

Barriers to Pap Smear Screening Among Medical Students: A Qualitative Study

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Abstract

Objective

This study aims to explore the Pap smear screening barriers among medical students.

Methodology

This study was a qualitative study conducted among forty-one medical students. Ten female and 31 male. Four focus group discussions were included in this study. The focus groups consisted of one female group and three male groups. The obtained data were sorted into categories based on content analysis and data were analyzed manually.

Results

A total of 41 medical students participated in this qualitative study. Most of the study participants were male and 22 years of age. All groups reported that the lack of awareness is the main barrier to Pap smear screening. The conservative culture and the traditions of the people, shame of doing a pap test despite the gender of healthcare workers, and not trusting the healthcare workers were some of the other key barriers to Pap smear screening among the groups. It was also reported that the man has the final decision as to whether his wife will get a Pap smear screening. Finally, fear of the disease and/or fear of the complications of the test were also considered barriers to Pap smear testing. All groups were willing to suggest this test to their families and friends to prevent and treat the disease as early as possible. All groups agreed that the gender of the healthcare worker matters and definitely will affect a woman's decision whether to do the Pap smear screening or not. All girls preferred to be examined by a female. All the groups mentioned that the advantage of Pap smear screening is to diagnose and treat the disease early. All groups thought that personal hygiene of the private parts is the most important prevention method for cervical cancer.

Conclusions

Lack of awareness is the main barrier to Pap smear screening. The gender of the healthcare worker also greatly affects women's decision to have a Pap smear test. Therefore, raising awareness about the importance of early detection of cervical cancer among the general population is urgently needed, considering the culture and the tradition of the people. Introducing the human papillomavirus (HPV) vaccine is highly recommended.

Introduction

Cervical cancer is a malignant neoplasm that occurs in the cervical tissue. Asymptomatic cancer is typically slow-growing but can be found with routine Pap smear screening. Cytology is the most common method for cervical cancer screening. Other methods that can be used for cervical cancer screening such

as HPV DNA tests and visual inspection with acetic acid (VIA) are available. Visual inspection with acetic acid is used in low-resource settings [1].

Infection with human papillomavirus (HPV) is now a well-established cause of cervical cancer and there is rising evidence that HPV is an important factor in other anogenital cancers such as anus, vulva, vagina and penis, as well as cancers of the head and neck. HPV types 16 and 18 are responsible for around 70% of all cases of cervical cancer globally [2].

HPV vaccines are now available to prevent HPV 16 and 18 infections and have the ability to minimize the incidence of cervical and other anogenital cancers. Well-organized cervical screening programs will reduce the incidence and mortality of cervical cancer. The implementation of HPV vaccination will also reduce the burden of cervical cancer in the decades to come [3].

Cigarette smoking, high parity, long-term hormonal contraceptive use, and co-infection with HIV are known risk factors for cervical cancer. Other potential risk factors include co-infection with Chlamydia trachomatis and herpes simplex virus-2, immunosuppression, and some dietary deficiencies [4].

Cervical cancer screening could start at age 21 years [5]. Women younger than 21 years should not be screened irrespective of the age of sexual initiation or other behavior-related risk factors. However, according to the World Health Organization (WHO), cervical cancer screening among women aged 30 and 49 could minimize cervical cancer deaths [6]. Cervical cancer screening has been effective in reducing morbidity and mortality in developed countries over the past five decades. However, effective cervical cancer screening in developing countries such as Yemen is almost absent [7].

Cervical cancer is the world's third most prevalent cancer among women, with more than 600,000 new cases and 311,365 deaths in 2018 [8]. Approximately 170 new cases of cervical cancer are diagnosed annually in Yemen [9]. Cervical cancer ranks as the 13th leading cause of female cancer and it is most common among women aged 15 to 44 years in Yemen [9]. Therefore, it is urgent to examine the barriers to Pap smear screening in Yemen. This research study is aimed at exploring the barriers to Pap smear among medical students in Yemen.

Methodology

This study was conducted among year two medical students from the Faculty of Medicine, Al-Hikmah University, Yemen during March 2020. Forty-one medical students participated in this qualitative study, 10 female and 31 male. To be included in this study participants needed to be medical students, fluent in Arabic and have Yemeni citizenship. Foreign students were excluded from this study. This study was approved by the University Ethical Committee.

Medical students were invited through an invitation advertised at the Faculty of Medicine to participate in this study. Those who met the inclusion criteria and agreed to participate were divided into four discussion groups. Each group consisted of 9 to 11 students. There was one female and three male

discussion groups. Each group had a facilitator to allow each focus group to run smoothly. This ensured each participant had an opportunity to contribute and that more in-depth questions could be asked so that all the themes of this study were covered. The facilitators followed the standardized protocol to ensure that all the group discussions were conducted similarly and that an identical set of questions were discussed.

The participants were given a briefing on the study and its objectives. Verbal consent was obtained from all the study participants. The main questions given to the students are presented in Table 1.

Table 1
The main questions exploring the Pap smear screening barriers

No.	The main questions
Q1	What are the main barriers to the Pap smear test?
Q2	Are you going to suggest the Pap smear test to your family or friends? And why?
Q3	In your opinion, will the gender of the physician affect the patient's decision to do the routine Pap smear test? And why?
Q4	Who do you prefer to perform this test for you? (For female only)
Q5	What are the advantage and disadvantages of the Pap smear test?
Q6	What are the prevention measures of cervical cancer?

More detailed questions were asked during the session to encourage more discussion and to develop more themes. The session took approximately 1 hour. The obtained data were sorted into categories based on content analysis and data were analyzed manually.

Results

A total number of 41 medical students participated in this qualitative study. The majority of them were male and 22 years of age (Table 2).

Table 2: Basic information of the study participants

Variable	Number
Sex	
Male	31
Female	10
Age (Years)	
18	1
19	3
20	7
21	9
22	2
23	1
24	4
25	4
26	3
27	3
28	1
29	1

The main barriers to having a Pap smear are categorized in Table 3. Each main category includes a subcategory. For example, lack of awareness is considered one of the main barriers. However, further in-depth discussion showed this theme included a lack of awareness in the community, in families, among healthcare workers and also a lack of awareness about cervical cancer and screening programs.

Table 3: The main categories and sub-categories of barriers to Pap smear test

Main Barriers	Subcategory of barriers
Lack of awareness	<ul style="list-style-type: none"> - lack of awareness in the community. - lack of awareness among families. - lack of awareness among healthcare workers. - lack of awareness about the pap smear test. - lack of awareness about cervical cancer.
Culture and traditions	<ul style="list-style-type: none"> - conservative culture barriers. - tradition is a barrier.
Personal	<ul style="list-style-type: none"> - feeling shameful. - shame of showing the private parts to others.
Healthcare system	<ul style="list-style-type: none"> - the sex of healthcare workers. - not trusting the healthcare workers.
Domination of men	<ul style="list-style-type: none"> - men are dominant in the community. - man has the final decision for his wife to do the Pap smear screening.
Fear	<ul style="list-style-type: none"> - fear of the disease. -fear of the complications of the test.
Financial	<ul style="list-style-type: none"> - financial difficulties.
Strange test	<ul style="list-style-type: none"> - strange test.
Myths	<ul style="list-style-type: none"> - pap smear test will damage the cervix and then not allow women to give birth anymore. - pap smear may spread cancer. - pap smear may spread sexually transmitted disease. - sharing underwear among girls is a risk factor for the development of cervical cancer.
Suggesting pap smear to your family or friends	
	<ul style="list-style-type: none"> - Reasons for male - screening help to prevent cervical cancer, to make sure the cervix is clean and healthy. - it's a religious obligation.

	<ul style="list-style-type: none"> - they will advise their families to do screening if there is a tumor or suspected case of cancer. - if there are vaginal secretions from the vagina with different colors and bad odor. - to diagnose cancer early. - to create awareness about the disease.
	<p>- Reasons for female</p> <ul style="list-style-type: none"> - because not getting the screening, will delay the diagnosis of cervical cancer and will affect your entire life.
Healthcare sex and patients decision on Pap smear	the gender of the healthcare workers matters and definitely will affect the women's decision to do the Pap smear screening.
	<p>Reasons reported by male</p> <ul style="list-style-type: none"> - if there are necessities for the male physician to take a Pap smear test from the women. - because the life of the patient is more important than the gender of the physician.
	<p>Reasons reported by female</p> <ul style="list-style-type: none"> - because the women will be comfortable if the female physician does the Pap smear test. - a woman belief that they can't be examined by a male. - shame, not trusting male physicians, conservative beliefs, and conservative families.
Advantage and disadvantage of Pap smear test	<p>Male group</p> <ul style="list-style-type: none"> -the advantage of Pap smear screening is to diagnose and treat the disease early.
	<p>Female group</p> <ul style="list-style-type: none"> -the advantage is feeling safe and comfortable when the result of the Pap smear screening is negative.
	<p>Male group</p> <p>The disadvantages:</p> <ul style="list-style-type: none"> - Pap smear may spread cancer - Pap smear may spread STDs
	<p>Female group</p> <p>The disadvantage is that the test may spread the disease and the contamination</p>

Prevention measures	<p>Male group</p> <ul style="list-style-type: none"> - a female getting married before 18 is a risk factor of developing cervical cancer. - danger of sharing underwear among girls as a risk factor for the development of cervical cancer. - avoiding carcinogenic chemicals, carcinogenic food, radiation, and contraceptives are among the protective measures.
	<p>Female group</p> <ul style="list-style-type: none"> - early detection -treat any infections - no smoking

1. The main barriers to Pap smear screening

The main barriers to Pap smear screening in the groups are as follows:

- From the four focus groups discussion it was agreed that the lack of awareness is one of the main barriers to having a pap smear. There was considered to be a lack of awareness in the community, among families and healthcare workers. There was also a lack of awareness about the Pap smear test and cervical cancer among participants.
- The male focus groups (three focus group discussions) agreed on the conservative culture and traditions of the people as another main barrier to Pap smear testing. However, the female focus group reported feeling shameful of having a pap test performed by either male or female healthcare workers as a barrier to screening.
- Not trusting the healthcare workers was also found to be another main barrier to Pap smear testing. Three focus groups agreed upon the following statement "Not trusting the healthcare workers because of the lack of moral and ethical issues."
- A male dominant community is another contributing barrier to Pap smear testing. The three focus groups agreed that the husband has the final decision whether or not his wife has a Pap smear. Some of them said "Man is not allowing his wife to go for Pap smear check-up especially it is a very private part and such a sensitive issue."
- Three of the focus group discussions shared that fear is one of the barriers to Pap smear testing. Fear of the disease and fear of the complications of the test were most common.

Three focus groups also mentioned that stigma is one of the barriers. One of them said "Afraid of spreading the news of her disease [if any] to the relatives and friends and cannot get married in the future."

One focus group highlighted that financial difficulties are a barrier.

It was reported from one male focus group that "*It's a strange test for women.*"

One male focus group mentioned that "*Some people think that performing Pap smear test will damage the cervix and then not allowing women to give birth anymore.*"

Another of the male focus group shared that "*Shame of showing the private parts to others*" was a barrier to screening.

Myths

This study found that there were several myths reported by medical students in Yemen. T that Pap smear testing will damage the cervix and then not allow women to give birth in the future, a pap smear may spread cancer and sexually transmitted infections and sharing underwear among girls is a risk factor for cervical cancer.

2. Suggesting Pap test to your family or friends

The male group mentioned that they will suggest the Pap smear test to their families and friends for the following reasons [*to help prevent cervical cancer, to make sure the cervix is clean and healthy, because it's a religious obligation, they will advise their families to do the Pap smear screening if there is a tumor, or a suspected case of cancer or if there are vaginal secretions from the vagina with different colors and bad odor, to diagnose cancer early and to treat it before it becomes advanced and to create awareness about the disease*]. The female group mentioned that they will suggest the Pap smear test to their families and friends for the following reasons [*because not getting the screening will delay the diagnosis of cervical cancer [if any] and will affect your entire life, Prophet Mohammed said [you are responsible for your own body and you need to take good care of your body]*].

3. The influence of gender of physician and the patient decision

All groups agreed that the gender of the healthcare worker matters and will definitely affect a woman's decision to have a Pap smear test. The female group gave the following reasons [*because the women will be comfortable if the female physician does the Pap smear test, most women believe that they can't be examined by a male, shame, not trusting a male physician, conservative beliefs and conservative families*]. The male groups also agreed that the gender of the healthcare workers will influence the decision of the women. However, there are a few reasons to have it either with male or female [1. if there are necessities for the male physician to take Pap smear test from the women. 2. Because the life of the patient is more important than the gender of the physician]. One male focus group believed: [*because the Islamic regulations not allowing women to be seen by others especially the private part*].

4. personal preference to perform this test [for female only]

All girls preferred to be examined by a female.

5. The advantage and disadvantage of the Pap smear test

All the groups mentioned that the advantage of Pap smear screening is to diagnose and treat the disease early. One of the male groups mentioned that the advantage of Pap smear screening is *to stop Sexually Transmitted Diseases (STD)*. However, the female group mentioned that the advantage is *feeling safe and comfortable when the result of the Pap smear screening is negative*. The disadvantages mentioned by the male groups are: [*Pap smear may spread cancer, Pap smear may spread STDs, the high cost of the test, and the test needs trained personnel*]. Similar disadvantages are mentioned by the female group that [*the test may spread the disease and the contamination, and the test needs skillful personnels*].

6. The prevention measures of cervical cancer

All groups mentioned that personal hygiene of the private parts is the most important prevention measure for cervical cancer. The female focus group discussion emphasized that early detection, treating any infections, and not smoking are some measures of prevention. One of the male groups focused on [*if female getting married before 18 is a risk factor of developing cervical cancer*], therefore, not doing so is a protective measure. Another male group focused on the danger of sharing underwear among girls as a risk factor for the development of cervical cancer. Furthermore, another male group mentioned that avoiding carcinogenic chemicals, carcinogenic food, radiation, and contraceptives are among the protective measures.

Discussion

In this study, the main barrier to Pap smear screening in Yemen is a lack of awareness about cervical cancer and Pap smear screening. This maybe due to the fact that Yemen is considered one of the poorest countries in the world. Other contributing factors include; the civil war, conflict and violence, cultural constraints and often girls are unable to complete their education. Low awareness and misconceptions about the Pap smear screening test can lead to low uptake of Pap smear Screening. Our results are consistent with other studies' findings [10, 11]. Also, national education policies, a shortage of female teachers, and a low standard of job opportunities for girls, domestic servitude and early marriage are additional constraints that hinder Yemeni girls to access to education. It is important to note that less-educated women are more likely to report worries about having a Pap smear screening, Pap smear costs, and not knowing where to get a Pap smear screening. These are considered barriers to cervical cancer screening in Yemen. A possible explanation is that the decreased awareness of health information around cervical cancer and Pap smear screening could be associated with lower education thus leading to reduced information seeking. Literacy-appropriate educational materials and intervention programs may theoretically reduce these barriers [12, 13]. Previous studies found that the lack of awareness and lack of understanding of cervical cancer screening may lead to a poor screening uptake [14, 15]. Cultural beliefs were reported to be obstacles among African-American women [16].

Our study is consistent with several other studies which have shown that financial challenges are a barrier for women to get their regular Pap smear screening. It has been found that knowledge and

awareness of cervical cancer screening are very low in low and middle-income countries [17-19].

The primary barriers to Pap smear screening were found to be the conservative culture and traditions of the people in Yemen. In Yemen, the family is male-centered, with women not being allowed to come out of the house without permission from their husbands. Any medical visit and medical procedures require a man's permission in Yemen.

All these can prevent Yemeni women carrying out Pap smear screening. Most women attended healthcare services with many companions. Although companions usually provide financial, and psycho-social support, this was counterbalanced at times by their contribution to postponed attendance, inflated costs and the promulgation of prejudice and misinformation. Yemen has the lowest rankings of gender equality globally and this is characterized by a traditional tribal and conservative culture and it is likely many women are unable to attend Pap smear screening [20].

Our study participants reported that the gender of the healthcare workers significantly influences the women's decision on Pap smear screening. This is supported by several previous studies that reported that women always prefer a female physician or nurse for Pap smear screening [21-24].

Physical restrictions on the freedom of movement of women have implications for psycho-social development, particularly concerning interpersonal relationships and communication. A similar culture can be observed in some Arabic countries, such as Saudi Arabia and Jordan in which girls from a young age learn to fear being alone in some areas. They are taught to feel helpless and to rely on male protection. In certain cases, non-compliance of women with the wishes of a husband or family may result in the loss of family support, divorce, or the loss of custody of children [25]. Some of these barriers may potentially be reduced via culturally responsive and linguistically relevant education programs [12, 26]. Worry in regards to the views of the spouse and family may hinder the conduct of Pap smear screening among those who have never been screened for cervical cancer. Including the partner and family in Pap smear screening education may help ultimately to reduce cervical cancer. Healthcare professionals need to resolve these barriers to ensure a more educated view of health-related issues from diverse perspectives [13].

In our study, participants reported many myths and misconceptions about the Pap smear test. These are considered barriers that need to be addressed urgently. They mentioned that a Pap smear test will damage the cervix and then not allow women to give birth in the future. A previous qualitative study reported that women did not like to be screened for cervical cancer because they thought that the procedure pinched the cervix and this may cause perforation of the uterus that would lead to infertility [27]. Several studies revealed major misconceptions and myths about Pap smears [28, 29]. Several other myths reported in this study such as Pap smear screening may spread cancer, Pap smear screening may spread STDs and sharing underwear among girls is a risk factor for the development of cervical cancer. This study was conducted among year 2 medical students, who appear to lack knowledge and have many misconceptions and myth around Pap smear screening. There needs to be a good education system in all medical schools in Yemen.

Another barrier reported in this study by the female focus group was feeling shameful in doing Pap testing either performed by male or female healthcare workers. It is consistent with a previous study where shyness, uneasiness concerning medical examination, and feeling ashamed to expose private parts lead to non-screening, particularly when the screening is being done by male health personnel [30]. A previous study reported that embarrassment related to the intimate nature of pap smears was a deterrent to screening. The main barrier to routine screening tests in a previous study reported was socio-cultural barriers, for example the shame of pelvic exam [55].

Self-collected HPV testing was regarded as embarrassing by women in one qualitative study [31]. Location of screening and whether privacy was afforded or not, also affected willingness to screen. A study found that women universally agreed that embarrassment would not be a major deterrent to screening if they were well informed about the need for screening and if a private place for self-collection of HPV swabs was available [31]. It also emerged that some women, particularly the older ones, are shy of or embarrassed by exposing their nakedness, especially to male health personnel when they go for screening.

Furthermore, not trusting the healthcare worker is one of the main barriers to Pap smear testing. This may be due to the civil war and the current crisis that Yemen is going through at present. This leads to a weakening in the healthcare system throughout the country. Furthermore, medical experts often move abroad due to the lack of training and continuous medical education. They also experience brain-drain and prefer to have better pay and a good quality of life for their family in another country.

There is also a high rate of medical errors at local healthcare facilities. Therefore, there is an urgent need for clear and simple communication by health staff about Pap smear screening. Trust in the healthcare system still presents a substantive problem to health service utilization [32, 33]. In a previous study, the majority of women indicated that they were screened due to the insistence of their provider [34]. Many studies reported that healthcare worker's behaviors and characteristics such as poor interaction, unfriendly attitude and aggressive behavior are considered barriers for patients in a clinical setting [28, 35, 36]. Several studies reported that there was a lack of trust that providers would give patients the proper diagnosis. This is considered another barrier to Pap smear screening [36-38].

It was reported by our participants that healthcare workers are one of the barriers to Pap smear screening. Several studies have shown that healthcare professionals can act as a barrier. When women trusted their healthcare worker to help treat their condition they were more likely to seek care and follow up. Some methods of gaining patient trust and respect included providing patients with education about their cultural and religious values [23, 39, 40]. Some women have suggested that rude and disrespectful healthcare staff should not be allowed to engage in screening women [15]. In a previous report, women who were not concerned about the gender of the healthcare staff carrying out the screening were five times more likely to have been screened than women who were concerned about the gender of the healthcare professional [41]. Healthcare workers indicated that a lack of cervical cancer screening and skills among some of the clinical staff was an obstacle to cervical cancer screening [42].

Another finding reported by the participants was that girls getting married before 18 is considered a risk factor for developing cervical cancer. A previous study stated that a risk factor for HPV infection is early-age sexual activities, although the scientific explanation is still unclear [56].

MALE DOMINANT COMMUNITY IS CONTRIBUTING AS A BARRIER TO PAP SMEAR TESTING

In our study, the participants reported that the man has the final decision on his wife having the Pap smear screening. A previous study showed that lack of spouse emotional and financial support was a barrier to cervical cancer screening [42]. Another study showed that the common barrier reported among participants was no encouragement from their partner [43]. The findings in this study are similar to other research conducted in Asian Americans, which reported that male partners may not be supportive of cervical cancer screening [44].

Our respondents indicated that most women must seek approval and financial support before they can seek care for any serious illness, including cervical cancer screening. In previous studies, it has been observed that some women find it very difficult to persuade their husband to visit a healthcare facility, especially if they are visiting it for screening. As a result, their inclusion in screening possibly relies on the acceptance of male partners and their ability to financially support women [19, 30, 45].

Conversely, women in Teng et al's qualitative study universally stated that they would attend cervical cancer screening regardless of whether or not their spouse approves [31], and spousal approval did not influence women's willingness to self-collect HPV samples in Mitchell et al's cross-sectional study [46]. Male respondents were supportive in terms of sending their spouses to the health facilities or give more freedom to their wives to choose and decide on their health due to the prominent reason that women know best about their health [47].

FEAR OF THE DISEASE AND FEAR OF THE COMPLICATIONS OF THE TEST

Fear of disease and fear of the complication of the Pap smear screening were reported in this study. Similar findings were reported by a previous study which showed that the Pap smear test made the women worry about the common barriers to cervical cancer screening in a study carried out in Malaysia [43]. Another study reported that fear of pain, myths about Pap smear screening and a fatalistic attitude are also barriers [10].

Fear of being diagnosed with cervical cancer has been identified as a barrier. This is often combined with a sense of fatalism in terms of prognosis and consequences. Previous studies also found that fear of being tested for cervical cancer is a barrier [48, 49].

In our study, fear of the screening technique was the most widely recorded barrier. This was also due to perceived discomfort, but also to myths, including that it was necessary to use contaminated equipment or remove vital organs. Fear of being diagnosed with cervical cancer was another recorded obstacle, combined with a sense of fatalism. Fear of pain during the test was another major individual barrier and this is similar to what was reported in previous studies [23, 36].

In our current culture in Yemen, the public opinion and even that of specialists is that cancer is a taboo. Cancer is similar to death and has led to a lack of adequate care and treatment. Similar findings reported that women were worried that their partner could leave them if they were found to have cervical cancer due to the resulting treatment costs [15].

Financial issues are recognized difficulties that are considered as an obstacle to Pap smear screening. Studies have shown that cancer screening is less frequent for people with less income than for those with higher income levels [50]. In some research, financial costs associated with screening were an obstacle to women and linked either to the expense of the service, transport and food costs related to screening [15, 42, 48, 49]. Evidence from many studies has indicated that economic factors, particularly low income or high screening and treatment costs, are a major barrier to screening and early diagnosis. For instance, some studies showed socioeconomic and financial barriers play a significant role against early screening and treatment [36, 38, 51-53].

In this study, another widely identified barrier was embarrassment linked to the Pap smear screening. It is assumed that a private part cannot be seen by others except for the husband only. Furthermore, inserting the metal speculum is a painful procedure that is considered a barrier for Pap smear screening [54]. Therefore, there is an urgent need for sufficient training of healthcare staff to find solution for these obstacles and to improve the incentive for women to have Pap smear screening. This is a difficult barrier to remove, considering the complexities of the screening process, but it can be strengthened by maintaining privacy and making female healthcare staff available at facilities. Self-collection of HPV is a promising means of overcoming embarrassment and avoids the need for exclusive female healthcare workers.

As for prevention measures, our participants emphasized that early detection, treating any infections, and not smoking are some measures of prevention. Similar findings in a previous study reported that screening is an important prevention measure in improving quality of life and reducing mortality [52].

Conclusions And Recommendations

Lack of awareness is the main barrier to Pap smear screening. The gender of a healthcare worker greatly affects a woman's decision as to whether she will have the Pap smear screening test or not. Therefore, raising awareness among the general population about the importance of early detection is urgently needed considering the culture and the tradition of the Yemeni people. Introducing the HPV vaccine in Yemen is highly recommended.

Declarations

Ethics Approval And Consent To Participate

Ethical approval is attached in the supplementary material

Consent For Publication

Not applicable

Availability Of Data And Materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests

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No funding was available for this study.

Authors' Contributions

RA Al-Naggar : Study design, analysis of the data and was a major contributor in writing the manuscript

H Alshaikhli - Writing, proofreading, referencing and prepare for submission

Sharon Murtagh - Writing and Proofreading

Lutfi Almaktari - Collecting the data

Bahaa Saleh – Collection of data

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