

# Knowledge and Perception Regarding the Development and Acceptability of Male Contraceptives Among Pharmacists: A Mixed Sequential Method

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## Abstract

Community pharmacists play a crucial role in providing comprehensive patient education regarding contraception methods. This study aims to investigate Jordanian pharmacists' knowledge and perceptions toward male oral contraceptive pills (OCPs). A mixed-explanatory sequential method was divided into two phases. The first was a self-administered electronic survey that was distributed to community pharmacists/trainees in Jordan. The second phase was carried out through online semi-structured in-depth interviews targeting the maximum variation purposive sample of community pharmacists. A total of 158 (response rate 98%) questionnaires were included in the analysis. The majority of the participants were female ( $n = 118$ , 74.2%). In terms of knowledge, only 25% of participants acknowledged the presence of male OCPs and almost half were uncertain about the mechanism of action and the possible uses. The findings of the interviews confirmed a relatively negative perception toward male OCPs and the identified barriers to male OCPs were cultural norms, side effects, and poor compliance. It is argued that there is a negative perception toward male OCPs due to the majority of pharmacists not believing such products will be successful in Jordan. Once these pills are approved for their effectiveness and safety, men may need further education and encouragement to take an active role in family planning along with their partners.

## Keywords

contraceptive pills, males, Jordan, pharmacists

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## Introduction

Contraception can be achieved via behaviors, procedures, devices, or medications (Jain & Muralidhar, 2011). For four decades, research on contraception as a method to control birth and aid in family planning has largely focused on manipulating the female reproductive system and hormones (Plana, 2017). Although female oral contraceptive pills (OCPs) have proven to be effective, women with certain medical conditions or those who cannot tolerate the side effects cannot use them (Amory, 2016). To help reduce unintended pregnancies, males can take a more active role in family planning by using the available male contraceptive options.

Currently, only two methods are widely available: condoms and vasectomy (Amory, 2016; Gava & Meriggiola,

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2019). Unfortunately, condoms have a failure rate of approximately 13% (World Health Organization, 2019) and a vasectomy is invasive and not easily reversible (Gava & Meriggiola, 2019; Wang & Swerdloff, 2010). There are various ongoing male contraception options, which can be classified as either nonhormonal and hormonal methods (NHS inform, 2021).

The nonhormonal methods that are under investigation include the inhibition of sperm under guidance (RISUG), where a nontoxic synthetic chemical is injected into the vas deferens to block it and kill the sperm. This method has been demonstrated to be immediately effective (NHS inform, 2021). A variation of this technique is the intra-vas device (IVD), where a plug is injected into the vas deferens to filter out sperms. Both techniques have given promising results but they still need further research to assess their long-term safety and effectiveness (NHS inform, 2021).

The development of male hormonal contraception started in the 1970s. It is based on either the use of exogenous testosterone alone or in combination with a progestin or gonadotropin-releasing hormone (GnRH) analogue to suppress spermatogenesis (Wang et al., 2016; Wang & Swerdloff, 2010). To date, testosterone has been formulated in the form of injections, implants, gels, or oral pills (male pills), but none of these methods have been approved (Thirumalai & Page, 2019). Structured interviews of men in Edinburgh, Shanghai, and Hong Kong revealed that using oral pills was more convenient, despite the fact that they require multiple daily dosing (Martin et al., 2000). Clinical trials assessing hormonal male contraceptive therapy have reported it to be efficacious, with few side effects (Ayoub et al., 2017; Wu et al., 2019). The most common side effects revealed during clinical trials include acne, mild weight gain, decreased libido, mood swings, and increased appetite (Ayoub et al., 2017; Thirumalai & Page, 2019; Von Eckardstein et al., 2003; Wu et al., 2019). However, it takes around 5 to 8 weeks to suppress sperm production effectively by this treatment (Ayoub et al., 2017; Von Eckardstein et al., 2003; Wu et al., 2019). The main disadvantage of male hormonal contraception is that the suppression of sperm production differs between men of different ethnicities. Currently, this method of using hormones as a male contraceptive method is in Phase III trials, and to date, no such product has received a medical license yet (NHS inform, 2021).

In the Middle East, particularly in Jordan, largely due to gender norms and traditional family planning information being female-oriented, reproductive health was considered a woman's domain (Mansour et al., 2016). It is argued, however, that males should share the burden of contraception responsibility and their involvement must not be underestimated (Chng, 1983). Male OCPs are not

currently available in the Middle East, but there is a potential male OCP on the horizon (Li, 2021).

In light of the apparent need for such pills as an option for birth control, we conducted this study, starting with the knowledge that pharmacists have regarding male OCPs. Community pharmacists in Jordan are one of the more easily accessible health care providers who provide free consultations (Nazer & Tuffaha, 2017). In addition, they play a crucial role in providing comprehensive patient education to both males and females regarding birth control methods and assist them in selecting the most suitable contraceptive method (Colquitt & Martin, 2017).

The present study therefore explores from pharmacists' point of view the willingness of Jordanian men to take contraceptive measures and get more involved in family planning regardless of the social and gender norms in the Middle East. This study aims to investigate Jordanian pharmacists' knowledge of and perceptions toward male contraceptive pills (Heinemann et al., 2005).

## Method

This study was conducted using a mixed-explanatory sequential method, which consisted of two phases. The first phase involved a self-administered electronically conducted survey from March 15 to April 24, 2020, targeting community pharmacists and pharmacy trainees in Jordan. Recruitment took a place through social media platforms (Facebook, WhatsApp, LinkedIn, and Twitter). A month later, the second phase of the study was carried out through online semi-structured in-depth interviews, using the Microsoft Teams® application. Those interviews targeted the maximum variation purposive sample of community pharmacists. Study approval was obtained from the Institutional Review Board of Applied Science Private University, Jordan (Ethical Approval No. 2019-PHA-14).

### Quantitative Method (First Phase)

The development and validation (face and content validity) of the online self-administered survey were completed by clinical researchers according to the general principles of good survey design (Boynton & Greenhalgh, 2004). Respondents were recruited anonymously and their data were treated confidentially. The survey contains multiple-choice questions, which can be completed in an average of 15 min. The survey was administered in both Arabic and English via Google® Forms. The participants were advised that participation of voluntary and that the study did not pose any risk of harm. Potential participants who completed the survey were considered to have given informed consent to participate in the study.

To ensure face validity, 20 independent academics evaluated the first draft of the survey, along with an evaluation by a statistician. The final version of the survey was completed based on the comments and feedback provided by the evaluators. To ensure internal validity, the survey was translated from English into Arabic and then was back-translated by two senior academic staff members considered fluent in both languages. The questions were free from medical jargon or difficult terminologies. Survey piloting was conducted at the end of the survey development to enhance clarity, readability, understandability, and to confirm the study's applicability to Jordanian community pharmacists. Internal consistency reliability was tested by the Cronbach's alpha coefficient (.81).

The final version of the survey contained three sections. The first section (Part A) aimed to collect sociodemographic information, the second section (Part B) assessed the pharmacists' knowledge of male contraceptives, and the third section (Part C) measured the pharmacists' beliefs regarding male contraceptives.

### Sample Size

The calculation of the sample size was based on Tabachnick and Fidell's recommendation for analysis, in which five to 20 subjects per variable are suggested (Tabachnick et al., 2007). According to the number of independent study variable levels used in this study ( $n = 9$ ) and by using 10 subjects per predictor level, a minimum sample size of 90 or higher was considered suitable for the purpose of this study. In this study, 158 community pharmacists who met the inclusion criteria were recruited.

### Statistical Analyses

Statistical Package for Social Sciences version 24.0 (SPSS® Inc., Chicago, IL, USA) was used for analysis after extracting the completed surveys from Google® Forms as an Excel sheet. For each question, descriptive statistics included percentages and frequency of distribution was calculated.

### Qualitative Method (Second Phase)

The semi-structured in-depth interviews were conducted for 22 purposively collected community pharmacists (as sample saturation was reached). The sampling process focused on pharmacists with a reasonable level of experience regarding contraceptive methods. In this regard, introductory pilot interviews were employed to find the pharmacists who provided a fruitful and in-depth response.

Multiple questions regarding the use of male contraceptive pills were asked, which were answered freely by

the participants. A group of leading clinical pharmacy researchers reviewed the research tool to ensure the suitability of the measurement instrument. The interview was separated into two main parts: assessing the knowledge of the participants regarding male contraceptive pills and assessing the barriers for their usage in Jordan. Each interview took between 20 and 25 min. All data were treated confidentially and electronic informed consent was given to the participants. The meeting was recorded and transcribed verbatim after obtaining the participant's consent. Records were written in Arabic, as its the native language of Jordan; then, these records were translated into English language, checked for clarity and accuracy, uploaded to NVivo12 (qualitative data analysis software; QSR International Pty Ltd. Version 12) for coding, then analyzed thematically using modified grounded theory methods (Chun Tie et al., 2019). The trustworthiness and the accuracy of transcription, translation and intercoder reliability were rechecked by the second researcher.

## Results

### Sociodemographic Characteristics of the Participants

A total of 165 questionnaires were viewed by the participants and 162 agreed to participate (response rate of 98.1%). Of the 162, four uncompleted forms ( $n = 4$ , 2.4%) were excluded, resulting in 158 (97.5%) questionnaires to be included in the analysis. Females ( $n = 118$ , 74.2%) were the majority of the participating pharmacists and around half of them ( $n = 79$ , 49.7%) were <40 years old and held a university education degree (bachelor's and postgraduates). Less than half of the participants ( $n = 75$ , 47.5%) had been working for more than 10 years and most of them worked in community pharmacies located in the capital of Jordan, Amman ( $n = 115$ , 72.3%). Regarding the demographic data of the interviewed pharmacists, the saturated sample was included, resulting in 22 participants. Both genders were equally involved, with 31.8% aged 41 to 55 years old ( $n = 7$ ) and ( $n = 17$ , 77.3%) held a bachelor's degree (Table 1).

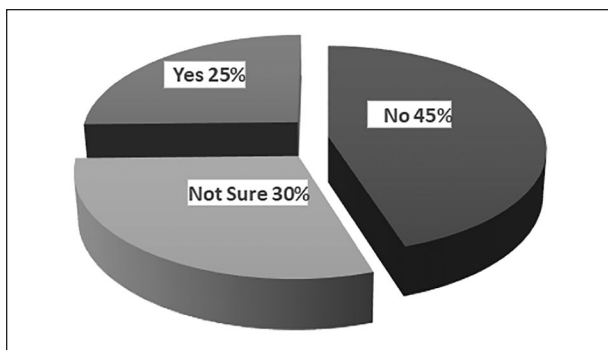
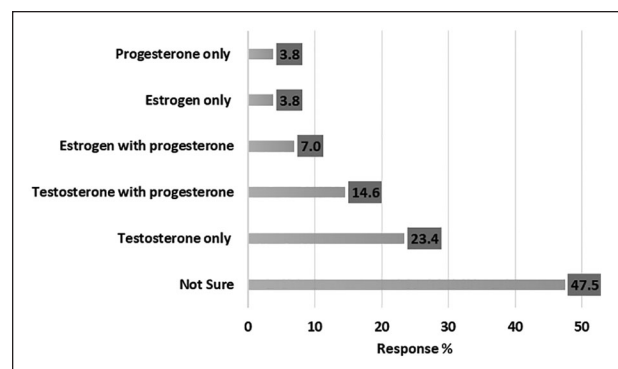
### Questionnaire Results

An evaluation of the pharmacists' perceptions and knowledge of male contraceptive pills is shown in Figure 1. A quarter of the study sample ( $n = 40$ , 25.3%) confirmed the presence of OCPs for males, whereas almost one third of ( $n = 47$ , 29.7%) were not sure about their presence. The remainder of the participants believed there were no such pills for males ( $n = 71$ , 44.9%).

Regarding the pharmacists' knowledge of the possible active ingredients of male OCPs, almost half ( $n=75$ ,

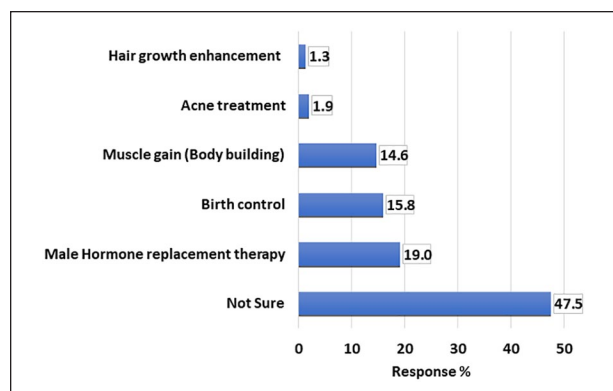
**Table 1.** Sociodemographic Characteristics of the Participating Pharmacists in Both Questionnaire ( $n = 158$ ) and Interviews ( $n = 22$ ).

Characteristic	Questionnaire sample $n$ (%)	Interviews sample $n$ (%)
<b>Gender</b>		
Female	118 (74.2)	12 (54.5)
Male	41 (25.8)	10 (45.5)
<b>Age (years)</b>		
20–25	16 (10.1)	5 (22.7)
26–40	79 (49.7)	5 (22.7)
41–55	59 (37.1)	7 (31.8)
>55	5 (3.1)	5 (22.7)
<b>Education</b>		
Bachelor's degree	100 (63.3)	17 (77.3)
Pharmacy student + trained in a pharmacy	35 (22.2)	4 (18.2)
Postgraduate degree	11 (6.9)	1 (4.5)
Diploma	12 (7.5)	0
<b>Years of experience</b>		
<5	35 (22.2)	4 (18.2)
5–10	48 (30.4)	4 (18.2)
11–15	58 (36.7)	5 (22.7)
16–20	8 (5.0)	5 (22.7)
>20	9 (5.7)	4 (18.2)
<b>Position in the pharmacy</b>		
Employee pharmacist	94 (59.5)	9 (40.9)
Trainee in a pharmacy	37 (23.4)	6 (27.3)
Pharmacy owner	27 (17.6)	7 (31.8)
<b>Province where you work</b>		
The capital of Jordan (Amman)	115 (72.3)	13 (59.1)
East of Jordan	9 (5.7)	2 (9.1)
West of Jordan	6 (3.8)	3 (13.6)
North of Jordan	16 (10.1)	2 (9.1)
South of Jordan	1 (0.6)	2 (9.1)

**Figure 1.** The Percentage of Community Pharmacists Who Acknowledged the Possible Presence of Males OCPs ( $n = 158$ )  
Note. OCP = oral contraceptive pill.**Figure 2.** Community Pharmacists' Knowledge About the Possible Active Ingredients of Males OCPs ( $n = 158$ )  
Note. OCP = oral contraceptive pill.

47.5%) of them were not sure about the possible active ingredients. On the contrary, the answers of the other

half of the participants were varied, suggesting there was testosterone only ( $n = 37$ , 23.4%), testosterone



**Figure 3.** Community Pharmacists' Perception and Knowledge About the Possible Uses of Males OCPs ( $n = 158$ )  
 Note. OCP = oral contraceptive pill.

with progesterone ( $n = 23$ , 14.6%), estrogen with progesterone ( $n = 11$ , 7.0%), and estrogen only and progesterone only ( $n = 6$ , 3.8% each), Figure 2.

Finally, the participants stated that male OCPs could be used as hormone replacement therapy, birth control tool, and muscle gain, ( $n = 30$ , 19%), ( $n = 25$ , 15.8%), and ( $n = 23$ , 14.6%), respectively. A minority ( $n = 3$ , 1.3% and  $n = 2$ , 1.9%) of the pharmacists agreed that male OCPs could be used for hair growth enhancement and acne treatment (Figure 3).

## Qualitative Phase Results

**Theme 1. General Pharmacists' Knowledge and Perceptions of Male Contraceptive Pills.** The first part of the interview was concerned with the pharmacists' knowledge and perception about the presence of a particular male OCP. Around 40% ( $n = 9$ ) of the participants knew of the possible existence of male specialized OCPs, stating that they had read in the literature about some trials to develop male OCPs, which were not licensed yet. Some participants proposed that the possible components for such OCPs would be a mix of testosterone and progestin, which theoretically may affect the spermiogenesis process among males. Moreover, only three pharmacists showed a positive perception toward the male OCPs, confirming that this option could solve a big problem for women who could not use the conventional female OCPs and could not tolerate other contraceptive methods, such as condoms. At the same time, the remainder of the participants were doubtful about the success of this type of pill in Middle Eastern countries.

### Part of the Reported Codes

The interviewer asked, "What do you know about the male contraceptive pills?"

Participant 1 said, "What I know is that for birth control, a male's spermiogenesis must be suppressed using these pills, so it should contain testosterone."

Participant 4 said, "Male contraceptive pills should primarily contain testosterone and a small amount of progesterone."

The interviewer asked, "Do you believe this type of contraceptive pill would be successful in our country?"

Participant 5 said, "Yes, I believe it will solve a problem, especially for people who have problems with other contraceptive methods."

Participant 10 said, "Yes, there is general acceptance for the concept of male OCP. Several male customers came to my pharmacy asking for oral contraceptive pills for personal use as a contraceptive method. Even the requested contraceptives are usually combined contraceptive pills, which consist of estrogen with progesterone."

Participant 6 said, "I doubt it will be successful in Middle East countries. It will not be perceived positively."

**Theme 2. Barriers to the Possible Use of Male Contraceptive Pills.** The study participants disclosed that the success of male OCPs would face several barriers. One of the most significant barriers is the social acceptability for such contraceptive methods compared with the others used in Jordan. Moreover, the participants suggested there was a fear of side effects of testosterone-containing pills, such as enlarged breasts, infertility, elevated blood pressure, heart attack, and liver disease. The pharmacists also clarified that, in general, males would rely on other contraceptive methods such as condoms and vasectomy, rather than using pills, because they are better established. Finally, one of the apparent barriers from the perspectives of the pharmacists is that males will not be as committed to contraceptive pill intake, as they believe that males will not be as compliant as females.

### Part of the Stated Codes

The interviewer asked, "In general, what would be the barriers for the use of male OCPs?"

Participant 3: "In our Middle Eastern culture, it would be very strange to ask males to take OCPs for birth control purposes."

Participant 8: "I am sure if any company attempted to launch OCPs for male use, it would fail in Jordan."

Participant 16: "Arab males will refuse to take such pills, unless it will empower their sexual potency."

Participant 17: "The main barriers are social acceptability and the presence of possible side effects, such as the enlargement of the breast."

Participant 19: "Theoretically, such pills could have many side effects, including gynecomastia, liver



and heart diseases. Further, Jordanian males don't consider contraception to be enough of a priority to administer a pill for it."

Participant 21: "I don't believe that Jordanian males will be as committed with this type of pill as women."

Participant 22: "It is very hard to convince males to take medication for contraceptive purposes, because they will refuse to harm themselves with the side effects of these pills for contraceptive purposes."

## Discussion

To our knowledge, this is the first study to assess community pharmacists' knowledge and perceptions of male OCPs in Jordan. Overall, the majority of the participants had poor knowledge about the availability, mechanism of action, and side effects of male OCPs, which can be explained due to the fact that no such products are medically approved as of yet. Moreover, the pharmacists had a negative perception of male OCPs' potential use in the Jordanian community.

Jordan's demographic reports show that about 40% of Jordanians are within the age group of 25 to 54 years of age, whereas the second-ranking age group is children aged 0 to 14 years old, forming around 30% of the population (Factbook, 2020). Accordingly, more than 85% of the participants were aged between 26 and 55 years old. Moreover, more than two thirds of Jordanian registered pharmacists are females (Net, 2020), which explains why the majority of our study participants were females. Amman is the Kingdom's commercial and administrative hub, as well as its economic and educational center, where 42% of the population resides (Ministry of Interior, 2021; Department of Statistics, 2020).

Previous studies have investigated knowledge and beliefs toward the use of female OCPs among males (Barakat et al., 2021; Barakat et al., 2020); however, none were concerned about the specialized pills for males that are currently in Phase III clinical trials. In this study, only a quarter of the pharmacists were aware of the development of male OCPs. This is mainly due to the fact that male OCPs are confined to clinical trials and none have been approved by any regulatory agency as of yet. Around 15% of the pharmacists assumed that estrogen (with or without progestin) OCPs could be used for male contraception, which has no scientific basis. On the contrary, these hormones are used in female OCPs (Sech & Mishell, 2015).

Clinically tested male OCPs included medroxyprogesterone acetate, norethisterone enanthate, testosterone enanthate, and testosterone undecanoate (Gava & Meriggiola, 2019). It was reported in clinical trials that androgens alone are less effective in suppressing

spermatogenesis when compared with the combination of androgen and gonadotropin suppressive agents, for example, progestin (Yuen et al., 2020).

Testosterone is clinically involved in delayed puberty, hypogonadism, muscle wasting, depression, and fatigue in HIV-infected men (Margo & Winn, 2006). As testosterone is the main component in male OCPs, some of the study participants predicted that male hormone replacement therapy and increasing muscle mass are possible uses for male OCPs, once approved.

A small percentage of the participants postulated the possible use of male OCPs for acne and hair growth. According to the literature, acne is a potential side effect associated with the use of testosterone and male OCPs (Kanakakis & Goulis, 2015; Margo & Winn, 2006; Nieschlag, 2010). Additional side effects of OCPs reported in clinical trials include elevations in liver enzymes, a reduction in high-density lipoprotein cholesterol (HDL-C), an increase in hemoglobin and hematocrit, weight gain, behavioral changes (including aggression or hostility), a decrease or increase in libido, mood changes, and night sweats (Margo & Winn, 2006).

According to the pharmacists in the study, the vast majority believe that male OCPs are unlikely to be successful in the Middle Eastern region. Fear of side effects, men's questionable commitment to oral pills, and the unwillingness of Middle Eastern men to share responsibility in family planning are among the most common barriers perceived by the study participants. According to a multinational study that assessed the willingness of more than 9,000 men to take male OCPs, approximately 60% of European, and 50% of American and Latino American men are willing to take male OCPs if made available, compared with only 28.5% in Indonesia, which was the only Asian country included in the study (Heinemann et al., 2005). A study conducted in the United Kingdom revealed that male contraceptive pills were generally accepted among the study participants; however, concerns about effects on future fertility and health risks were raised (Walker, 2011). Whereas in the context of developing countries, men are more dominant in society. Based on a number of studies conducted in developing countries regarding family planning, gender factors, along with men's dominance in decision-making, are considerable barriers to the use of modern contraceptives in general (Coll et al., 2019; Kabagenyi et al., 2014; Schuler et al., 2011).

The present study is thus the first to assess these points in the context of Middle Eastern and Arab countries. These findings may be explained by Eastern/Asian gender stereotypes. Our study participants suggest that Middle Eastern men may perceive male OCPs as a threat to their masculinity, which is consistent with the existing social and cultural norms (Dunne, 1998).

In the past two decades, the overall use of contraceptive methods in Jordan has increased from 40% to 61%, and fertility rates have declined to half (Almalik et al., 2018). However, this is still not in line with Jordan's Family Planning Program's objective of achieving an 80% contraceptive rate among married women, due to the high 12-month contraceptive discontinuation rate (Almalik et al., 2018). If male OCPs are to be approved, pharmacists can take a proactive role in patient education and counseling on the proper use of these medications. Encouraging men to be more involved in family planning can reduce the burden on women and help the country achieve its national goals for birth control.

## Strengths and Limitations

This is the first study in Jordan to assess the knowledge and perception of pharmacists on male OCPs in a community pharmacy setting. In addition, this study addresses an area of importance in family planning science that is understudied and has a potential for high impact in the field. Study takes place in the Middle East about a hard-to-reach population adult male population using mixed-method approaches. The limitations of the study include the use of convenient nonrandom sampling and self-selection bias. Moreover, surveys and interviews were carried out online during the COVID-19 lockdown, which resulted in access being limited to pharmacists who regularly use and have access to the internet. Although this study had a fairly small sample size, the sample was representative of the pharmacists in Jordan being mostly female and residing in Amman.

## Conclusion

Male contraceptive pills are presently still undergoing their research and development phase, and knowledge regarding these pills was insufficient among the participant pharmacists. The published literature shows a promising role for these pills at the level of family planning. However, there is a negative perception toward male OCPs, given that the majority of the pharmacists believed that such products will not be successful in Jordan, especially considering the existing social and cultural norms, along with a lack of evidence base and long-term safety data. Once these pills are approved for their effectiveness and safety, men may need further education and encouragement to take an active role in family planning along with their partners.

## Authors' Note

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## Anonymized Information

Study approval was obtained from the Institutional Review Board of Applied Science Private University, Jordan (Ethical Approval No. 2019-PHA-14).

## Author Contributions

M.M.B. and Samar T. contributed to conceptualization, methodology, supervision, and data curation. M.M.B. contributed to formal analysis & software. M.M.B., Samar T., Sara T., R.A.A.-Q., and A.A. contributed to investigation & visualization. R.A.A.-Q. contributed to resources. M.M.B., Sara T., and R.A.A.-Q. contributed to validation. M.M.B., Samar T., Sara T., and R.A.A.-Q. contributed to writing—original draft preparation. M.M.B., Samar T., Sara T., and A.A. contributed to writing—review & editing.

## Availability of Data and Materials

The data will be made available by the corresponding author upon request.

## Declaration of Conflicting Interests

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