Definition of Research Center:
The health research Center established in the Ministry of Health at the year 1997, It’s considered to be specialized in quality tasks and Goals. It’s a main supporter of Health policies, programs and reforms. It’s depend on national cadres for it’s programs and Goals.

General Objective:
1- The Determination of the policies, strategies and priorities of Health research.
2- To strength the ability of Health & medical research and to develop the skills of the professional researchers in preparing and bringing out health researches and studies to gain from it’s results.
3- Formation of the national health and medical research committee and it’s roll especially in ethical review.
4- Establishment of the health research brunches in the main cities: Aden, Al-Hodeidah, Hearamout, and Taiz.
5- Establishment of specialized referenced library with update technical methods.
6- Coordination and cooperation with health programs, academic institutions, governmental and International organizations to develop and speed up the activities of health research.
Terms of Reference
Developing National Health Research Strategy for the Ministry of Health in Yemen

Developed by: Fadi El-Jardali, MPH, PhD.

Context
It is well established in the literature that evidence informed decisions can strengthen health systems. The need for countries to establish a national plan for health policy research has been iterated by several international bodies like the Commission on Health Research for Development and the World Health Organization. For instance, the Bamako Call to Action urged national governments to allocate 2% of budgets of ministries of health to research (WHO, 2008). Expanding health research is viewed as a fundamental tool for health development and informing health policy changes (WHO-EMRO, 2011). In order for research to inform decision making, it should be aligned with the needs of the larger community, particularly policymakers (El-Jardali et al., 2011). Indeed, the WHO Executive Board underscored the importance of priority setting stating that it is as critical as conducting the research itself (Nuyes, 2007). In the recent years, Yemen has had some progress in this front. It participated in a research priority setting exercise that was conducted for nine countries in the region in 2008 (El-Jardali et al., 2010). However, till this day, Yemen lacks a comprehensive strategy for setting policy-relevant research priorities.

As previously stated, improving health conditions and equitable access to healthcare is highly reliant on well informed policies. Producing evidence to inform policymaking is hence of utmost importance in Yemen’s context. However, Yemen falls short in this category, as it was identified as one of the lowest in the region with health policy related research production (El-Jardali et al., 2011).

Another issue is the actual utilization of generated evidence by policymakers. Studies done in the region, including Yemen, highlighted the gap that exists between researchers and policymakers (El-Jardali et al., 2012a; El-Jardali et al., 2012b). While 67.2% of the researchers interviewed indicated that they transferred research results to other researchers, only 40.5% indicated transferring it to policymakers. Almost 70% of the researchers interviewed identified insufficient collaboration between policymakers and researchers as obstacles to evidence informed policies while more than half of the policymakers thought that the lack of an administrative structure for supporting such initiatives is the reason (El-Jardali et al., 2012a; El-Jardali et al., 2012b).

Approach
Research findings highlight the importance of having a set strategy for health research in Yemen. Engaging policymakers in setting the research agenda was shown to increase the likelihood of using research to inform policy. Identifying research priorities is but the first step in the right direction, further steps need to be taken in order to build capacities to perform those studies, communicate their findings to stakeholders to facilitate their use to inform decision making. Based on the above, the following approach will serve as a multifaceted approach for developing a national health research strategy in Yemen:
I. Conducting documentary reviews

In this step, document review will be conducted to assess the production of research pertaining to health system priorities in the context of Yemen. This assessment will include websites of the Ministry of Health and related ministries in addition to websites of international organizations and agencies. This step will help identify official governmental reports and strategic plans in addition to international reports about Yemen. Key informants, ministry directors, policymakers and stakeholders in Yemen will also be asked to provide important documents relevant to this topic that may not be publicly available.

II. Stocktaking production to analyze gaps

In this step, all health related research that is published about Yemen will be identified and reviewed. The aim is to lay out what is already known and what needs to be known in Yemen’s context. A similar exercise was already done where El-Jardali et al. identified all health related articles published about Yemen from 2000-2008 (El-Jardali et al., 2011). This exercise will be repeated for years 2009-Present by searching databases like Medline for indexed articles of relevance.

III. Elicit policymakers and stakeholders’ opinions
In this step, interviews and focus groups will be performed with policymakers, researchers, academicians, program managers, ministry directors, implementers and other stakeholders. Individuals will be selected based on a sampling frame developed for this purpose. A detailed interview guide for these semi-structured interviews will be developed. The exercise will be guided by the listening priority setting approach developed by Lomas et al. (2003). The aim is to garner the input of policymakers working in or out of the ministry of health and other stakeholders about topics that they consider as priorities. This will help ensure that generated research is valuable and relevant to the needs and priorities of policymakers and stakeholders in Yemen. In addition to the previous steps, this step will help in identifying priority topics in need of research evidence.

IV. Validation and ranking

The topics that are generated from the previous steps will be validated and ranked in a validation and ranking workshop based on preset criteria. The priority setting process will be developed along with the criteria to be used over which each topic is ranked. Participants will come from various backgrounds and will include policymakers, government officials, ministry directors, program managers, implementers, researchers and academicians. Those participants will be asked to rank the different topics based on the selected criteria. This will help validate the topics are indeed of concern and urgency in the context of Yemen. The priority setting exercise will also help ranking the numerous potential research questions. As a result, the workshop will narrow down the research questions to a few that are of top priority and need to be answered.

V. Capacity Building for Proposal Writing and Knowledge Production

The next step is to build capacity teams to write proposals, secure funding and conduct research about the prioritized research questions for MOH. In this step, a plan will be created to produce research proposals in order to secure funding after which research will be conducted to produce evidence on priority topics. The previous steps of identifying what research is already done will help ensure that efforts are not duplicated. Capacities will be built to produce the appropriate evidence for the prioritized research questions.

VI. Knowledge Translation

Producing the evidence on identified priority topics is not enough. In many cases, even if the evidence is generated, it is not used to support the policymaking process for the identified priorities (Nuyens, 2007). This discontinuity poses a threat for the goals of the priority setting. This underscores the vitality of the knowledge translation step. The aim of this step is to package the research findings in a policy friendly manner and disseminate it to the concerned parties. This will be done thorough the production of policy briefs and by performing policy dialogues. These tools will help in communicating and disseminating the findings to the policymakers and pertinent stakeholders in order to facilitate their use in informing the policymaking process.
References:


Assessment of medical waste management in the main hospitals in Yemen

Authors: AA AL-Emad

ABSTRACT No previous studies about the management of medical waste have been published in Yemen. This research in 5 government and 12 private hospitals in Sana’a aimed to evaluate waste-workers’ and hospital administrators’ knowledge and practices regarding medical waste handling. Interviews and observations showed that the waste-workers were collecting medical and nonmedical wastes together manually in all hospitals without receiving adequate training and without using proper protection equipment. There was poor awareness about medical waste risks and safe handling procedures among hospital administrators, and most hospitals did not differentiate between domestic and medical waste disposal. Budgets were not allocated for waste management purposes, which led to shortages in waste handling equipment and an absence of training programmes for staff. Poor knowledge and practices and a high rate of injuries among waste-workers were noted, together with a risk of exposure of staff and visitors to hazardous waste.

Évaluation de la gestion des déchets médicaux dans les principaux hôpitaux du Yémen

RÉSUMÉ Aucune étude de la gestion des déchets médicaux n’a été publiée précédemment au Yémen. La présente recherche conduite dans cinq hôpitaux publics et douze hôpitaux privés de Sanaa visait à évaluer les connaissances des agents de collecte des déchets et des administrateurs des hôpitaux concernant la manipulation des déchets médicaux et leurs pratiques en la matière. Des entretiens et des observations ont permis de révéler que les agents collectaient les déchets médicaux et non médicaux à la main dans tous les hôpitaux sans avoir reçu de formation adéquate ni utilisé les outils de protection adaptés. Les connaissances en termes de risques représentés par les déchets médicaux et de procédures de manipulation étaient faibles parmi les administrateurs des hôpitaux, et la plupart des hôpitaux ne séparent pas les déchets ménagers des déchets médical. L’absence d’allocation de budgets à la gestion des déchets a conduit à l’insuffisance des équipements de manutention des déchets et à l’absence de programmes de formation pour le personnel. Des connaissances faibles, des mauvaises pratiques ainsi qu’un taux élevé de blessures chez les agents de collecte ont été observés, mais aussi un risque d’exposition du personnel et des visiteurs aux déchets dangereux.
Introduction

Over the last few decades, progress in medical science and technology and expansion in the number of health institutions worldwide has been accompanied by increasing quantities of potentially hazardous medical waste [1,2]. The risks include occupational exposure of health workers and waste-handlers and environmental exposure of the public caused directly by illegal or careless management and disposal practices or indirectly through emissions and ash handling from medical waste incinerators [3]. In 2002, the World Health Organization (WHO) reported that underdeveloped countries suffer the greatest burden of risk from medical waste due to the high costs of proper disposal procedures. The spread of bloodborne pathogens in health care waste [4] motivated the WHO in 2004 to call for the development of national policies, guidance and plans for health care waste management [5].

Although a number of studies have been made of medical waste handling [6–8], research in the Arab region is limited. A study in Palestine of medical waste management in hospitals found that there was insufficient separation between hazardous and non-hazardous wastes, an absence of necessary rules and regulations for collection, transport and treatment of waste and a lack of training and protective equipment [9]. Another study in Palestine comparing the management of medical waste in primary health care centres and private clinics showed that most workers in the public sector did not follow correct methods of handling medical waste [10]. In Yemen, no published studies can be found and no protocols exist for the management of medical waste, although a report about the cleaning of medical facility waste in the capital was issued in 2006 [11].

The present study aimed to evaluate the management of medical waste in the largest hospitals in Yemen. The specific objectives were to identify the types of medical waste produced, identify and evaluate collection procedures, assess waste-workers' knowledge and practices, identify and evaluate disposal and clearance procedures and assess hospital administrators' knowledge regarding medical waste.

Methods

Setting and sample

This descriptive study was carried out in Sana'a, the capital of Yemen, which has the majority of large hospitals in Yemen. The study sample was the departments and waste-workers in hospitals larger than 50 beds. The study included 5 government hospitals (Al-Thowra, Kuwait, Republica, Al-Sabeen, Police) and 12 private hospitals (Saudi-German, Science University, Asal, Yemeni-German, Modern German, Ibn Cynaa, Al-Ahly, Al Motawakel, Al-Om, Al-Horabi, Tiabab, Al Amal). The literature was reviewed, the research framework was designed, the questionnaire was prepared and the fieldwork was completed from August 2007 to December 2008. The fieldwork was achieved after notices from the dean of the faculty of medicine in the University of Sana'a to the general managers of the selected hospitals. Permission was obtained from the hospitals prior to conducting the interviews with workers.

Data collection

A number of instruments were used for data collection as follows:

Knowledge and practices of hospital administrators

This was assessed using a special form covering their awareness about the importance of medical waste and their management role. Forms were filled through personal interviews with the official responsible for waste at each hospital. The form contained 13 items and was administered to the 17 hospital administrators, 1 at each hospital.

Knowledge and practices of waste-workers

This was assessed using a special form which included knowledge about the risks of and proper disposal procedures for medical waste and the collection practices followed. The form contained 19 items in 5 categories: nature of wastes, collection, separation and packaging, transportation and disposal, risks, and administrative issues. Forms were filled through personal interviews with 211 workers (87 workers at government hospitals and 124 workers at private hospitals). At least half of the employees in each hospital were included.

The number of active workers in all the hospitals was estimated to be about 300 cleaning workers, taking into account possible inaccuracies in the reported numbers of workers in most hospitals. Translators were used as many of the waste-workers were from countries located in the Horn of Africa (Somalia, Ethiopia) and lacked mastery of Arabic or English languages.

Practices of workers in handling medical waste

Actual practices were assessed using a form which was designed according to WHO criteria for collection of medical waste [12]. The form contained 25 items in 5 categories similar to those of the form for assessing the knowledge and practices of waste workers. All waste observations were made through direct site inspections to check the agreement between the interview data and the actual practices.

Results

Knowledge and practices of hospital administrators

Table 1 illustrates the self-reported knowledge and practices of hospital administrators in relation to medical waste. Only 20.0% of administrators in government hospitals confirmed the importance of having specialized waste-workers available, while none of those in
private hospitals did so. Personal safety tools were provided to waste workers by 20.0% of government hospitals and 33.2% of private hospitals, and their use was monitored in 80.0% and 91.7% of government and private hospitals respectively. None of the government hospitals, and very few private hospitals, had waste user manuals. All government hospitals claimed to be raising awareness of workers about dealing with medical waste, while three-quarters of the private hospitals reported this. Only one-fifth of the government hospitals and two-thirds of the private hospitals supervised their workers during waste collection.

None of the hospitals had a dedicated budget for waste handling, but many hospitals had an allocation for waste management within the hospital cleaning budget. Two-thirds of the private hospitals had a department responsible for waste collection, whereas none of the government hospitals did.

All government hospitals reported that they collected waste 3 times or more per day while less than half of the private hospitals were doing so (Table 1).

**Waste-workers’ knowledge of dealing with medical waste**

Table 2 shows the waste-workers’ knowledge about dealing with medical waste. It was found that 11.5% and 45.9% of workers in government and private hospitals respectively were able to identify the types of medical waste they were collecting. Few of the government hospitals workers (19.5%) and more than half of the private hospitals workers (61.3%) considered it necessary to sort medical waste. Only 11.5% of the workers in government hospitals and 44.4% of the workers in private hospitals could understand the reasons behind sorting medical waste. Consequently, none of the government hospitals workers and only 25.0% of the private hospitals workers knew the adequate quantities for packing medical waste.

Concerning risks that workers could be exposed to during handling medical waste, 68.9% of government and 70.9% of private hospitals workers seemed to be aware of these. Regarding knowledge of adequate disposal procedures of liquid waste, expired blood units, human tissue remains and expired medicines, the percentages were 12.6%, 7.0%, 4.5% and 4.0% respectively for government hospitals workers, and 37.1%, 8.8%, 6.5% and 0.0% respectively for private hospitals workers. The percentages of workers who believed that throwing expired blood units, tissue remains and expired medicines into the normal domestic rubbish collection was an adequate disposal procedure were 69.0%, 43.7% and 39.5% respectively for government hospitals, whereas for private hospitals these were 63.3%, 13.7% and 63.5% respectively (Table 2).

**Actual practices of workers in handling medical waste**

Table 3 presents the results of the assessment of the actual practices of workers in handling medical waste. None of the government hospitals were sorting their medical waste and 20.0% of them were only separating sharps from blunt instruments, whereas 16.7% of the private hospitals were sorting waste and half of them were separating sharps from blunt ones. None of the government hospitals and 8.3% of the private hospitals had workers filling wastes sacks to two-thirds or less.
Table 2: Waste-workers’ knowledge about dealing with medical waste in government and private hospitals

<table>
<thead>
<tr>
<th>Item</th>
<th>Government hospitals (n = 87)</th>
<th>Private hospitals (n = 124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to identify nature of medical waste</td>
<td>11.5%</td>
<td>45.9%</td>
</tr>
<tr>
<td>Identifies need to sort medical waste during collection</td>
<td>19.5%</td>
<td>61.3%</td>
</tr>
<tr>
<td>Know reasons behind sorting medical wastes</td>
<td>11.5%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Know adequate quantities for packing medical waste</td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Aware of risks in dealing with medical wastes</td>
<td>68.9%</td>
<td>70.9%</td>
</tr>
<tr>
<td>Knows adequate disposal procedures of liquid waste</td>
<td>12.6%</td>
<td>32.1%</td>
</tr>
<tr>
<td>Knows adequate disposal procedures of expired blood units and by-products waste</td>
<td>7.0%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Knows adequate disposal procedures of human tissue remains</td>
<td>4.5%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Knows adequate disposal procedures of expired medicines</td>
<td>4.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Believes throwing blood waste in domestic waste is an adequate disposal procedure</td>
<td>69.0%</td>
<td>65.3%</td>
</tr>
<tr>
<td>Believes throwing of human tissue remains in domestic waste is an adequate disposal procedure</td>
<td>43.7%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Believes throwing of expired medicines in domestic waste is an adequate disposal procedure</td>
<td>39.5%</td>
<td>65.5%</td>
</tr>
</tbody>
</table>

n = number of waste workers interviewed.

For government hospitals, 60.0% were using trolleys to move medical waste, and none of them were cleaning trolleys after each collection process. For private hospitals, 25.0% were using trolleys and 8.3% of them were cleaning trolleys after each collection.

Workers in 20.0% of the government hospitals and 33.3% of the private hospitals were using personal protection tools. Those who were not using protection claimed that the tools were not provided by their supervisors.

None of the government hospitals were using the waste bags only once, and only 8.3% of the private hospitals were using them once. Workers were collecting liquid waste, blood waste and human tissue remains in separate bags in 8.3%, 16.7% and 25.0% respectively of private hospitals, while none of the government hospitals were doing any of these. On the other hand, for hospitals where workers were using the same bags for collecting liquid waste, blood waste, human tissue remains and expired medicines with other wastes, the percentages for private hospitals were 50.0%, 83.3%, 75.0% and 41.7% respectively, while for government hospitals these were 20.0%, 100%, 100% and 100% respectively.

Workers were disposing liquid waste directly into the sewage system without any processing (dilution and/or sterilization) in 20.0% and 50.0% of government and private hospitals respectively, and were disposing of liquid wastes into the sewage after processing (dilution and/or sterilization) in 60.0% and 25.0% of these hospitals respectively. None of the government hospitals were sending expired medicines back to importers, while 58.3% of the private hospitals were doing so. None of the government or private hospitals had a furnace for destroying medical waste.

In 80.0% of the government hospitals and 75.0% of the private hospitals, visitors were exposed to medical waste in one way or another. All government hospitals and 83.3% of the private hospitals were gathering medical waste in open areas within the hospitals for temporary storage before it was transferred to final dumping destinations outside the hospital. None of government hospitals and only 8.3% of private hospitals had standard stores for temporary storage of medical waste. All government hospitals and 83.3% of private hospitals were depending on the city cleaning authorities for transporting and disposing of medical wastes outside hospitals. None of the government hospitals and only 8.3% of private hospitals were moving and disposing of medical wastes outside hospitals using their own vehicles (Table 3).

Work's injuries caused by medical wastes

Table 4 gives an indication of workers’ injuries caused by medical waste in government hospitals and private hospitals and administration responses. The rate of injuries during the previous 12 months in government and private hospitals were 28.7% and 27.4% respectively according to workers’ reports. Administrators ignored 16.1% of reported injuries in government hospitals and 7.3% in private ones.

Discussion

Knowledge and practices of hospital administrators

It was concerning to realize that administrators of the majority of government hospitals and private hospitals in this study in Sana’a did not see the necessity of having specialized waste workers within the hospital. This indicates
Table 3 Waste-workers' actual practices in dealing with medical waste in government and private hospitals

<table>
<thead>
<tr>
<th>Item</th>
<th>Government hospitals (n = 5)</th>
<th>Private hospitals (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers sort medical waste during collection</td>
<td>0.0</td>
<td>16.7</td>
</tr>
<tr>
<td>Workers separate sharp waste from blunt waste</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Workers fill sacks with medical waste to two-thirds or less</td>
<td>0.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Workers move medical waste using trolleys</td>
<td>60.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Workers clean waste trolleys directly after each collection</td>
<td>0.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Workers use personal protection tools</td>
<td>20.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Workers are using special plastic bags once for collecting medical waste</td>
<td>0.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Workers collect liquid waste in bags that prevent leakage</td>
<td>0.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Workers collect blood waste in separate bags that prevent leakage</td>
<td>0.0</td>
<td>16.7</td>
</tr>
<tr>
<td>Workers collect human tissue remains in separate bags that prevent leakage</td>
<td>0.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Workers collect liquid wastes together with other wastes</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Workers collect blood waste together with other waste in ordinary bags</td>
<td>100.0</td>
<td>83.3</td>
</tr>
<tr>
<td>Workers collect human tissue remains together with other wastes in ordinary bags</td>
<td>100.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Workers collect expired medicines together with other wastes</td>
<td>100.0</td>
<td>41.7</td>
</tr>
<tr>
<td>Workers dispose of liquid waste directly into sewage system without any processing (dilution and/or sterilization)</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Workers dispose of liquid waste into sewage system after processing</td>
<td>60.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Hospital sends expired medicines back to the importer</td>
<td>0.0</td>
<td>58.3</td>
</tr>
<tr>
<td>Hospital has furnaces for internal destruction of medical waste</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Hospital visitors are exposed to medical waste</td>
<td>80.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Workers gather medical wastes in open areas within the hospital for temporary storage before being transferred outside hospitals</td>
<td>100.0</td>
<td>83.3</td>
</tr>
<tr>
<td>Hospital has standard stores for temporary storage of medical wastes</td>
<td>0.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Hospital depends on city cleaning authorities in moving and disposing medical wastes outside hospitals</td>
<td>100.0</td>
<td>83.3</td>
</tr>
<tr>
<td>Hospital moves and disposes of medical wastes outside hospital using own vehicles</td>
<td>0.0</td>
<td>8.3</td>
</tr>
</tbody>
</table>

n = number of hospitals.

Insufficient awareness about the risks to public health and the environment that medical waste could cause or about the importance of its regular and proper collection and clearance. This is similar to what was founded in Palestinian hospitals and medical centres [10,13]. Private hospital companies may be reluctant to invest or spend money to prevent or to control pollution levels that are causing potential damage to the environment. This may be because they do not wish to reduce their profit margins or due to lack of knowledge, information and awareness about the...

Table 4 Distribution of workers injured by medical wastes according to hospital response

<table>
<thead>
<tr>
<th>Variable</th>
<th>Government hospitals (n = 87)</th>
<th>Private hospitals (n = 124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker did not report injury</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Worker reported injury but ignored by administration</td>
<td>14</td>
<td>16.1</td>
</tr>
<tr>
<td>Worker sought treatment at own expense</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Worker received checkup and treatment from administration</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>28.7</td>
</tr>
</tbody>
</table>

n = number of waste workers interviewed.
dangers of pollution and lack of understanding about the social and economic values of preserving a clean environment [14].

Most of the hospital administrators claimed that they provided all necessary personal safety tools to their workers, but on interviewing workers during the field survey it turned out that the availability of such tools was realized in only 5 out of the 17 hospitals surveyed and, even in those hospitals, the tools were not as complete as they should be. Moreover, although most administrators in government and private hospitals reported that they supervised the use of personal safety tools by their workers, actual field observations and workers’ reports revealed that less than half of the hospitals exercised such supervision. Also, there were no penalties imposed on violations except in the case of one private hospital. Despite claiming that there was training for workers in dealing with medical waste, hospitals had no formal training programs except at one private hospital. The main reason was due to lack of a dedicated budget for waste management and the lack of attention given to the issue of medical waste. Since only one private hospital had a user manual for collecting medical waste, this meant that each waste-worker had to improvise his/her own way of doing things, which maximized the risks that workers were exposed to. Even worse were the findings that out of the 14 hospitals which claimed to raise their workers’ awareness about the risks of handling medical wastes, only 1 was actually doing so.

More than half of the study sample of hospitals depended on private cleaning companies for collecting waste. These same companies were the ones responsible for supervising waste-workers, thus making the process susceptible to weaknesses aggravated by lack of adequate monitoring performed by the targeted hospitals. Some cleaning companies tended to register more workers than actually deployed for cleaning. Hospitals can improve this situation by establishing their own waste departments and employing qualified personnel. In general, the establishment of standard operating procedures is regarded as an effective way to ensure the proper handling, storage, and transportation of medical wastes [3]. Obviously this requires each hospital to have a budget for waste management. In fact, field observations revealed that the money spent on waste collection and disposal was only a small allocation under a general purpose cleaning budget for hospitals, and was far from sufficient to cover the expenses of handling waste. A similar result was found in Lebanon, where 93% of the hospitals had no budget for waste management or a budget that was judged to be insufficient [15].

To ensure continuity and clarity in these management practices, clear plans and policies for proper waste management and disposal are needed. These need to be integrated into routine employee training, continuing education, and hospital management evaluation processes. Governments could require waste management plans from all hospitals as a condition for licensing [16].

Knowledge of waste-workers

Workers lacked adequate training in safe handling of medical waste. Therefore they had little knowledge regarding identification of types of medical waste, the necessity of sorting waste and adequate quantities for packing waste. Our field surveys showed that ignorance about medical waste disposal was at an alarming level, as many of the workers believed that disposing of waste in the normal domestic waste collection was the best method. On the other hand, disposing of medical waste by incineration can create additional pollution problems, because incineration releases toxic materials into the surrounding environment and it is more expensive to clean up emissions after burning than to prevent pollution in the first place [17].

Actual practices of waste-workers

None of the hospitals had special workers for collecting medical waste since workers were responsible of collecting all types of waste in addition to all other cleaning tasks. Therefore, workers were not giving much care to the nature and types of waste they were collecting as all waste was collected into the same bags. This complicated the sorting processes, exposed transport workers to infection risks and caused leakage of liquid wastes and possible pollution. The United Nations Environmental Programme has established that only 10% of health care waste is considered to be “potentially infectious” [18]. The proportion can be further reduced to 1%-5% with proper segregation practiced at source. Based on epidemiological and microbiological data, only 2 types of medical waste would require special handling and treatment: sharps and microbiological waste [19]. Only 2 out of the study hospitals were collecting different types of waste in separate bags, whereas the rest were collecting all types of waste together, and about half of them were separating only sharp items from the rest. One reason was the unavailability of bags other than those for regular waste, and these bags were overfilled, thus escalating the problem further. Only 3 study hospitals were using bags that complied with international standards for collecting medical waste. Unfortunately these bags were being reused in 1 of the 3 hospitals, exposing a focus on short-term cost over the long-term costs of cleaning up pollution.

Another serious problem prevailing in hospitals was the improper internal transportation of medical wastes, as some hospitals were doing it manually while others were doing it by overloading trolleys. These practices were causing bags to drop and be torn, thus polluting the surroundings and possibly harming workers, patients and visitors. Such risks were increased by practices
such as continuous use of waste trolleys without rinsing. In this regard, the situation was worse in government than private hospitals.

Another dangerous practice followed by some study hospitals was the disposal of liquid medical wastes directly into the city sewage system without sterilization or dilution. Concerning expired medicines the situation was even worse, since more than half of the study hospitals dumped them with other wastes, adding to the hazards to public health and the environment. A common unsafe practice in most study hospitals was collecting and piling up medical waste uncovered in open areas within hospitals. In most cases, it would be a long period before the waste was transferred by city cleaning authorities to the final disposal destination outside hospitals, giving an opportunity for animals such as cats and even visitors to come into contact with the waste, as was the case in many hospitals. This was reported from a previous study in private health care centres in Palestine, which showed that almost all centres disposed of their medical waste in a random way [15].

Waste-worker’ injuries and the administrations’ responses

High proportions of waste-workers in the hospitals in this study were injured by medical waste, highlighting the unfavourable situation in both government hospitals and private hospitals (28.7% and 27.4% of workers respectively had been injured). These rates of injuries were unacceptable when compared with the rates recorded in developed countries which have been reported to range between 1.8% and 8% annually for health workers including cleaning staff [20]. On the other hand the rates were lower than the rate in Palestine (around 40% injured), which could be because of a high turnover of workers in the Yemeni hospitals, most of whom are temporary workers [13]. The injuries could be attributed to a lack of training in procedures of collecting and disposing of medical wastes and an absence of supervision. Similarly, a previous study concluded that operating without waste management authority and failing to give adequate warning signals were considered unsafe acts, whereas developing pictorial training manuals was an essential part of the training component for raising awareness of risks [21].

Study limitations

A number of limitations to the study can be identified. There was anecdotal evidence that some departments of the hospitals or the private companies exaggerated their answers in order to improve their image. There were also large discrepancies between the reported and actual numbers of workers; for example, in the statements of the cleaners in 1 of the hospitals, we found that they contain 80 names while the actual number was only 20 workers. Moreover, the workers’ supervisors may have adversely influenced workers’ responses. Finally, the lack of a special medical waste department in many hospitals meant that waste management was not the responsibility of a specific person.

Conclusions

There was poor awareness about medical waste risks and safe handling procedures among hospital administrators, and most hospitals were not differentiating between domestic and medical waste. Budgets were not allocated for waste management purposes, which caused shortages in waste facilities handling equipment and supplies and absence of training programmes for staff, resulting in poor knowledge and practices of waste workers, a high rate of injuries and possible exposure of staff and visitors to hazardous waste.

References

10. Abu-Awad MIQ. Medical waste management in primary health care centres and private clinics: Jerus district [Masters the-


13. Al-Karhib L. The development of the medical waste management sector in the private medical sector in Palestine. 


Effect of First and Second Doses of Measles Vaccine on Immunity to Measles Among Infants in Sana`a City, Yemen

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ABSTRACT

Objective: To investigate the effects of first and second doses of measles vaccine on immunity to measles among infants in Sana’a city.

Methods: A total of 318 infants, aged 2-24 months were enrolled. Of these, 318 infants were unvaccinated and were either under the age of vaccination or had already passed the age of vaccination (age 2 to 12 months). 71 infants who were given the first dose and 71 infants who were given two doses of measles vaccine. Serum samples were tested for measles specific IgG.

Results: Two hundred and seven out of 376 (55.1%) unvaccinated infants were seropositive for measles antibodies. With increasing age, the rates of seropositivity increased and the mean antibody levels among seropositive infants decreased. In the unvaccinated cohort (n=129) who aged 9-12 months...
(the age at which all infants are due for vaccination), 109 (84.3%) were seronegative. Compared to unvaccinated infants 56 of 71 (78.9%) who were given the first dose of vaccine seroconverted (p<0.0001) developing a significantly higher mean antibody level (p<0.001). However, 63 of 71 (91.5%) who had received the second vaccine dose seroconverted (p<0.001) with a higher mean antibody level (p<0.001) compared to those who only received the first dose. However, the antibody levels decreased significantly with time intervals after the first dose (p=0.044) but insignificantly decreased after the second dose (p=0.15).

Conclusions: The relatively high rate of non-responders along with the decline of antibody concentrations after the two doses of vaccine could be due to vaccine failure. This demands improving the vaccination coverage and supplementary vaccination campaigns.

INTRODUCTION

Despite the availability of measles vaccine, measles remains a major cause of mortality for almost 40 years. Worldwide measles deaths were estimated to be 242,000 in 2006 but it declined in 2007 to be 197,000. 1 The majority of these deaths occurred in developing countries where malnutrition is common. 2 Cases of measles in different parts of the world were attributed to low vaccination coverage, 3 as more than 95% vaccination coverage is required to prevent the circulation of the measles virus. 3 In some countries a vaccination coverage of as high as 98% failed to prevent measles outbreaks owing to the high contagiousness of the disease and/or to primary or secondary vaccine failure. Primary vaccine failure is a failure to seroconvert after vaccination, while secondary vaccine failure is a loss of immunity over time. Vaccine failure results in accumulation of susceptible children. 4 Studies from India, Egypt, and Brazil have reported that 5 to 12.5% of unvaccinated children did not respond to the vaccine. 5

However vaccination coverage of 100% was achieved in Iran and no cases were detected as a result. 6 Since 2000, the WHO and UNICEF have recommended a second dose of measles vaccine in addition to a high coverage with the first dose in order to increase the total number of immunized individuals. 7

Yemen is a country located in the southern area of the Arabian Peninsula with a population of 24 million. Sana’a region which consists of the capital city and Sana’a governance has a population of approximately 2.5 millions.

Despite the inclusion of measles vaccine in the EPI-1976 in Yemen with a routine first dose given at the age of 9 months, a high measles seronegativity rate among children of 1 to 5 years of age was reported in 2006. 8 In addition, a total of 11,436 measles suspected cases were reported in Yemen, during 2005 to 2006, with 6% were tested for measles IgM, of which 34.2% were laboratory confirmed. 9

This study aims to investigate the effect of measles vaccine in infants who were given the first and the second dose of the vaccine.

METHODS

This cross-sectional study was conducted during the period from January to December 2006 among infants who consecutively attended 4 vaccination centers located at 4 different district of the city of Sana’a for their regular immunization. An informed consent was obtained from the infants’ guardians before blood samples were collected for this study. A total of 518 infants aged between 2 to 24 months in the city of Sana’a, Yemen were investigated. Of these, 272 (52.5%) were males and 246 (47.5%) were females. The median age was 9 months (range 2 to 24 months). The subjects consisted of (a) infants who had not yet had their first dose of measles vaccine (n=376), (b) infants who had already had their first dose (n=71) and (c) infants who had received both vaccine doses (n=71).

A volume of 3 ml blood was collected from the infants and serum was separated and stored at 2-8°C until tested. Serum samples were tested for measles-specific IgG using ELISA (HUMAN, Gesellschaft für Biochemica und diagnostica mbH, Germany). Testing was performed according to the manufacturer’s instructions. Qualitative
results were obtained by comparison with cut-off values. All samples with optical density (OD <sub>490</sub>) ≥ cut-off value plus (+), 15% of this value were considered seropositive. Samples with OD <sub>490</sub> < cut-off value minus (−), 15% of this value were considered seronegative. Samples with readings falling within the range between the two values were regarded as equivocal. All equivocal samples were excluded from the analysis (n=25). The determination of measles antibody levels expressed in international units per milliliter (IU/ml) was achieved by a formula provided by the manufacturer.

Sample size was calculated using the statistical program Epi-info (version 6), using a target population of 520.291 infants aged between 2 to 24 months of age from Sana’a city and governorate. Statistical analyses were conducted using the statistical SPSS® Package 11.5 for Windows. The Chi-square test was used to measure the difference in proportions; t-test was used to measure differences in means and One Way Anova to measure differences in variance of mean titer for the various age groups. The p-value of ≤0.05 was considered statistically significant.

RESULTS

Two hundred and twenty-nine of the total 518 (44.2%) infants and 207 of 376 unvaccinated, (55.1%) infants (age 2 to 12 months) were measles seronegative. Among unvaccinated infants, the rate of seronegativity increased with increasing age exceeding 80% in those aged 8 to 12 months (Table 1), and the mean antibody level decreased with increasing age reaching the lowest level at the age of 10 to 12 months, Figure 1. Of the unvaccinated cohort (n=129) aged 9-12 months (mean age 9.3 months), which is the age at which all infants should have been already vaccinated, 109 (84.5%) were seronegative.

Fifty-six of 71 (78.9%) of infants who were given the first dose of vaccine had seroconverted (p<0.0001) developing a significantly higher mean antibody level (p<0.001) than among unvaccinated infants.

A total of 65 out of 71 (91.5%) of those who were given the second dose had seroconverted (p<0.051) with a higher mean antibody level as compared to those given the first dose (p<0.001), Table 2 and Figure 2.

<table>
<thead>
<tr>
<th>Age groups (months)</th>
<th>Antibody negative infants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>2-3</td>
<td>9/73</td>
</tr>
<tr>
<td>4-5</td>
<td>36/104</td>
</tr>
<tr>
<td>6-7</td>
<td>38/53</td>
</tr>
<tr>
<td>8-9</td>
<td>99/117</td>
</tr>
<tr>
<td>10-12</td>
<td>25/29</td>
</tr>
<tr>
<td>Total</td>
<td>207/376</td>
</tr>
</tbody>
</table>

Table 1. Infants negative to measles maternal antibodies.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Unvaccinated</th>
<th>After first dose</th>
<th>After second dose</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>129</td>
<td>71</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Mean antibody level (IU/ml)</td>
<td>0.19</td>
<td>0.68</td>
<td>1.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antibody positive (No. %)</td>
<td>20 (15.5)</td>
<td>56 (78.9)</td>
<td>65 (91.5)</td>
<td>p*</td>
</tr>
</tbody>
</table>

* Antibody level below 0.2 IU/ml was considered negative. p<0.0001 for the first dose and 0.051 after the second dose.

Table 2. Measles antibody levels among unvaccinated and those who were given the first and the second dose of vaccine.

Although, the antibody levels decreased significantly with time intervals after the first dose of the measles vaccine (p=0.044), the antibody level also declined after the second dose but this decline was found to be insignificant (p=0.18), Table 3 and Figure 2.

<table>
<thead>
<tr>
<th>Immune status</th>
<th>Time interval after vaccination (months)</th>
<th>Mean (IU/ml)</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>After first dose</td>
<td>1-2</td>
<td>0.85</td>
<td>3.25</td>
<td>0.044</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After second dose</td>
<td>1-2</td>
<td>1.42</td>
<td>1.78</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>1.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>0.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Measles antibody levels among infants tested at various time intervals after the first and the second dose of vaccine.
DISCUSSION

Before 2005, the measles vaccination program in Yemen was based on one vaccine dose given at 9 months of age. Since 2005 a second vaccine dose was introduced and given to infants at the age of 18 months with low vaccination coverage. A low rate of antibodies to measles among children aged 1 to 5 years was previously reported during the years 2002 and 2003. In 2005 the vaccination coverage of the two doses was 76% and 25% respectively which is a relatively low. There were repeated measles outbreaks in Yemen. The present study was conducted to investigate the effects of first and second dose of measles vaccination.

Our findings showed that more than 80% of unvaccinated infants (aged ≥8 months) had no measles antibodies. This suggests that not only this age is appropriate for vaccination, but also necessitates efforts to maximize the vaccination coverage with the first dose to avoid early age measles outbreaks. Moreover, a high proportion of infants seroconverted after the first vaccine dose with mean antibody level reaching twice the concentration seen among a cohort of unvaccinated infants aged ≥8 months (mean age 9.3 months).

However, risks still exist as no measles antibodies were detected in 84.5% of infants at the pre-vaccination age (6 to 7 months).

Despite the good response to the first dose of vaccine, a considerable proportion (21.1%) of the infants had no antibodies, and the level of antibodies among those who responded showed a significant decline with time after vaccination. This may explain the reasons for the high seronegativity rate that we have previously reported among children between 1 to 5 year-old during 2002 and 2003. After the second dose, although a high proportion of infants seroconverted producing a significantly higher antibody levels, their levels of antibodies declined (although insignificantly) with time after vaccination. Vaccine failure could have occurred with both doses of vaccine. In fact, 13.8% of the unvaccinated infants remained antibody positive around the age at which the infants were given the first dose of vaccine. Whether these antibodies were maternal or due to previous infection their presence while giving the first dose may exert a neutralizing effect on the vaccine virus leading to a primary vaccine failure. The significant decline in antibody concentration after the first dose and its decline after the second dose, although
insignificantly due to probably small sample size of this group, suggests a secondary vaccine failure. Decline of antibody levels after two doses of vaccination has also been reported elsewhere and primary and secondary vaccine failure was blamed for this decline.2

Vaccine failure has been reported to be one reason for a measles outbreak in Indiana, USA, despite vaccination coverage of 98% (Mulholland, 2006) and the cause of measles in 50% of patients in an outbreak in Russia.21 Routine immunization is often recommended at 9 months of age, i.e., promptly after passive immunity wanes, to reduce the risk of the severe infection in early life.22 Vaccination of infants before the age of 9 months not only fails to immunize, but also interferes with their subsequent re-immunization.23 For instance immunization at 6 months of age has resulted in as high as 46.8% of non-responders.24 Immunization at 9 months of age was found to give an average seroconversion rate of 85% leaving a considerable proportion of children susceptible to disease25 in which case further vaccine doses seems mandatory.

The vaccine potency, which is influenced by the extent to which the cold chain is maintained during vaccine transport, could be another reason for vaccine failure among our infants. A well-managed cold chain remains a prerequisite for a successful vaccination program.26 The potency of measles vaccine was found to decline by 50% at 22°C to 25°C within one hour.27 Also from our observations in some vaccination centers an optimal vaccine dose did not seem to be strictly maintained because the lyophilized vaccine vials did not seem to be properly reconstituted, perhaps because of the lack of knowledge and/or experience. This may result in an administration of a suboptimal vaccine doses.

The impact of early loss of measles maternal antibodies should be carefully monitored through effective measles surveillance among infants during the first 6 months of age. Furthermore, a large-scale measles antibody surveillance is required to fully assess the immune status to measles at the pre-vaccination age before drawing final conclusions on the current timing of the first dose of measles vaccination. Delaying the time of the first dose to achieve a higher proportion of seronegative children will tilt the balance towards early measles infection. Finally, the current timing of the first dose is acceptable if supported with higher vaccination coverage with two vaccine doses and supplementary vaccination campaigns.

ETHICAL CLEARANCE

Ethical approval was obtained from the ethical committee for medical research, Al-Yemenia University, Sana’a, Yemen.

CONCLUSIONS

The relatively high rate of non-responders along with the decline of antibody concentrations after the two doses of vaccines could be due to vaccine failure. This demands improving the vaccination coverage and supplementary vaccination campaigns.

ACKNOWLEDGEMENTS

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REFERENCES

Early detection is the most important for management of cancer.

We are pleased to conduct this dialogue with Prof. Dr. Kyungkook Kim, Hepatic-Pancreatic-Biliary System surgery in (Al-Gumhouri Hospital- Sana’a).

Interview by: Dr. Abdulfattah. M. Al-Mahdi (Specialist Doctor)

Q: Dr Kim, Could you introduce yourself and your study and career in medicine?
I graduated from Seoul National University in 1979 and got my PhD there, and then worked as a professor at Inha University Hospital in Korea. I conducted clinical research at Johns Hopkins University Hospital in the United States in 1994-95. I am a general surgeon, and my subspecialty is Hepato-Pancreato-Biliary System surgery. I have extensive experience in cancer surgery. Then in 2002 I participated in a program which focused on improving medical systems in developing countries, which led me to come to Yemen. In Yemen, I have handled many cases of pancreatic resection in patients with periampullary cancer, and liver resection in patients with liver tumor. I also have experience in reconstructive surgery of Common Bile Duct Injury after (laparoscopic) cholecystectomy.

Q: Dr Kim, What’s the present situation in cancer surgery in Yemen?
A: The most serious problem is that patients come to the hospital very late. Many patients lose the opportunity to receive an operation, because their tumors are so far advanced and have already spread to the neighboring tissue or to distant organs, so that they cannot be removed.

Q: Why do the patients come to the hospital so late?
The early stage of cancer does not have symptoms like pain. With cancers developing from the internal organs, like the liver or pancreas, patients or doctors cannot palpate
(feel) the mass until a much later stage. For example, in the case of liver cancer, most cases of a palpable mass appear only in the advanced stage of cancer. In developing countries, poverty and difficulty accessing medical facilities are also main causes. Keeping illness a secret is another cause. Patients living in the countryside try not to bother family members. In most cases in Yemen, the tumor mass has been growing over a number of months, and eventually causes severe pain, at which point patients come to the hospital. In these cases the medical costs tend to be very high, while treatments such as surgery or chemotherapy are unlikely to be effective.

Q: What is the most important factor in cancer management?
The curability rate in cancer surgery depends on early detection and early diagnosis. Cancer often does not cause any signs or symptoms until it has grown quite large, and begins to put pressure on the capsule, or on the neighboring organs. Most signs and symptoms of cancer in earlier stages are vague and non-specific.
For example, the American Cancer Society uses the word C-A-U-T-I-O-N to help recognize the seven early signs of cancer.

Change in bowel or bladder habits
A sore that does not heal
Unusual bleeding or discharge
Thickening or lump in the breast, testicles, or elsewhere
Indigestion or difficulty swallowing
Obvious change in the size, color, shape, or thickness of a wart, mole, or mouth sore
Nagging cough or hoarseness

These signs cannot be applied to cancers developing in the deep-seated organs, like the liver and pancreas. Therefore, a regular medical checkup, including tests like ultrasonography, colonoscopy and mammography, is the most important early diagnostic tool before a large mass and pain develop.

Q: What is being done for early detection and early diagnosis of cancer in Yemen?
NCCF (National Cancer Control Foundation) has a project promoting the early detection of breast cancer. It is very encouraging. But it does not have the operation theatre to perform modern operation procedures. The breast tissue can be preserved if it is diagnosed in the early stage of breast cancer, because often a partial mastectomy is enough to eradicate the tumor. When the patient comes to the hospital at a later stage, the whole breast usually needs to be removed (full mastectomy).
Every day a large number of cancer patients visit the National Oncology Center, but for many of these patients, their tumors are too widespread to remove. In those cases chemotherapy or radiotherapy are generally not effective, either.
In Korea, 50% of stomach cancer resections are for early gastric cancer (EGC). 75% of stomach cancers detected by medical checkup in Korea are EGC. The five-year survival rate for EGC in Korea is 96%. In other words, the high success rate for the treatment of stomach cancer in Korea is due to the high rate of early diagnosis. I would estimate that the rate of EGC among the diagnosed stomach cancers in Yemen may be less than 3%. In fact, I have not yet met a single patient in Yemen who has been diagnosed with EGC. Early diagnosis is that rare.
One cannot emphasize too strongly the importance of education for early detection and early management of cancer. Investment in education may contribute to saving national financial expense, as well as saving the lives of patients.

Q: Would you explain the importance of early detection with an example?
A: Periampullary cancer (see Figure) develops from the Ampulla of Vater and from its surrounding tissues, such as the head of the pancreas, the distal common bile duct, and the duodenum. In cases of periampullary cancer, jaundice may develop at an early stage because the cancer blocks bile flow. Obstructed bile flows back to the whole body so that the patient complains of yellow eyes and pruritis. In many of these cases, the cancer is still resectable.

(Of course, in the case of cancer developing in the liver or in the body of the pancreas, jaundice develops at a later stage. In those cases, the cancer is not detected early enough, and is therefore not resectable.)

These days, endoscopists sometimes insert a stent into the distal bile duct to decompress bile obstruction. After this procedure, the jaundice disappears. This procedure is appropriate in for palliative care, or in some temporary cases. But when it is performed in the early stages of cancer, the outcome is disastrous, because the cancer will continue growing, but without the symptom of jaundice. Both the patient and the doctor tend to be satisfied with relief of the symptom, and they are not concerned about cancer. Later the tumor growth obstructs the stent and causes jaundice to develop again, but the cancer is no longer resectable because it has already progressed into the far-advanced stage. This means that stent insertion actually masks jaundice, and prevents early management.

Endoscopists say that because the cancer is not pathologically diagnosed, the stent insertion may be the best option. I do not agree with them. There are two types of small obstructing mass, one is adenoma, and the other is small carcinoma. Of course, in these cases it is not easy to get sufficient tissue for diagnosis. But as a surgeon, I can diagnose cancer based on gross findings and clinical history. Even without a pathology report, the tumor can be removed. In benign cases, adenoma from Ampulla of Vater progresses like a colon polyp. Adenoma grows to the size of 2-3 cm and then cancer develops inside it. So if complete resection of adenoma is not done early, major surgery will be required.

Q: What kind of experience do you have in cancer surgery in Yemen?
Let me tell you about a recent case. In general, liver cancer is not resectable by the time it is palpable. And most liver cancer is accompanied by hepatitis and liver cirrhosis. But this particular case was not related to hepatitis and liver cirrhosis. The tumor size was 16 cm., and it was resectable. During dissection of the liver parenchyma, the electricity in the hospital went off for 15 minutes. Fortunately, during the dissection, there was not much bleeding. So the operation was finished without event. After 10 days the patient went back to his hometown.

When I came to Al-Gumhouri Hospital, I heard that some European doctors had come to the hospital and performed a pancreatice-duodenectomy. But the patient died of bleeding after operation. The operation procedure, especially pancreatice-jejunostomy (anastomosis between the pancreas and small bowel), is very difficult. When bile juice and pancreatic juice leak, the activated digestive juice may digest the patient's own tissue (blood vessel) and cause severe bleeding that leads to death.

So in the beginning it was not easy for me to perform that operation at the hospital. After one year I performed the first operation, without complications. So far, there have been
no complications like that. These days, I perform that operation routinely. Now that the other doctors have confidence in me, some of them want to learn that operation from me.

Q: Do you have any cancer patients in your family?
A: Yes, myself! I was a thyroid cancer patient. Four years ago my tumor was removed. Actually, in Korea anyone can receive a medical checkup every two years. Even though he looks healthy, the government pays for it. Four years ago during a routine medical checkup, a thyroid tumor was detected by ultrasonography. It was 0.9 cm in size, but there was no palpable mass. Cytologic biopsy showed thyroid cancer, and a hemi-thyroidectomy was performed. I still have 50% of the thyroid tissue, and do not take any medication now. One month after surgery I came back to Yemen. The Korean Government is willing to pay for the medical checkup cost, because prevention and early treatment can reduce the total medical insurance fees in Korea. My own experience proves that early detection and management can help people to have longer and healthier lives, and can also greatly reduce medical costs.