# Evaluation of practice guidance for infertility patients self-inject ovarian stimulation medicine at home

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## ABSTRACT

*Objectives:* Determine the effective of implementation of the patient education regarding the self-inject of ovarian stimulation medication at home. *Methods:* The quasi-experimental study evaluating the program before and after the education intervention was carried out on 139 patients with assisted reproductive treatment at the Infertility Department, Tu Du Hospital from November 1, 2019 to May 31, 2020. *Results:* The proportion of patients who agree to self-inject at home is 92.05%. After being instructed by nurses, 79.1% of patients practice the correct injection in front of nurses. Patients with education upper high school level were able to inject the right technique 8.38 times higher than patients with education level ≤ high school (OR = 8.38; p <0.05; 95% CI: 2.61-34.86). If the patients injected the right technique in front of nurses after training, they would be reduced the difficulty when they performed at home by 82% (OR = 0.18; p <0.05; CI: 0.03-0.93). Patients who have the help of relatives feel more favourable than those without support of relatives when injected at home is 90% (OR = 0.10; p <0.05; 95% CI: 0.01-0.53). *Conclusion:* Patients believe that self-injection at home is easy and acceptable. However, it is necessary to train slowly and more carefully in patients with low education. At the same time, nurses should persuade relatives to help patients to self-inject at home.

**Keywords:** Ovarian stimulation, intrauterine insemination, in vitro fertilization.

## 1. INTRODUCTION

Infertility is a disease of the reproductive system defined by the non-clinical pregnancy 12 months or more of sexual intercourse without any contraceptive method (Nguyen, 2015). It is a stressful and important experience that can impact a couple's social life and marriage (Zaidouni et al., 2018). The first step of assisted reproductive techniques is injecting ovum stimulation medicine into the woman. This step makes patients spend the most time and money. During the time of fertility stimulant therapy, patients must go to the hospital for daily injections, for an average of 15-30 days a month depending on the treatment regimen. The high cost of treatment, the cost of accommodation due to long distance from home, taking time off from work to get injection, waiting for the injection, increasing the hospital overload are the causes of stress and fatigue for patients (Mao et al., 1994).

Ovum stimulation control also requires coordinated efforts of patients in medicine management and adherence to treatment regimens (Brod et al., 2013). In developed countries, the injection of ovum stimulation medicine is directed at home injection (Buhler, 2015; Welcher et al., 2010). Most patients of the Reproduction Support Centers around the world self-injected ovum stimulation at home such as England, Germany, Australia (Illingworth, 2014; Buhler, 2015). Currently, at the Infertility Department - Tu Du Hospital, patients are still guided to Tu Du Hospital or local hospitals for daily injections, affecting their work and daily activities. With a large number of patients such as Tu Du then instructing patients to inject medicines at home has reduced the time and cost for patients and reduced the hospital load. Therefore, we conducted the project: "Evaluation of infertility woman instruction program to self-inject ovum stimulation at home".

Objectives: (1) Determine the proportion of patients who accept self-injecting ovum stimulation at home when consulted by nurses. (2) Determine the proportion of patients self-injecting ovum stimulation medicine correct in front of nurses at Tu Du Hospital. (3) Identify factors affecting proper self-injection practice at the hospital in front of nurses and correct practice at home.

## 2. SUBJECTS AND METHODS OF THE STUDY

**Research design**

Quasi-experimental study.

**Research subjects**

Patients are prescribed to inject Gonal-f ovum stimulation at the Infertility Department - Tu Du Hospital from November 1, 2019 to May 31, 2020 and agreed to participate in the study.

**Admission criteria**

Patients with menstruation on the 2nd or 3rd day are prescribed Gonal-f ovum stimulation injection and agree to participate in the study. Exclusion criteria: Patients with hearing and speech impairments.

**Sample size**

Applying formula: $n = Z^2_{(1-\alpha/2)} \times P(1-P)/d^2$

$Z(1-\alpha/2)$: Coefficient of confidence. With $\alpha = 0.05$ and 95% confidence, so $Z(1-\alpha/2) = 1.96$.

P: The expected rate in the population. According to a pilot study on 10 patients at the Infertility Department in Tu Du Hospital (November 2019), 90% of patients used the Gonal-f injection pen correctly after being instructed by nurses (Mecrk, 2016) => P = 0.9.d: expected (absolute) accuracy: d = 0.05; n = 139.

**Steps to conduct research**

- Step 1: Carry out a pilot study on 10 patients to verify the process, correct of data collection sheet and calculate the sample size.
- Step 2: Sample collection method and sign in consent form.
- Step 3: Intervention. The researcher will demonstrate the injection technique, use the used pen and inject the medicine on the pillow. Show the injecting instruction video on the researcher's phone for patient. Ask the patient or relative to repeat the injection checklist and inject the medicine into the patient.
- Step 4: Evaluate practice in front of researcher. Patients or relatives injecting patients are considered as self-injection. Patients and relatives will decide who injects medicine at home, who injects medicine at home to inject medicine in front of the nurse and inject it into patient.

Another nurse will observe the patient or relative's patient perform the steps in the medicine injection checklist to inject the medicine into the patient, nurse just observed and hit the checklist to achieve or not pass step by step => conclude whether the patient is injected with the right technique or not.

The medicine injection checklist is based on instructions for use of the injection pen in the medicine box and the subcutaneous injection checklist of the Nursing Department at the University of Medicine and Pharmacy in Ho Chi Minh City (Buhler, 2015; Welcker, 2010).

Patients who performed wrong one of the bold steps in the checklist concluded that they were injected with the wrong technique. The checklist of medicine injection with a total score of 50 is calculated on a 10-point scale. Patients who achieve more than 4 points are considered to be injecting with the right technique (Doan, 2014).

Before the patient came home, researcher provided the patient one medicine injection checklist, send video clip of instruction of medicine injection to the patient and phone number of main researcher to keep in touch when there is a problem with self-injection at home (the patient only performed 3 injections at home).

- Step 5: Managing and evaluating injections at home

At the follow-up visit (5 days later), the patient was instructed to answer the questionnaire for self-injection evaluation at home.

**Purpose**

+ Determining whether the patient self-injected medicine at home or not?

+ Patients have advantages or disadvantages when injecting at home

+ What difficulties do patients encounter when injecting at home?

Through this follow-up visit, the doctor will ultrasound to check the development of the follicle, through which the researcher will also know if the patient has enough dose of the medicine or not.

**Data management and analysis**

Data processing according to Stata 14 software. Using descriptive statistics to describe the frequency and percentage of research subjects' characteristics. Logistic regression analysis is used to find the relationship with patient's proper injection techniques and related factors.

## 3. RESULTS

**Percentage of patients who agree to inject ovum stimulation by themselves at home**

Number of patients the researcher approached invited to study: 151 patients. Agreed to participate in the study are 139 patients. Not agreed to participate in the study 12 patients. Percentage of patients who agree to inject ovum stimulation medicine by themselves at home: 92.05% (CI: 0.87-0.96).

***Characteristics of research subjects***

The majority of patients participating in the study under 35 years old 78.4%. Most patients do not live in Ho Chi Minh City 81.3%. Education level of patients was evenly distributed between 2 groups of ≤ high school and above high school. The majority of patients had never injected medicine at home 85.6% (table 1).

**Table 1** Characteristics of the research population

| Characteristics | Frequency | Ratio (%) |
|---|---|---|
| Age | | |
| < 30 | 60 | 43.2 |
| 30-34 | 49 | 35.2 |
| ≥ 35 | 30 | 21.6 |
| Place of residence | | |
| Ho Chi Minh city | 26 | 18.7 |
| Other | 113 | 81.3 |
| Education | | |
| ≤ High school | 72 | 51.8 |
| >High school | 67 | 48.2 |
| Have self-injected medicine at home | | |
| Never | 119 | 85.6 |
| Used to | 20 | 14.4 |

**Proportion of patients who self-injected ovum stimulation medicine properly in front of Nurse**

After receiving instructions for injections by nurses based on the injection checklist: Total score: 9.5 ± 0,7 (mean±SD). Biggest: 10. Smallest: 7.6; 79.1% patients practice the correct injection (figure 1).
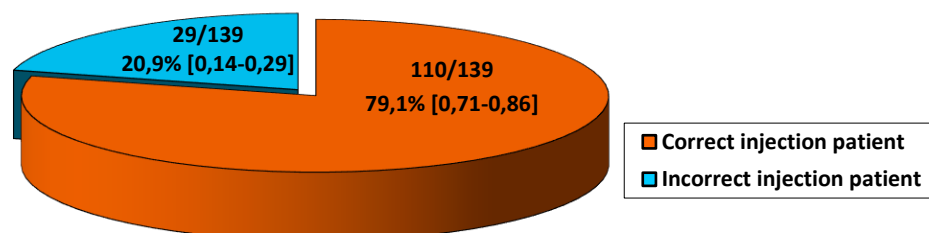


**Figure 1** Proportion of patients injecting medicines with proper techniques.

**Factors related to the correct ovum stimulation medicine injection**

Using logistic regression analysis of factors that may be related to the correct ovum stimulation medicine injection, we found that only education affects the proportion of patients who inject the technique correctly, this effect is statistically significant with p <0.05. Thereby, patients with higher education levels than high schools are 8.38 times more likely to get the right technique in front of a nurse than patients with lower high school education (table 2).

**Table 2** Analysis of factors that may be related to the correct ovum stimulation medicine injection

| Related factor | Correct injection n = 110 (%) | Incorrect injection n = 29 (%) | OR | 95% CI | p |
|---|---|---|---|---|---|
| Age | | | | | |
| <30 | 48 (80) | 12 (20) | 1 | | |
| 30-34 | 37 (75.5) | 12 (24.5) | 0.77 | 0.31-1.91 | 0.692 |
| ≥ 35 | 25 (83.3) | 5 (16.7) | 1.25 | 0.39-3.96 | |
| Education | | | | | |
| ≤ High school | 47 (65.3) | 25 (34.7) | 8.38 | 2.61-34.86 | 0.000 |
| >High school | 63 (94) | 4 (6) | | | |
| Years of looking forward to children | | | | | |
| <5 years | 80 (80.8) | 19 (19.2) | 1 | | |
| 5 to <10 years | 23 (74.2) | 8 (25.8) | 0.68 | 0.16-12.65 | 0.740 |
| ≥10 years | 6 (85.7) | 1 (14.3) | 1.42 | 2.55-6.96 | |
| Treated before | | | | | |
| No | 70 (77.8) | 20 (22.2) | 1.27 | 0.49-3.48 | 0.593 |
| Yes | 40 (81.6) | 9 (18.4) | | | |
| Have self-injected medicine at home | | | | | |
| No | 96 (80.7) | 23 (19.3) | 0.56 | 0.18-1.98 | 0.370 |
| Yes | 14 (70) | 6 (30) | | | |
| Relatives accompany | | | | | |
| No | 21 (80.8) | 5 (19.2) | 0.88 | 0.24-2.76 | 0.820 |

| Related factor | Correct injection n = 110 (%) | Incorrect injection n = 29 (%) | OR | 95% CI | p |
|---|---|---|---|---|---|
| Yes | 89 (78.8) | 24 (21.2) | | | |
| Relatives want to help patients self-inject | | | | | |
| No | 20 (71.4) | 8 (28.6) | 1.71 | 0.57-4.77 | 0.261 |
| Yes | 90 (81.1) | 21 (18.9) | | | |
| Numerical order patient is consulted during the day | | | | | |
| ≥ 3 | 23 (76.7) | 7 (24.1) | 1 | 0.22-1.82 | |
| 2 | 25 (71.4) | 10 (28.6) | 0.64 | 0.18-1.27 | 0.310 |
| 1 | 62 (83.8) | 12 (16.2) | 0.48 | | |
| Instructed time | | | | | |
| ≤ 30 minutes | 110 (79.7) | 28 (20.3) | 0 | 0 | 0.209 |
| 30-45 minutes | 0 (0) | 1 (100) | | | |

**The difficulty rate of patient's self-injection at home**

Most patients felt that it was convenient for them to inject at home, accounting for 93.5%, only 6.5% of patients felt that it was difficult to inject ovum stimulation medicine at home. The most difficult problem in patients is the way to determine the injection site (2.9%) and how to inject the medicine (2.9%), the second difficulty is how to hold the injection pen during the injection process (1.4%) and at the end same way is to attach the needle (0.7%), remove the needle (0.7%).

**Factors related to patients' difficulty in self-injection at home**

Table 3 shows the logistic regression analysis of 23 univariate pairs to find factors related to patient difficulty with home self-administration, we found that the relative wants to help patients self-injection affect the feeling of convenience and difficulties of patients when self-injection at home. However, this effect was statistically significant with p <0.05. Patients with the help of relatives feel 90% better than those who do not have the help of relatives. In addition, the patient performed correct or incorrect injection technique before nurse also affects the feeling of convenience and difficulty of patients when self-injecting medicines at home, this influence is also statistically significant with p <0.05. Thereby, if the patient injected with the right technique in front of nurse, it will reduce the difficulty when the patient performs at home 82%.

**Table 3** Analysis of factors that may be related to patients' difficulty in self-injection at home at Tu Du Hospital

| Related factor | Hard n = 9 (%) | Advantage n = 130 (%) | OR | 95% CI | p |
|---|---|---|---|---|---|
| Relatives want to help patients self-injection | | | | | |
| No | 6 (21.4) | 22 (78.6) | 0.10 | 0.01-0.53 | 0.002 |
| Yes | 3 (2.7) | 108 (97.3) | | | |
| Injection technique in front of nurse | | | | | |
| Correct | 4 (3.6) | 106 (96.4) | 0.18 | 0,03-0,93 | 0.019 |
| Incorrect | 5 (17.2) | 24 (82.8) | | | |

## 4. DISCUSSION

**Percentage of patients who agree to self-inject ovum stimulation medicines at home**

This is the first study in the Infertility Department, Tu Du Hospital on intervention to instruct patients to self-inject FSH at home during assisted reproduction cycle with injection pen that is available on the market (Mecrk, 2016). After being invited to study by the researcher, explaining the purpose, benefits and disadvantages of the study, the rate of patients who agreed to self-inject medicines at home was up to 92.05% patients. This shows that if nurses consulted, the percentage of patients who consent to interact with treatment is high (92.05%).

**The proportion of patients self-injecting subcutaneous ovum stimulation medicine correctly in front of nurse**

The proportion of patients self-injecting ovum stimulation medicine with correct technique in front of nurse is quite high 79.1% patients. However, this rate is lower than the study of Nguyen THH (2016) is 96.8%. This is explained by the education that affects the proportion of patients who inject medicines correctly. Compared with patients with educational level ≤ high school, patients with upper high school level have the right injection rate increased by 8.38 times, this difference is statistically significant with p <0.05. In Nguyen THH's 2016 study, patients were mainly concentrated in the city, so her education was mostly university and graduate, while in our study, patients were mainly provincial people (81.3%) and 51.8% of patients study high school or below. This shows that in order to increase the proportion of patients who inject medicines correctly, they need to give more guidance in patients with low education; 6.5% of patients had difficulty self-injecting medicines at home. This rate is lower than in Nguyen THH's study of 8.8% (Nguyen, 2016). This is because in our study, we sent the video and checklist to the patients for self-review if they forgot.

**Factors related to the correct ovum stimulation medicine injection**

By examining the factors related to the difficulty of self-injection at home, we found that the relative's desire to help the patient self-injected was related to feeling favorable and difficult of the patients when they self-injected medicines at home. Compared to patients who do not have the support and assistance of their relatives in self-injection at home, patients who have the support of their relatives feel more convenient in self-injection at home by 90%, the difference is statistically significant with p <0.05. Thereby, we found that in addition to training patients to self-inject at home, we also had to convince their relatives to support, assist and encourage patients to self-inject at home.

In addition, the patient's right or wrong injection in front of nurse is related to feeling favorable and difficult for patients to self-inject medicines at home. Compared to patients who injected incorrectly in front of nurse, those who injected correctly in front of nurse will reduce difficulties when injecting at home is 82%, this difference is statistically significant with p <0.05. Therefore, after patients practice injecting medicines in front of nurse, if patients inject the incorrect technique, we recommend that patients should not inject at home.

# 5. CONCLUSION

It is easy and acceptable for the patient to self-administer follicle stimulation medicines at home. However, more careful and slow instructions are needed in patients with low education. At the same time, persuade relatives to help patients with self-injections at home.

**Author Contributions**

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

**Conflict of Interest**

The authors declare that there are no conflicts of interests.

**Informed consent**

Written informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

**Ethics in research**

The study was approved by the Ethics Council of UMP No. 512 / DHYD-HĐĐĐ, October 17, 2019. The study was approved by the Director Board of Tu Du Hospital in accordance with the Minutes No. 3490 / QD-BVTD in 2019.

**Data and materials availability**

All data associated with this study are present in the paper.

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