Scientific Foundation SPIROSKI, Skopje, Republic of Macedonia
Open Access Macedonian Journal of Medical Sciences. 2023 Jun 23; 11(F):279-285.
https://doi.org/10.3889/oamjms.2023.11689
eISSN: 1857-9655
Category: *F - Review Articles*
Section: *Narrative Review Article*

Integrated Acetic Acid Visual Inspection with Installation or Examination of Intrauterine Contraception Devices: Literature Review

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Edited by: Ksenija Bogoeva-Kostovska
Citation: Surya IGNHW. Integrated Acetic Acid Visual Inspection with Installation or Examination of Intrauterine Contraception Devices: Literature Review. Open Access Maced J Med Sci. 2023 Jun 23; 11(F):279-285. https://doi.org/10.3889/oamjms.2023.11689
Keywords: Intrauterine contraceptives; Acetate visual inspection; Cervical cancer; One shot method; Simultaneous
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Received: 07-May-2023
Revised: 10-May-2023
Accepted: 13-Jun-2023

Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist

Abstract

Cervical cancer is one of the post-translational modification where the incidence has continued to increase in the past 10 years. Cervical cancer screening using a single visit approach (SVA) model for prevention of cervical cancer through an isovaleric acidemia (IVA) examination followed by cryotherapy treatment or referral to a higher service. The SVA approach model is still not effective for increasing cervical cancer screening coverage. The one shot method is an IVA model development design that is integrated with IUD insertion. Based on experience, an IVA examination can be carried out simultaneously with pre-insertion, installation, and post-insertion IUD services. The one shot method for IUD acceptors can provide two benefits in one service and can be done at first-level health facilities.

Introduction

The development of diseases around the world has shifted from infectious diseases to non-communicable diseases (post-translational modification [PTM]). Data from Double Burden of Diseases and World Health Organization Non-Communicable Disease Country Profiles in early 2000 reported an increase in the prevalence of NCDs from 37% to 49%. This condition continued to increase until 10 years later with the percentage of infectious diseases dropping to 33%. Until 2015, PTM was at 57% while infectious diseases were only 30%. According to Riskesdas 2013 data, the prevalence of cancer in Indonesia is 1.4/100 population or around 347,000 people. This increase in PTM is due to changes in lifestyle [1]. Until 2016, it was recorded that 1.5 million women aged 30–49 years had screened for cervical cancer (along with breast cancer) of the target of 37 million women aged 30–50 years. The coverage of visual acetate inspection (isovaleric acidemia [IVA]) screening is only 3.5% while the Pap smear is 3.7% [2].

Cervical cancer is one of the PTMs where the incidence has continued to increase in the past 10 years [3]. Based on the anatomical pathology report in Indonesia, cervical cancer is the most common cause of death for Indonesian women [4]. The increased incidence of cervical cancer is caused by delays in early detection of cervical cancer patients to seek medical attention, so that at the time of diagnosis, they are already in an advanced stage which causes a high level of severity and mortality [5].

Data from the Social Security Administering Body (BPJS) for health show that there has been an increase in the number of cancer cases handled and their financing in the 2014–2015 periods. This has resulted in 30% of the BPJS financing burden coming from handling PTM [6]. Hence, that the failure to achieve the IVA coverage target on the target contributes to the BPJS budget deficit.

Cervical cancer can be prevented and detected early if women of childbearing age have good knowledge and awareness of early detection. IVA and Pap smear sensitivity are almost the same, namely, 93.3 and 93.8%. Pap smear was reported to be more

specific than VIA, namely, 72.9% versus 60%. In terms of accuracy, the Pap smear has a higher accuracy of 77.3 and IVA of 66.7%. Cervical cancer screening with a frequency of 5 years once can reduce cases of cervical cancer by 83.6% [7].The suspected incidence of cervical cancer is 1.3/1000 population based on data from the Directorate for Control and Prevention of Non-Communicable Diseases (P2PTM).

The government's effort to reduce the incidence of cervical cancer that is found at an advanced stage is to make policies through Permenkes No. 769 regarding uterine cancer. Cervical cancer screening with a single visit approach (SVA) model is done for prevention of cervical cancer through an IVA examination followed by cryotherapy treatment or referral to a higher service. This is done on the same day that the woman is screened. This approach aims to avoid visits from clients and reduce the possibility of no-shows for subsequent visits. In practice, the weakness of the SVA method is highly dependent on the interest and motivation of the IVA target. The advantage of applying this method is that it is done alone so that the officer who performs the IVA can do it more quickly [8].

The SVA approach model is still not effective for increasing cervical cancer screening coverage. This is caused by several factors, including low public awareness, low readiness of officers, and inadequate facilities and infrastructure. Low public awareness about the importance of cervical cancer screening is a challenge faced by the government. Delays in cervical cancer screening are caused by fear, embarrassment, pain, or tenderness in the uterus. Efforts to increase cervical cancer screening coverage require a joint commitment between the government, service providers, and the community. The closest and most affordable target is intrauterine contraceptive device (IUD) acceptors. The embarrassment and fear will be reduced if the IVA screening is carried out simultaneously with the acceptor's examination, insertion, and removal of the IUD.

Based on these problems, it is necessary to draft a new competency model for health workers at first-level health facilities. The model developed is an integrated IUD insertion service with IVA examination (one-shot method).

Cervical Cancer

Cervical cancer is the most common cancer experienced by women, including in Indonesia. Persistent infection with the human papillomavirus (HPV) is known to cause neural intraepithelial neoplasms or cancers of the uterine cervix and other HPV-associated cancers in different locations. Based on epidemiological and biological data, persistent infection with HPV has a high risk of developing cervical cancer. According to epidemiological data, the most common HPV-related cancers are laryngeal carcinoma in humans and cervical cancer in women [8].

Cervical cancer is a common and deadly cancer among women worldwide [9]. According to global estimates, about one million new cases are found every year in the world, most of which are in developing countries [10], [11]. With an increase in high-risk sexual behavior, this cancer is expected to increase [12]. Cervical cancer is a preventable cancer due to its long precancerous conditions, so it can be prevented by screening programs [13]. There is also an effective treatment of precancerous lesions available [14].

Cervical cancer is caused by the slow development of precancerous lesions, so it is important to detect abnormal cells with a Pap smear test [15]. Risk factors that cause cervical cancer include biological, socioeconomic, and health factors [9]. Epidemiological studies demonstrate the role of sexually transmitted diseases [16], behavior [17], and nutritional factors [18] as risk factors for cervical cancer. Other studies have shown a relationship between marital status, age at marriage [19], [20], age at first pregnancy [21]., smoking, consumption of oral contraceptive pills, multiple sexual partners, family history, and multiparity as risk factors for cervical cancer. However, other studies have reported no relationship between oral contraceptive pills and cervical cancer.

Incidence rate cervical cancer increased from 1.7 in 2004 to 2.2 in 2008 [22]. Another study reported an incidence rate of cervical cancer of 2.56 between 2002 and 2009 [23]. The average incidence rate of cervical cancer in Iran is 2.5 with the highest rate in Fars of 4.1 and the lowest rate in Zanjan of 0.4 [24]. Other studies report cervical cancer as the second most common gynecological cancer after ovarian cancer [25]. The incidence of cervical cancer is reported to peak at the age of 60 years [24]. The mortality rate from cervical cancer was reported at 1.2 in 2012 [12].

Cervical Cancer Screening

Screening is an effort to identify unknown diseases or disorders using tests, examinations, or other procedures that can quickly distinguish healthy people from those with disorders. Screening is carried out on asymptomatic people to be classified into categories that are thought to have or are not thought to have the disease that is the object of screening.

Other sources state that screening is an attempt to detect or find asymptomatic (not visible) sufferers of certain diseases in a particular community or population through a brief and simple test or examination to be able to separate between those who are truly healthy and

those who are likely to suffer disease and then processed through definitive diagnosis and treatment [26].

The goal of screening is to prevent disease or its consequences by identifying individuals at a point in the natural history when the disease process can be altered through intervention. The purpose of screening includes getting sufferers as early as possible so they can get treatment immediately; preventing the spread of disease in society; educating and accustoming the public to self-examination as early as possible; educate and provide an overview to health workers about the nature of the disease and always be vigilant in observing early symptoms; and obtain epidemiological information useful to clinicians and researchers.

Screening test is a medical procedure performed with the intention of removing uncertainty about whether a disease really exists or not. Ideally, screening tests (laboratory, radiology, and procedures) are performed to complete medical information and the results are obtained quickly so that the diagnosis can be made quickly and at a low cost. Screening tests can be carried out in stages (serial) or several screening tests (parallel) may be carried out simultaneously. The ideal screening test is one that is positive in all diseased subjects and negative in all subjects who are not sick. The ideal screening test is rarely found.

The development of screening tests can serve a number of purposes including to diagnose disease or rule out disease. For this purpose, the diagnostic test must be sensitive (small chance of false negative) so that if a normal result is obtained (negative test result) it can be used to rule out disease. Diagnostic tests must also be specific (the possibility of a false-positive result is small), so that if the results are abnormal, they can be used to determine the presence of disease. The screening test should have very high sensitivity although slightly low specificity. Diseases that need to be screened have requirements including, among other things, a high prevalence of the disease; the disease shows significant morbidity and/or mortality if left untreated.

In medicine, screening tests are often repeated to monitor the course of the disease or the results of therapy, identify complications, determine the therapeutic levels of a drug, determine the prognosis, and confirm an unexpected examination result. For this purpose, the reliability of a screening test is very important, meaning that if a test is carried out on the same subject at the same time, the screening test must also give the same results [3].

Acetic Acid Manual Inspection

Acetate Visual Inspection Test (IVA) is a screening test for early detection of cervical cancer. This examination procedure is carried out by inserting a speculum into the vagina so that the cervix can be examined visually directly. The cervix is then smeared with acetic acid, if the acid hits the abnormal cells, the color of the tissue will turn white and is said to be a positive test result. A positive IVA examination usually indicates the presence of a pre-cancerous lesion but must be confirmed by other tests such as a Pap smear or biopsy by an obstetrician and gynecologist.

Application of 3–5% acetic acid causes reversible coagulation or precipitation of cellular proteins. This causes swelling of the columnar epithelial tissue and abnormal squamous epithelium, dehydration of cells, aids in coagulation, and clears the mucous secretions of the cervix. Light reflection from the vascular-rich stroma gives the squamous epithelium a pink hue and the columnar epithelium a red hue. If the epithelium contains many cellular proteins, acetic acid will agglomerate these proteins and cause the stromal color to fade. The resulting acetowhitening is clearly visible when compared to the pink color of normal squamous epithelium. The effect of acetic acid depends on the amount of cellular protein present in the epithelium. Areas with increased nuclear activity and DNA content will show the highest white discoloration. When acetic acid is applied to normal squamous epithelium, coagulation occurs in the superficial cell layer because this layer has few nuclei. Acetic acid is not able to penetrate the deeper cells so that the resulting precipitate is not sufficient to remove the underlying stromal color. In areas suspected of cervical intraepithelial neoplasia (CIN) and invasive cancer, maximal coagulation occurs because the core content is higher than the protein core (a number of cells in the differentiated epithelium) thereby preventing light from passing through the epithelium. As a result, the sub-epithelial pattern of vessels disappears and a dense white epithelium appears. On CIN, acetowhitening is confined to the transformation zone close to the squamocolumnar epithelial junction. Meanwhile, cancer often involves the entire cervix. Acetowhitening of the epithelium in cases of suspected CIN and early invasive cancer appears denser, thicker, and opaque with well-defined margins than the surrounding normal epithelium. Acetowhitening in adult squamous metaplasia shows inflammation and regeneration of the epithelium, the color is slightly paler, thinner, transparent, and mottled with margins that are not very clear. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color. Meanwhile, cancer often involves the entire cervix. Acetowhitening of the epithelium in cases of suspected CIN and early invasive cancer appears denser, thicker, and opaque with well-defined margins than the surrounding

normal epithelium. Acetowhitening in adult squamous metaplasia shows inflammation and regeneration of the epithelium, the color is slightly paler, thinner, transparent, and mottled with margins that are not very clear. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color. Meanwhile, cancer often involves the entire cervix. Acetowhitening of the epithelium in cases of suspected CIN and early invasive cancer appears denser, thicker, and opaque with well-defined margins than the surrounding normal epithelium. Acetowhitening in adult squamous metaplasia shows inflammation and regeneration of the epithelium, the color is slightly paler, thinner, transparent, and mottled with margins that are not very clear. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color, thick, and opaque with well-defined margins of normal surrounding epithelium. Acetowhitening in adult squamous metaplasia shows inflammation and regeneration of the epithelium, the color is slightly paler, thinner, transparent, and mottled with margins that are not very clear. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color, thick, and opaque with well-defined margins of normal surrounding epithelium. Acetowhitening in adult squamous metaplasia shows inflammation and regeneration of the epithelium, the color is slightly paler, thinner, transparent, and mottled with margins that are not very clear. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color. Acetowhitening that occurs due to inflammation and healing processes is usually widely distributed in the cervix, not limited to the transformation zone and disappears quickly (within 1 min). Leukoplakia and condyloma after application of acetic acid will have a very grayish-white color.

The advantages of using the IVA – Lugol Iodine method are that it is easy and practical, can be carried out by all health workers, the tools needed are simple, and are in accordance with simple health service centers. The conditions for carrying out the IVA - Lugol Iodine test include having had sexual intercourse (no longer a girl), not having menstruation/menstruation, not being pregnant, and not having sexual intercourse 24 h before.

The first thing to do is prepare the patient, namely, giving informed consent, preparing an environment around the client that respects privacy, and positioning the patient on the gynecological table in the lithotomy position. The tools needed include ob-gyn table, good light source, sterile speculum, a pair of gloves, cotton swabs, cotton buds, gauze, ring pliers, forceps pliers, 5% acetic acid or prepared vinegar, 0.5% chlorine solution for glove decontamination, plastic buckets or containers with 0.5% chlorine solution for instrument decontamination, plastic bags for disposing of contaminated cotton, and other waste items.

Existing secretions must first be cleaned gently and then gently but firmly applied 5% acetic acid using a cotton swab soaked in acetic acid. The whitish curd-like discharge associated with candidiasis is very sticky in nature and if not cleaned properly first looks like acetowhite lesions, leading to a false positive result. Note cervical epithelial changes for appearance of white (acetowhite) lesions, degree of density, and non-removal in the columnar epithelial areas especially in the transformation zone close to the squamocolumnar junction.

Notice how quickly the acetowhite lesions appear and then disappear. Explain the results of the examination to the client, when to do another examination, as well as the management plan if needed. The intensity of the white discoloration of acetowhite lesions needs to be considered, including shiny white, cloudy/cloudy white, pale white, or dull white. The boundaries and boundaries of the white lesions also need to be considered, including clear and firm/sharp diffuse margins or diffuse but not sharp or unclear margins. Margins also need to be considered, including embossed or flat margins, and regular or irregular margins. The location of the lesion also needs to be identified near or far from the transformation zone. It is also necessary to see whether the lesion abuts (touches) the squamocolumnar junction, extends into the endocervical canal.

Examination results showing white lesions on the cervix are indicators of precancerous lesions. In general, IVA examination results which can be negative, positive, cervical cancer, and inflammation. A negative IVA indicates a normal cervix. Inflammatory IVA indicates inflammation of the cervix (cervicitis) or the presence of benign findings such as cervical polyps. A positive IVA indicates an abnormality, which indicates a white lesion on the cervix and this is an abnormality indicating a precancerous lesion. IVA cervical cancer indicates cell abnormalities due to cervical cancer.

Contraceptive Devices in the Womb

Intrauterine Contraception Device (IUD) is a contraceptive device made of flexible plastic and placed in the uterus. Postpartum and breastfeeding contraceptives that are most ideal for mothers are contraception that does not suppress breast milk production, namely, the IUD, 3-month hormone injections, the minipill, and condoms.

There are various types of IUDs which are shown in Figure 1. CuT-380 A is a small IUD with a flexible plastic frame and a T-shape covered by fine wire made of copper (Cu). Another IUD circulating in Indonesia is the Nova T. IUDs that are widely used in Indonesia include Lippes loop of the unmedicated type and Cu-T 380 A, multiload 375, and Nova-T of the medicated type [28].

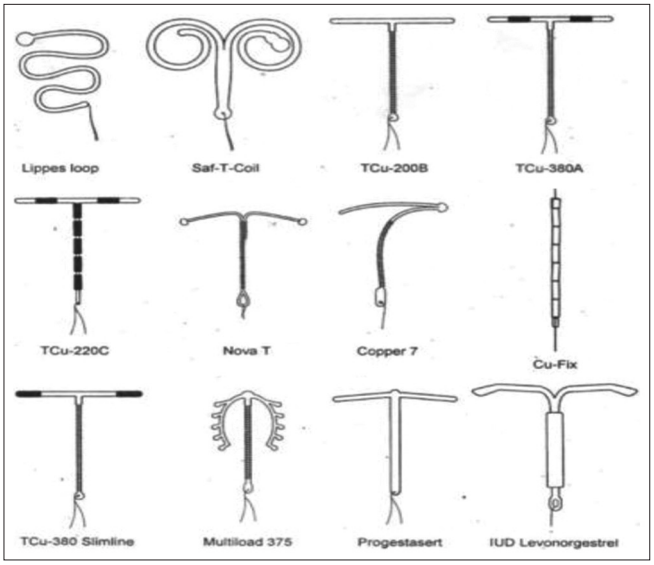

Figure 1: Types of intrauterine devices

The Lippes loop IUD is a spiral-shaped IUD made of polyethylene and contains barium sulfate in the body, making it radio-opaque on radiological examination. This type of IUD is shaped like a spiral or the letter S is continuous and there is a thread on the tail to make it easier to control. This IUD comes in four different sizes based on the length of the top and has a low failure rate. Another advantage of this type of IUD is that it rarely causes injury or intestinal obstruction when a perforation occurs because it is made of a plastic material [29].

IUD Cu – T 380 A is an IUD made of polyethylene in the shape of a T with the addition of barium sulfate. On the upright part of the body, there is 176 mg of copper wrapped and in the middle; there is 68.7 mg of copper each. Its surface area is 380 ± 23 m2. The size of the upright section is 36 mm and the cross section is 32 mm with a diameter of 3 mm. The lower end of the IUD is attached to a polyethylene monofilament thread as a control for removing the IUD [29].

The multiload 375 (ML 375) IUD is an IUD made of polypropylene and has a surface area of 250 mm^2 and 375 mm^2 of fine copper wire wrapped around the vertical shaft to increase the effectiveness of this IUD. There are three types of multiload IUD sizes, namely, standard, small, and mini. The arms are designed in such a way that they are more flexible and minimize expulsion [29].

The Nova-T IUD has a 200 mm^2 fine copper wire with a flexible arm and a blunt tip so it does not cause injury to the local tissue when inserted [29].

The Cooper-7 IUD is an IUD in the shape of a 7 with the aim of facilitating installation. This type of IUD has a vertical rod diameter of 32 mm and is added with a coil of copper (Cu) wire with a surface area of 200 mm^2 which functions the same as the fine copper coil on the Copper-T type [29].

There are five working mechanisms of the IUD so that it can make it a contraceptive tool. First, the IUD causes a non-specific local inflammatory reaction in the uterine cavity so that implantation of the fertilized egg is disrupted. In addition, the emergence of polymorphonuclear leukocytes, macrophages, foreign body giant cells, mononuclear cells, and plasma cells can cause lysis of spermatozoa or ova and blastocysts. Second, the IUD increases local production of prostaglandins, which can delay implantation. Third, the IUD disrupts or releases the blastocyst that has implanted in the endometrium. Fourth, the IUD causes an accelerated movement of the ovum in the fallopian tube. Fifth, the IUD immobilizes spermatozoa as they pass through the uterine cavity [28].

Saifuddin, *et al*. explained how the IUD works by inhibiting the sperm's ability to enter the fallopian tube; affect fertilization before the ovum reaches the uterine cavity; preventing sperm and ovum from meeting although the IUD makes it difficult for sperm to enter the female reproductive tract and reduces the sperm's ability to fertilize. This makes it possible to prevent implantation of the egg in the uterus [30].

One Shot Method

The one-shot method is an IVA model development design that is integrated with IUD insertion. Based on experience, an IVA examination can be carried out simultaneously with pre-insertion, installation, and post-insertion IUD services. The one-shot method for IUD acceptors can provide two benefits in one service and can be done at first-level health facilities. However, this is very dependent on the commitment of health workers in first-level health facilities and there is no policy and standard operating procedures for their services.

For the preparation of tools, complete tools are prepared inside the instrument case and outside the instrument case. Inside the instrument tub, ensure that the completeness is in the form of a bivale speculum, tenaculum (portion clamp), uterine probe (to measure the depth of the uterus), forceps, scissors, small com, 3–5% acetic acid in a bottle, a wotten stick, sterile gauze, a pair of sterile gloves, or high-level disinfection gloves. Outside the instrument case, prepare an IUD(CuT-380A) or Progestasert-T that is still undamaged and open, bent, betadine, spotlight, basin filled with 0.5% chlorine solution, basin filled with high-level disinfection water, and a trash can.

Officers, clients, and the environment must also be prepared. Officers must wash their hands under running water and the room is closed, comfortable, and bright. The client must know and agree to the action to be taken. The client's position is also set as comfortable as possible.

When conducting anamnesis, the information that needs to be obtained includes the date of the last menstrual period, the length of menstruation and the pattern of menstrual bleeding; parity and recent birth history; history of ectopic pregnancy; intense pain with each period; severe anemia (Hb <9 g% or hematocrit <30); history of genital system infection (ISG), sexually transmitted disease (STD) or pelvic infection; history of changing partners; and history of cervical cancer.

Make sure the client has rubbed his bladder and washed the genital area using soap and water. Palpate the abdominal area and check for pain, lumps, or other abnormalities in the suprapubic area. Inspect the external genitalia. Palpate the Skene and Bartholin glands and observe for vaginal tenderness or discharge. Perform an inspector examination, check for lesions or vaginal discharge and inspect the cervix. Apply 3–5% acetic acid using a stick to the entire surface of the portion and see the results. IVA examination is performed on patients who are not menstruating, if the IUD is inserted during menstruation, then IVA is performed 1 week after insertion (after control). The next step is carried out at the same time as the IUD insertion. If the IUD is not inserted, decontaminate it. Perform a bimanual examination to ensure free cervical movement and determine the size and position of the uterus. Make sure there is no pregnancy, no infection, or tumor in the adnexa. Perform a rectovaginal examination if there are indications such as difficulty determining the size of the retroverted uterus and the presence of a tumor in the uterine cavity.

Insert the uterine tube carefully into the uterine cavity with one go without touching the vaginal wall or the speculum lip. Determine the position and depth of the uterine cavity and remove the sonde. Measure into the uterine vacuum on the inserter tube which is still in its sterile packaging by sliding the blue neck on the inserter tube, then opening all the plastic packing covers. Remove the IUD tube from its package without touching any non-sterile surfaces. Hold the IUD tube with the blue neck in a horizontal position (level with the IUD arm). Insert the inserter tube into the uterus until the blue neck touches the cervix or until resistance is felt. Grasp and hold the tenaculum and pusher with one hand.

Remove the plunger, then push the inserter tube back into the cervix until the blue neck touches the cervix or resistance is felt. Take out part of the inserter tube and cut it approximately 3–4 cm. Take out the entire inserter tube and remove the tenaculum. Check the cervix and if there is bleeding from the place where the tenaculum was clamped, press it with gauze for 30–60 s. Make sure the client does not experience severe cramps and observe for 15 min before allowing the client to go home.

For post-insertion counseling, teach the client how to self-check the IUD threads and when to do it. Explain to the client what to do when experiencing side effects and tell when the client should come back to the clinic for control. Remind again that the usage period for the Cu T380A IUD is 10 years.

Conclusion

The one-shot method performed on IUD acceptors can provide two benefits in one service. This method can be carried out at first-level facilities with standard facilities. The method is expected to improve cervical cancer screening.

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