard deviation

Table 2. Participants' knowledge about isotretinoin (n=147).

Knowledge items	**Correct answer**	
	n	**%**
Isotretinoin treatment has several potential side effects, including (more than one answer is allowed):		
• Dryness (skin, lips, eyes, nose…)	147	100
• Skin rash	39	26.5
• Teratogenicity	59	40.1
• Lipid profile disturbance	75	51
• Headache	61	41.5
• Dysglycemia	44	29.9
• Sun allergy	108	73.5
• Changes in vision or eye inflammation	83	56.5
• Nose bleeding	76	51.7
• Depression	63	42.9
• Increased liver enzymes	79	53.7
Knowledge statements		
1. Isotretinoin can be used without prescription[$]	134	91.2
2. Isotretinoin can be used for more than 6 months without stop[$]	41	27.9
3. No need to have laboratory monitoring during Isotretinoin use[$]	137	93.2
4. Isotretinoin is recommended to be given with fatty meal	70	47.6
5. Isotretinoin is recommended to be used with sunblock	144	98
6. Patients who are on isotretinoin must take plenty of water	144	98

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7. Patients can donate blood while on Isotretinoin treatment[$]	95	64.6
8. Pregnant or breastfeeding women can take Isotretinoin[$]	140	95.2
9. Isotretinoin can be taken by people with liver disease or hyperlipidemia[$]	134	91.2
10. Women must not get pregnant for one month after stopping this treatment.	115	78.2
11. Isotretinoin is not recommended for children under the age of 12	128	87.1
Knowledge score (out of 22)[#]	**Mean**	**SD**
	14.25	**3.97**

*Each correct answer scored one point, while the incorrect one scored 0 point.
[#]Bloom's cutoff point is a low level of Knowledge. Bloom's cutoff was used to interpret the scores values where 80%-100% (17.6-22) was considered high level of Knowledge, 60%-79% (13.2-17.5) moderate level of Knowledge and <60% (<13.2) low level of Knowledge.
[$]Correct answer is NO.

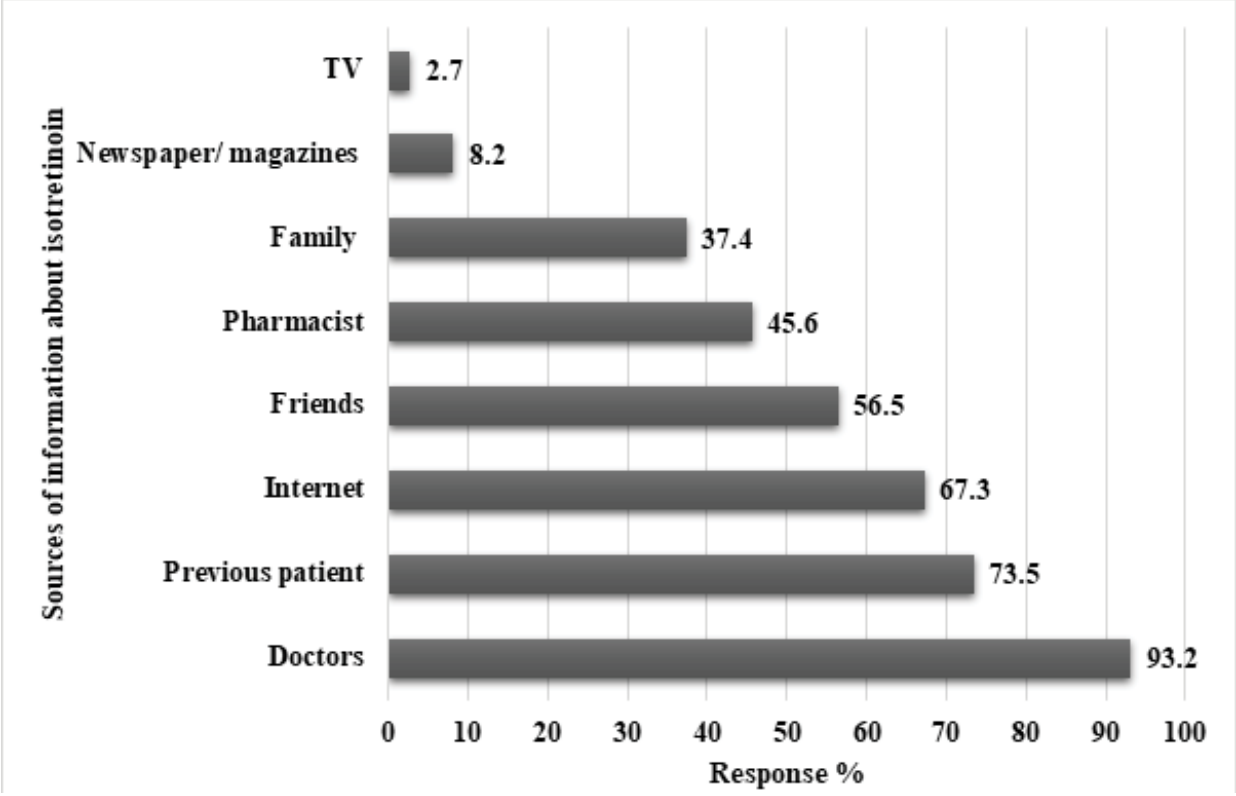

Figure 1. Sources of information about isotretinoin according to participants' responses (More than one option was allowed).

Table 3. Participants experience with isotretinoin after a week of use.

After a week of using isotretinoin, how bothered were you by it (score 0 -100)	**Mean**	**STD**
1. Itching sensation.	21.8	17
2. Burning or tingling of the skin.	17.9	14.2
3. Skin painful sensation.	25.1	18
4. Your skin feels rough and uncomfortable.	52.5	16.7
5. Persistent or recurring symptoms of your skin condition	46.3	17.6
6. Worry about your skin condition (for example, whether it will spread or get worse, or cause a scar in the future, or that it cannot be predicted what will happen to it, etc....)	42.7	17.8
7. The appearance of your skin condition	38.9	12.2
8. Frustration because of your skin condition	47.5	10.5
9. Embarrassment due to your skin condition	45.5	10.7

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10. Being extremely upset (angry) because of your skin condition	34.3	14.7
11. You feel depressed and sad because of your skin condition	38	15.9
12. Negative social effects due to your skin condition (for example: interaction with family, friends, relatives, etc....)	20.5	11.1
13. The effect of your skin condition on your desire to socialize with people	34.4	19.1
14. Difficulty showing feelings of love due to your skin condition	26	13.1
15. The effects of your skin condition on your daily activities (including acts of worship such as ablution, prayer, etc....)	28.3	18.7
16. Difficulty working or doing what you enjoy because of your skin condition.	27.9	12.7
Experience mean score (out of 100)*	**33.9**	**12.4**

*According to Bloom's cutoff point 80%-100% was considered negative experience, 60%-79% neutral experience and <60% positive experience.

Medication adherence with isotretinoin

According to LMAS scoring, the study sample was considered adherent to isotretinoin. Participants' mean score was 4.61±2.48, and the cut-off point was 6. As Table 4 reveals, most of the patients never stop their medication without consulting the physician for a feeling of improvement or not (>70%). They tried to remember their medication intake under many circumstances (e.g., intensive work or travel).

Factors affecting the patient's knowledge, experience and medication adherence with isotretinoin.

The knowledge score regarding isotretinoin was positively associated with female gender, university education, living in urban areas, and prior isotretinoin use (Table 5). In addition, there was a positive association between the doctor-patient communication score (details in Appendix, Table S1) and the knowledge score. While patient experience with isotretinoin was positive, it was also associated with older participants.

Regarding medication adherence, it was positively affected by previous experience with isotretinoin and the doctor-patient communication score.

DISCUSSION

Isotretinoin, known commercially as Accutane, is a significant breakthrough in treating severe acne. Originally studied in the 1960s for its effects on skin cell renewal, isotretinoin reduces oil gland size and oil production, targeting the primary causes of severe acne[20]. Its journey to FDA approval in 1982 was marked by caution due to its side effect profile, particularly its teratogenicity[21]. Additionally, other potential side effects such as liver enzyme abnormalities, elevated blood lipid levels, and

Table 4. Participants' adherence to isotretinoin using LMAS score (n=147).

Questions	Never	Sometimes	Often	Most of the times
1. Do you forget to take your medication when you are busy (intensive work or travel)?	75(51)	30(20.4)	8(5.4)	34(23.1)
2. Do you forget to take your medication if you are invited to lunch or dinner?	66(44.9)	54(36.7)	24(16.3)	3(2.0)
3. Do you forget to take your medication?	58(39.5)	86(58.5)	2(1.4)	1(0.7)
4. Do you get late when it comes to buying your medication packs when they become empty?	68(46.3)	50(34.0)	28(19.0)	1(0.7)
5. Do you stop taking your medication if it forbids you from eating certain food that you love because of possible food-medication interaction?	82(55.8)	56(38.1)	7(4.8)	2(1.4)
6. Will you stop taking your medication, without your doctor's consultation, if your neighbor/relative took a prescription like yours for a long term and it caused them side effects?	106(72.1)	30(20.4)	9(6.1)	2(1.4)
7. Do you stop taking your medication without consulting your doctor if the laboratory tests show improvement during treatment period?	105(71.4)	31(21.1)	9(6.1)	2(1.4)
8. Do you stop taking your medication without consulting your doctor if you do not feel better during treatment period?	109(74.1)	28(19.1)	8(5.4)	2(1.4)
9. Do you stop taking your medication without consulting your doctor if you feel better during treatment period?	107(72.7)	29(19.7)	10(6.8)	1(0.7)
10. Do you decide to stop some of your medications without consulting your doctor if you noticed that you are taking too many medications every day?	99(67.3)	40(27.3)	6(4.1)	2(1.4)
11. Do you stop your chronic treatment if you get bored of it?	78(53.1)	62(42.2)	6(4.1)	1(0.7)
12. Do you stop taking your medication in case of side effects?	54(36.7)	49(33.4)	36(24.5)	8(5.4)
13. Do you stop taking your medication if your insurance does not cover it?	103(25.9)	38(25.9)	5(3.4)	1(0.7)
14. Will you stop buying your medication packs if you considered them expensive?	99(67.3)	40(27.2)	7(4.8)	1(0.7)
Adherence score* mean ±SD	**4.61±2.48**			

*A cut-off of 6 was admitted classifying patients as adherent (<6) and nonadherent (score ≥ 6).

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Table 5. Factors affecting participants' knowledge, experience and medication adherence using multiple linear regression.

Questions	No	Probably, No	Yes	Probably, Yes
o Did the doctor listen to you cautiously during the consultation?	11(7.5)	11(7.5)	106(72.1)	19(12.9)
o Did the doctor allow you to speak without interrupting you?	13(8.8)	8(5.4)	103(70.1)	23(15.6)
o Did the doctor encourage you to express yourself?	19(12.9)	7(4.8)	73(49.7)	48(32.7)
o Did the doctor examine you carefully?	16(10.9)	11(7.5)	97(66.0)	23(15.6)
o Did you feel that the doctor understands you?	14(9.5)	8(5.4)	93(63.3)	32(21.8)
o Was it easy to understand what the doctor said?	8(5.4)	4(2.7)	113(76.9)	22(15.0)
o Do you feel you were given all the necessary information?	15(10.2)	6(4.1)	94(63.9)	32(21.8)
o Did the doctor explain the advantages and disadvantages of the treatment or care?	14(9.5)	11(7.5)	97(66.0)	25(17.0)
o Did you participate with the doctor in decision making?	17(11.6)	5(3.4)	102(69.4)	23(15.6)
o In your opinion, did the doctor have a reassuring attitude and style of speaking?	10(6.8)	7(4.8)	108(73.5)	22(15.0)
o Do you think the doctor was generally respected?	9(6.1)	3(2.0)	97(66.0)	38(25.9)
o Did the doctor make sure that you understood his explanations and instructions?	13(8.8)	7(4.8)	101(68.7)	26(17.7)
o Do you think the doctor told the whole truth?	11(7.5)	9(6.1)	99(67.3)	28(19.0)
o Do you trust this doctor?	11(7.5)	8(5.4)	105(71.4)	23(15.6)
o Did the doctor meet all your expectations and concerns?	13(8.8)	8(5.4)	98(66.7)	28(19.0)
DPC Total Score (out of 60)* mean±SD	**44.5±8.6**			

Significance of P-value<0.05 presented in bold font.

mood changes required thorough investigation to understand their incidence and impact fully[13,22,23,24]. Therefore, the current study aimed to evaluate patients' knowledge, experience, and adherence to isotretinoin treatment, as well as their awareness of its associated adverse effects. By examining these areas, we aim to enhance the overall treatment experience and safety for patients undergoing isotretinoin therapy, ensuring they are well-informed and supported throughout their treatment journey.

The average age of the study sample was 24.2 years. Most patients were aged 19–25, which is expected as acne is more prevalent in this age group[25,26]. Notably, 90.5% of the study participants were female, compared to only 9.5% male. This trend towards female predominance in acne cases, especially among adolescents, is reflected in the literature. For instance, our findings align with recent studies conducted in Jordan and Saudi Arabia, both highlighting a high prevalence of female patients undergoing isotretinoin therapy[6,11,12,27].

Several factors contribute to this gender disparity in acne incidence. For example, female hormone levels, which surge during puberty, can trigger acne development[28]. Additionally, conditions like polycystic ovary syndrome (PCOS) play a role in acne's manifestation[29]. Lifestyle choices, stress levels, skin sensitivity, and the use of full coverage foundation makeup can further exacerbate acne severity among females[30,31,32].

Concerning isotretinoin therapy, all patients need to be thoroughly informed about its potential adverse effects and contraindications due to its strong side effect profile. In our study, all participants were cognizant of isotretinoin's tendency to cause dryness, aligning with observations from other research[33,34,35]. However, only 40.1% were aware of its teratogenic risks, which is significantly lower than the 87.9% awareness rate reported by M. Lelubre et al. in Belgium36 and also lower than studies from Saudi Arabia[6,8,33].

The lower awareness of isotretinoin's teratogenic risks in our Jordan-based study may stem from differences in healthcare education, cultural practices, and communication barriers within Jordan. Healthcare systems in Belgium and Saudi Arabia might offer more comprehensive patient education, whereas in Jordan cultural norms and varying levels of healthcare provider engagement could limit discussions about medication risks.

Considering isotretinoin's teratogenic potential and that half of its users are women of childbearing age, it's imperative to adopt precautionary measures during its use[37]. Specifically, it is advised that women of reproductive age undergoing isotretinoin treatment undergo pregnancy testing both before and throughout the course of therapy to mitigate the risk of birth defects[38]. This necessitates implementing comprehensive patient counselling and educational initiatives to enhance patient understanding of isotretinoin's teratogenic risks and its other side effects, ensuring women are fully informed and can take appropriate precautions during treatment.

In our study, patients' initial knowledge score for isotretinoin was 14.25 out of 22, suggesting moderate awareness but a lack of comprehensive understanding of the drug's potential risks. Similarly, a study in Saudi Arabia found that the community's knowledge of the correct use and risks of isotretinoin was insufficient[6,35,39]. This contrasts with a previous Jordanian study, which found an average knowledge score of 8.1 out of 10 among isotretinoin users, indicating good knowledge of isotretinoin therapy[11].

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We observed a notable lack of awareness among patients regarding the appropriate duration of isotretinoin treatment and the benefit of taking it with fatty meals to enhance its effectiveness[21]. Optimal results from isotretinoin are typically seen when administered for a period of four to six months, based on the prescribed daily dosage[40]. However, a significant portion of our study's participants—over two-thirds—erroneously believed that isotretinoin treatment should extend beyond six months without interruption. This misconception mirrors findings from other studies in both Saudi Arabia and Jordan, suggesting a broader issue of patient education on isotretinoin therapy duration[11,12,27].

A noteworthy insight regarding blood donation among isotretinoin users revealed that only 64.6% of our participants were aware that isotretinoin patients should abstain from donating blood during their treatment period. This awareness level is significantly lower than that found in a previous Jordanian study, where an impressive 98% of participants knew about the restrictions on blood donation during isotretinoin therapy[11]. However, this figure is higher than the findings from a 2021 study by Imam SA et al., which revealed that over half (50.5%) of their participants were unaware of the need to avoid blood donation during isotretinoin treatment[41].

A minor segment of participants (8.8%) believed that isotretinoin could be used without a prescription. This finding aligns closely with results from another study, in which 10.4% of participants obtained isotretinoin without a prescription from pharmacies, friends, or family[12]. Additionally, a recent study conducted in Jordan reported that 6.3% of participants believed isotretinoin could be taken without a prescription[11]. These observations highlight the need for heightened public awareness and stricter regulation to prevent unauthorized use, given the drug's significant side effects and potential risks.

The overall positive experience, as indicated by the total mean score of 33.9, suggests that participants' side effects were generally not severe enough to significantly affect their perception of the medication. Despite this, the data points to specific areas of concern, particularly the sensation of rough, uncomfortable skin and the frustration associated with the condition, which received the highest mean scores. These findings are consistent with the well-documented side effects of isotretinoin, which include dryness and irritation, particularly in the initial stages of treatment[42]. Additionally, the literature supports the idea that acne and its treatment can significantly affect an individual's self-esteem, mood, and social interactions, and that initiating effective treatment can improve psychological well-being[43]. The phenomenon where isotretinoin may initially exacerbate acne before improving, which could explain the initial frustration and worry about the condition worsenig[44].

Our study showed that most participants had good adherence to isotretinoin therapy, with an overall adherence score of 4.61 (the cut-off value was set at 6). A considerable proportion of respondents indicated forgetfulness as a minor barrier, suggesting that while daily routines and social engagements might slightly affect medication adherence, they are not the primary reasons for lapses. Instead, a significant inclination among patients to cease medication based on personal judgment or external advice without consulting their healthcare provider emerges as a prominent concern. Comparatively, a retrospective cohort study in the USA found that 57.3% of isotretinoin patients maintained adherence within the first 90 days post-prescription, highlighting higher adherence with isotretinoin than with other acne treatments, such as topical applications or antibiotics[45]. Similarly, a cross-sectional study spanning America, Europe, and Asia reported a 54% adherence rate among isotretinoin users[46]. Moreover, research from England, using questionnaires and pill counts, revealed an average adherence rate of 64.7%, with first-time isotretinoin users showing significantly higher compliance (87.5%) than those on subsequent treatments (60.5%)[47].

The multiple linear regression analysis explores the relationship between various predictors and the outcomes of knowledge score, experience score, and medication adherence score among participants. The significant predictors of the knowledge score include gender, educational level, residential area, and previous experience with isotretinoin, as well as the patient communication score. Specifically, having a university-level education and residing in an urban area are strongly associated with higher knowledge scores. Additionally, being female and having prior experience with isotretinoin positively influence knowledge, as does a high patient communication score. Previous experience with isotretinoin and patient communication score significantly predict medication adherence.

Concerning gender, the literature has shown mixed results. Tan et al showed that men seem more knowledgeable[45], whereas Zaghloul et al found the opposite[47]. In our study, females were more knowledgeable about isotretinoin than males. This could be particularly relevant in the context of isotretinoin, given its serious teratogenic risks and women's greater concern for their skin compared to men[48]. Other factors can influence medication knowledge to isotretinoin including low education level aligning with our findings[46,49].

The significant positive impact of prior isotretinoin experience on both knowledge and adherence scores supports the notion that familiarity with the medication enhances patients' confidence and compliance with treatment protocols. This is in line with studies showing that prior experience with a medication or health condition can lead to better self-management and adherence[5,50,51]. The pivotal role of effective patient communication in enhancing both knowledge and adherence is well documented. Studies have shown that clear, empathetic communication from healthcare providers improves patient understanding, satisfaction, and engagement with treatment plans[52,53].

All in all, our study highlights crucial gaps in patient knowledge, especially regarding its risks and usage, highlighting the need for improved education and adherence. The predominance of female users and instances of non-prescribed use call for targeted education and stricter regulations. Findings suggest that greater knowledge and adherence are linked to factors

such as education level, urban residence, and effective communication with healthcare providers. Ultimately, enhancing patient education and provider communication is essential to safer, more effective isotretinoin treatment outcomes.

Study limitation

This study faced several limitations. The unequal gender distribution limits our ability to generalize findings across genders. Its cross-sectional nature introduces challenges with establishing cause-and-effect relationships and potential biases. Furthermore, reliance on an online survey format may introduce response bias, as participants may provide inaccurate responses to the questions posed.

CONCLUSION

This study sheds light on the multifaceted factors influencing patients' knowledge, experience, and medication adherence with isotretinoin. The findings underscore the importance of effective doctor-patient communication, prior experience with isotretinoin, and demographic factors such as gender, education, and urban residency in shaping patients' understanding, perceptions, and adherence to the medication. Notably, while the majority of participants demonstrated moderate knowledge, a positive experience, and adherence to isotretinoin, there were discernible influences on patient experience, such as age. These insights could inform healthcare providers in tailoring interventions to enhance patient education, communication strategies, and support mechanisms, thereby optimizing treatment outcomes and patient satisfaction with isotretinoin therapy. Further research could delve into longitudinal studies to track changes in patient perceptions over time and explore additional factors influencing medication adherence in this population.

AUTHORS CONTRIBUTIONS

Amani Al-Rawashdeh, Sarah Ibrahim and Muna Barakat: conceptualization. Amani Al-Rawashdeh, Sarah Ibrahim and Muna Barakat: investigation. Amani Al-Rawashdeh, Sarah Falah Al-Rawi, Shahad Al-Rawi, Diana Malaeb, Souheil Hallit, Muna Barakat: Methodology. Amani Al-Rawashdeh and Muna Barakat: Project administration. Muna Barakat: Supervision. Amani Al-Rawashdeh, Wala'a Al.Safadi, Muna Barakat. writing— original draft preparation: Amani Al-Rawashdeh, Sarah Ibrahim, Wala'a Al.Safadi, Sarah Falah Al-Rawi, Shahad Al-Rawi, Diana Malaeb, Souheil Hallit, Muna Barakat. writing— reviewing and editing. All authors read and approved the final version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no relevant conflicts of interest or financial relationships.

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Table S1. Participants' responses for the Doctor-Patient Communication (DPC) questions (n=147).

Questions	No	Probably, No	Yes	Probably, Yes
o Did the doctor listen to you cautiously during the consultation?	11(7.5)	11(7.5)	106(72.1)	19(12.9)
o Did the doctor allow you to speak without interrupting you?	13(8.8)	8(5.4)	103(70.1)	23(15.6)
o Did the doctor encourage you to express yourself?	19(12.9)	7(4.8)	73(49.7)	48(32.7)
o Did the doctor examine you carefully?	16(10.9)	11(7.5)	97(66.0)	23(15.6)
o Did you feel that the doctor understands you?	14(9.5)	8(5.4)	93(63.3)	32(21.8)
o Was it easy to understand what the doctor said?	8(5.4)	4(2.7)	113(76.9)	22(15.0)
o Do you feel you were given all the necessary information?	15(10.2)	6(4.1)	94(63.9)	32(21.8)
o Did the doctor explain the advantages and disadvantages of the treatment or care?	14(9.5)	11(7.5)	97(66.0)	25(17.0)
o Did you participate with the doctor in decision making?	17(11.6)	5(3.4)	102(69.4)	23(15.6)
o In your opinion, did the doctor have a reassuring attitude and style of speaking?	10(6.8)	7(4.8)	108(73.5)	22(15.0)
o Do you think the doctor was generally respected?	9(6.1)	3(2.0)	97(66.0)	38(25.9)
o Did the doctor make sure that you understood his explanations and instructions?	13(8.8)	7(4.8)	101(68.7)	26(17.7)
o Do you think the doctor told the whole truth?	11(7.5)	9(6.1)	99(67.3)	28(19.0)
o Do you trust this doctor?	11(7.5)	8(5.4)	105(71.4)	23(15.6)
o Did the doctor meet all your expectations and concerns?	13(8.8)	8(5.4)	98(66.7)	28(19.0)
DPC Total Score (out of 60)* mean±SD	**44.5±8.6**			

*The cutoff point was 30. Accordingly score ≥30 was considered positive communication score, while <30 was negative communication score.