Evaluation of Vaccine storage Efficacy in Hadhramout Governorate

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Abstract

The study concentrates upon the process of vaccine storage, which significantly determines the efficacy of vaccine in disease prevention.

Study design: Eighteen health centers were selected in Hadhramout governorate using multistage sampling &questionnaire were done according to WHO standard &by direct visualization. Good &poor results were found during this study, among poor ones, in 11% of centers there is lack of trained personnel for vaccine storage, also lack of memo papers in 33% The sun which has detrimental effect on vaccine storage, enters the room in 44% of studied centers ,.The refrigerators should be specified for vaccine storage only ,but unfortunately were used for other purposes in 6%,the temperature of the refrigerator was taken less than twice a day in 11%of health centers. The good results include, presence of refrigerators in all centers, disposing the vaccine after expiry date ,all personnel know the correct temperature of storage (2-8C) even some of them were not well trained .The results of this study were different in one aspect & similar in another with WHO recommendations &studies from Europe.

The study shows many defects in vaccine storage of health centers either due to carelessness of responsible personnel or from health authority in the governorate like lack of correct place where refrigerator should be placed, or lack of providing trained substitute in each center. According to WHO recommendations we recommend the following A-provision of trained personnel &trained substitute B-providing suitable place for refrigerator to prevent entry of sun light to vaccine storage C-the refrigerator should be specified for vaccine storage only D-provision of booklets &bulletin papers for responsible staff.

Introduction:

Diseases- free life is the hope of the parents when they bring their children to health center for vaccination, so we can conclude the importance of immunization and any factor is needed to success the vaccination & efficacy of vaccine.

One of these factors is vaccine storage, which should be at standardized procedures and techniques. The vaccine are very sensitive to changes in the temperature, if exposed to improper temperature, this may leading to loss of efficacy, although there is a variation of temperature stability from vaccine to another, e.g. the polio vaccine is most sensitive to temperature than others, but tetanus vaccine is the least sensitive [(1)]. Measles vaccine stored at 5ºC will keep its efficacy at least two years, but if exposed to high temperature (40ºC) will lead to loss of efficacy within one day or less [(2)]. Most vaccines should be stored between (2-8ºC). [(3)]. Production of vaccine which are resistant to temperature instability needed great effort, if it is possible by companies, because that may be completely impossible [(4)], so the effort which is done for effective vaccine storage is less than the great effort which needed to extract new vaccine resistant to temperature. Freezing of vaccine compromise the vaccine schedule[(5)], therefore good vaccine storage procedure are important for example refrigerator should be specified for vaccine storage only ,is not opened frequently &the temperature should be checked daily [(6)]. The aims of the study is to evaluate the vaccine storage in general practice setting &identify different techniques & procedures of vaccine storage in Hadhramout governorate & compare them

with standard methods of WHO & developed countries.

Materials And Methods

During the period between Nov. 2002 –May 2003, eighteen health centers were visited in selected areas in Mukalla, Ghail Bawazeer, Al-Shaher Seyuin & Al-aain valley) in Hadhramout governorate, the type of sampling is multistage.

The visitors have direct interview with the health workers and asked them questions about the techniques and methods of vaccine storage by using questionnaire papers.

The computer was used in data presentation & expression of the results. The results are expressed by using frequency distribution tables, simple bar graphs and pie (circular) charts.

Results

It was found that all health centers are supplied with refrigerators, which contain thermometers. Expired vaccines were disposed in all centers .The guidelines papers for vaccine storage are found in 67% (12 centers), & absent in 33%, Table 1: shows frequency distribution of duration of vaccine storage. The refrigerators were opened 1-4 times /day in all centers. All responsible workers know the correct temperature for vaccine storage. There is one center where refrigerator is used for other purposes than vaccine storage. Fortunately all the staff in visited centers believe in the importance vaccine storage. Defrosting of the refrigerators is done in 15 centers (83%) regularly, while in others it is not done. There is only one center where the refrigerator has no min.- max. control (6%).Two centers (11%) has no identified person responsible for vaccine storage. Fig.1 shows frequency distribution of availability of trained substitutes in visited centers. The temperature of the refrigerators was taken twice /day in 16 centers (89%). There is only one of the visited centers where vaccines are not available. DPT vaccine was in the freezer in one center (6%), while in 17 centers it was not. The sunlight enters the room of vaccine storage in 8 centers (44%). Fig.2 shows frequency distribution of the sequence of taking old vaccines or new ones or both.

Table (1) :- Shows the frequency distribution of the duration of vaccine storage in the visited health center after receiving

Duration of vaccine storage in The centers	Frequency	Percentage
More than month	3 centers	16.7%
One month	15 centers	83.3%
Total	18 centers	100%

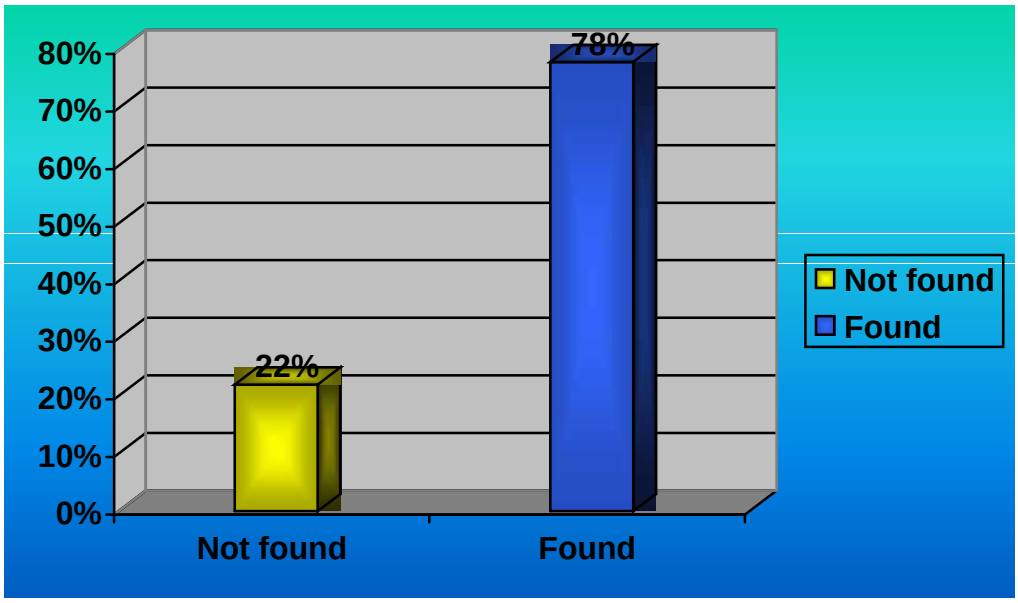

Fig. 1 :Frequency distribution of availability of trained substitutes in visited centers.

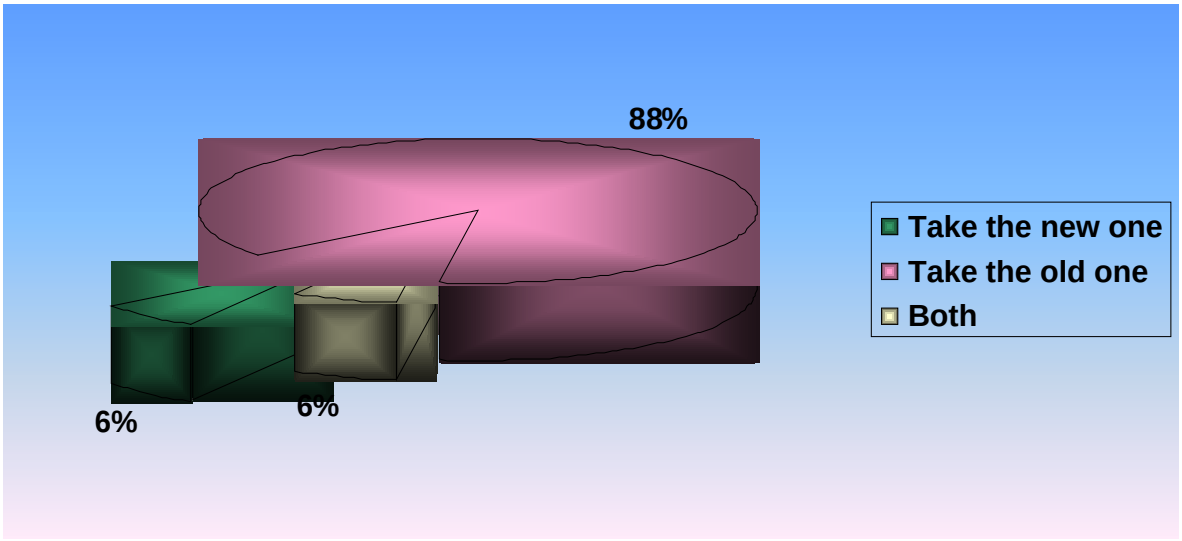

Fig 2: Frequency distribution of the sequence of taking old vaccine or new ones or both in visited health centers.

Discussion

The results of this study showed many defects in the visited centers according to WHO & worldwide standards recommendations, As seen in the following:

1- vaccine storage guidelines papers are absent in 6 centers (33%). These papers are essential to refresh the information of vaccine storage of working staff, probably are basically not available in governorate health department, or the workers are lazy & indifferent\to bring them.
2- In three centers (17%) the vaccines were stored more than one month, mainly because they use new one & leave the old ,also lack of orientation toward finished old one before they use new one.
3- In one of the visited center refrigerator was used for another purpose like keeping food material beside vaccines, this means refrigerator will be opened frequently leading to loss of coolness which is important for validity of vaccines this defect is due to lack of q\awareness of the importance of keeping the temperature of refrigerator stable & also negligence.
4- in two centers there is lack of trained personnel for vaccine storage which will lead to random manual working with vaccine, probably there is no enough staff available at governorate health department.
5- there is lack of maximum –minimum temperature controller in (one center), which may be predispose the vaccines to loss of efficacy especially in summer months where the temperature is rising without awareness of the workers this defect is also noticed commonly in all visited centers in Italy ,this depend upon type of refrigerator supplied to the health center.
6- Lack of awareness of workers about the storage of vaccine lead them to keep them vaccines in the door of the refrigerator, which expose the vaccine to low-cold circumstance predisposing them to decrease the efficacy of vaccine. Fortunately this defect is noticed in only one center.
7- there is lack of trained substitutes in 4 centers (22%); this results in bad handling of vaccines & decreasing efficacy of the vaccines.
8- Checking of refrigerator temperature less than twice daily is noticed in 2 centers (11%), this defect is important because in summer months the change in temperature will not be corrected accordingly, this is due staff negligence & lack of awareness of the importance of checking refrigerator temperature.
9- In eight centers Sunlight enters the room of vaccine storage refrigerator, in 8 centers (44%), which is a serious defect predispose the vaccine to rapid loss of efficacy owing to temperature changes. This is due to negligence & lack of guideline papers in these centers.

In spite of these defects, there are good findings show the improving aspects of governorate health centers like presence of refrigerators in all 18 visited centers, while in central Italy there is 23% of studied health centers (4) .In all visited centers the expired vaccines are disposed or sent to major health centers while in Italian study (4) 67% of health centers keep the vaccines after expiry date. Also in all visited centers in central Italy none of them had max-min. thermometer of the refrigerator, while in our study we found this defect in only one center these comparative findings which are in favor of our study may not reflect essentially that our centers are better than those in Italy, this may be due to small sample size in comparison to Italian study & also health workers in our centers may be afraid to give us real & correct information about the present defects.

Conclusion

The health centers in Hadhramout Governorate have many defects in process of vaccine storage which are either due to carelessness of the responsible staff or from health authority in the governorate like lack of correct places where the refrigerators should be placed , or lack of providing trained substitutes in each centers .In spite of these defects there are many positive points found in these centers which are promising in improving the process of vaccine storage as mentioned above.

Recommendations

According to WHO recommendations, we recommend the following points

1. Provision of trained personnel & trained substitutes
2. Providing suitable place for refrigerators to prevent entry of sunlight to vaccine storage rooms.
3. The refrigerators should be specified to vaccine storage purposes only.
4. Provision of booklets & bulletins papers for responsible staff
5. Increase the awareness of the responsible staff about the importance of proper vaccine storage for the efficacy of the vaccines.

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