



IMMUNIZATION SAFETY AMONG IMMUNIZATION CENTERS IN EL-OBIED, SUDAN

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ABSTRACT

Background: Immunization safety is greatly dependent upon vaccine safety, safe injections and waste disposal. Vaccines are sensitive to heat and freezing so must be kept at the correct temperature from the time they are manufactured until they are used in order to preserve their quality. **Objective:** This study aimed to determine immunization safety among immunization centers in El-Obeid, Sudan. **Methodology:** Facility based descriptive cross-sectional study in El Obeid was done, the entire target population was covered (34), data were collected with questionnaires and observation checklists, and analyzed by SPSS. **Results:** In this study, 3% of immunization centers were storing the vaccine with drugs and chemicals. In 73.5% of immunization centers, there is no space between vaccines in refrigerator during vaccine arrangement. About 52.9% of health workers, in immunization, did not aware about multi-dose vial policy. All health workers (100%) were use new syringes for any child. About 11.7% of health workers exposed previously to needle stick. 35.3% of health centers fill the safety box above $\frac{3}{4}$ of the box size, and about 91.2% of immunization centers storing injection waste separately. **Conclusion:** Immunization safety in E-Obeid immunization centers was poor, it demand intervention through excessive training and health education of health workers.

KEYWORDS: Immunization Safety, El-Obeid, Sudan.

INTRODUCTION

Immunization has been proved to be one of the most cost-effective parts of health promotion since in many countries after achieving high immunization coverage, the morbidity and mortality rates of vaccine-preventable diseases tended to decline.^[1,2] Immunization safety is greatly dependent upon vaccine safety, safe injections and waste disposal. Vaccines are sensitive to heat and freezing, so must be kept at the correct temperature from the time they are manufactured until they are used in order to preserve their quality. The system used for keeping and distributing vaccines in good condition is called the cold chain.^[3] Cold Chain is a system of storing and transporting vaccine at the recommended temperature range from the point of manufacture to point of use. In order to provide potent and effective vaccine to the beneficiaries a vast cold chain infrastructure is required, which should have a network of Vaccine Stores, Walk-in coolers (WIC), Walk-in-freezers (WIF), Deep Freezers (DF), Ice lined Refrigerators (ILR), Refrigerated trucks, Vaccine vans, Cold boxes, Vaccine carriers and icepacks from national level to states up to the out reach sessions.^[4]

Injection is a skin piercing procedure performed with a syringe and needle to introduce a substance for prophylactic, curative or recreational purposes.^[5] The World Health Organization (WHO) defines safe injection as one that does not harm the recipient, does not expose the health worker to any avoidable risk, and does not result in any waste that is dangerous to the community.^[6,8] Needlestick injuries present the single greatest occupational hazard to medical personnel. Unsafe injections are responsible for millions of cases of hepatitis B and C and an estimated 250 000 cases of HIV, annually.^[9,10] Sharps waste can cause serious health and environmental problems. Unsafe disposal can spread some of the very same diseases immunization programmes are working to prevent. Leaving used syringes and needles in the open or on the ground puts the community at risk. Inappropriate treatment of waste leads to environmental pollution.^[10] Safety boxes, or sharps containers, are puncture-resistant containers into which A-D syringes and needles are placed immediately after use and temporarily stored until they can be destroyed. They should be supplied in sufficient quantity such that a safety box is always within reach of a vaccinator, even during outreach sessions.^[11] Safety boxes should be closed when they are three quarters full. Used

needles and syringes should never be transferred from safety boxes to other containers. A five-litre safety box can hold about 100 syringes and needles.^[10] Once nearly full, safety boxes should be incinerated. If an incinerator is not available, a much less desirable and effective alternative is to douse them with kerosene and burn them.^[11]

This study aimed to determine immunization safety among immunization centers in El-Obeid, Sudan.

MATERIALS AND METHODS

Study design

Facility based descriptive cross-sectional study.

Study area

El Obeid or Al-Ubayyid is the capital of North Kordofan State its area has been estimated by 81 km² and the distance from Khartoum is about 560 km. El Obeid is connected to Khartoum by an asphalt motorway, a railway line and air-flights taking off its airport several times a week. The population of the City estimated by 440483 person. There are 38000 houses and 40000 families in the City. The population of this City is majority Muslim with a small Christian presence. Health services consist of 4 governmental hospitals, single private hospital, 34 health centers, 2 health units and 3 dispensaries.^[12]

Study population

- Immunization centers in El Obied
- Health workers in Immunization centers in El Obied

Sampling

In this study, the entire target population in El Obied was covered. Thus, the number of target population is 34 centers and 34 health workers.

Data collection

In this study, questionnaires and observation checklists were used to collect data from study group.

Ethics

Approval from ministry of health was obtained. Participants assured of the confidentiality of their responses and provided informed verbal consent.

Data processing & analysis

Data were analyzed using statistical software package (SPSS).

RESULTS AND DISCUSSION

In this study, 3% of immunization centers were storing the vaccine with drugs and chemicals (**table.1**), this bad practice may constitute, a big problem to children if injected instead of vaccine ignorantly, this finding in contrast with WHO recommendations which revealed that, in the past, tragedies related to reconstitution of freeze-dried vaccines with insulin, muscle relaxant and other inappropriate solutions have occurred. Therefore, managers should ensure that such products are not stored in the vaccine refrigerators or cold boxes. To avoid this confusion, WHO now encourages vaccines and diluents to be distributed together.^[3]

The present study exhibited that in 73.5% of immunization centers there is no space between vaccines in refrigerator during vaccine arrangement (**table.1**); this practice may cause damage for vaccine through preventing the air to pass to vaccine and keep it in recommended teperature. This finding in contradiction, with WHO which revealed that, store vaccine boxes or trays with, spaces between to allow air circulation inside the refrigerator.^[13]

As shown in (**table.1**), about 52.9% of health workers, in immunization, did not aware about multi-dose vial policy, that is in contradiction with, WHO recommendations, which, said that: Opened vials of OPV, DPT, DT, TT and hepatitis B vaccines may be used in subsequent immunization sessions until a new shipment of vaccine arrives, provided that each of the following 3 conditions are met; the expiry date has not passed, the vaccines are stored under appropriate conditions (0 to +8° C).^[13]

Table 1: Vaccine safety and cold chain among immunization centers.

Storage of vaccine with drugs and other chemicals	Frequency	Percent
Yes	1	3%
No	33	97%
Availability of all cold chain components		
Yes	9	26.5%
No	25	73.5%
Availability of space between vaccines in refrigerator		
Yes	9	26.5%
No	35	73.5%
OPV kept in refrigerator		
Top shelf	27	79.4%
Middle shelves	7	20.6%

Procedures for vaccine preparation		
Check expire date	2	5.9%
Using of correct diluant	1	2.9%
Using new syringes for any vial	2	5.9%
All above correct	29	85.3%
Do you know multi-dose vial policy		
Yes	16	47.1%
No	18	52.9%

The present study revealed that 34 (100%) of health workers were use new syringes for any child (**table.2**), this is considered good practice which prevent the transmission of blood borne infection. And considered high percentage as compared with (60% in provincial dispensaries, 80% urban health centers and 11% rural health centers) in Burkina Faso and 65% in Senegal, while the same finding was recorded in CÔte d'Ivoire which revealed that 100% of health workers using new syringes for any child.^[14]

As study show, about 11.7% of health workers exposed previously to needle stick (**table.2**), this finding is lower than that found in similar study which revealed that

needlestick injury in the previous year was reported by 14.9% of physicians and 16.5% of nurses (0.21 and 0.38 injuries/person/year respectively).^[15]

As shown in (**table. 2**) only 3% of health workers recapping of needles, which is considered lower rate as compare with 21.9% of health workers recapping of needles in similar study conducted in Kaski District, Western Nepal.^[16] Although the lower rate of recapping but may constitute high risk for health workers by transmitting of diseases such as hepatitis C,B, HIV and other blood borne diseases. Also in other previous study, 59.6% of physicians and 40% of nurses were recapping the needles before disposal.^[15]

Table 2: Injection safety among immunization centers.

Clean the site of injection	Frequency	Percent
Yes	1	3%
No	33	97%
Doses of vaccine		
Correct	33	97%
Not correct	1	3%
Using new syringes for any child		
Yes	34	100%
No	0	0%
Needle stick exposure		
Yes	4	11.7%
No	30	88.3%
BCG injection site is correct		
Yes	21	61.8%
No	13	38.2%
Hepatitis B injection site is correct		
Yes	6	17.7%
No	28	82.3%
Re-cap the needles		
Yes	1	3%
No	33	97%

In this study, 97% of immunization centers were using safety boxes; this finding is in contradiction with analogous study conducted by Allaqband UF et al, which revealed that, 34.2% of health care facilities did not use of sharps container.^[17]

Table.3 showed that 35.3% of health centers fill the safety box above $\frac{3}{4}$ of the box size, this practice in contrast with Ministry of Public Health and Population of Yemen, which said that the lid of the box should be closed when about $\frac{3}{4}$ of box size is full and do not force too many syringes into the box.^[18]

As shown in (**table.3**), about 91.2% of immunization centers storing injection waste separately, this is a good practice and if injection storing with public waste this may pose a major risk to sweepers and garbage handlers. As in developing countries, the searching waste dumps for valuable things and metal are very common among waste scavengers who may be children; they may be also at risk of acquiring infections. While in analogous study conducted in two districts of Kashmir valley, only 30.9% of study group, segregate of injection waste.^[17]

Table 3: Immunization waste disposal among immunization centers.

Use of safety boxes	Frequency	Percent
Yes	33	97%
No	1	3%
When safety box is closed		
Full box	12	35.3%
Fill until it is about ¾ full	22	64.7%
Storing of safety boxes		
Separate storage	31	91.2%
With other wastes	3	8.8%
Disposal of full safety boxes		
Burning	34	100%
Burial	0	0%

CONCLUSION

Immunization safety (vaccine safety, injection safety and waste disposal) in El-Obeid immunization centers was poor and there is a weaknesses in cold chain maintenance, it demand intervention through excessive training, health education of health workers and availing immunization equipments to prevent the children health.

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