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Community Health & Disease Surveillance Newsletter

Sultanate of Oman *Ministry of Health*

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Antimicrobial Resistance Surveillance

Global Scenario

The approach to the management of infectious diseases has been revolutionised since the discovery of antibiotics. Today antibiotics have led to a dramatic drop in the incidence of the common infectious diseases.

At the beginning of the new millennium, humanity is faced with another crisis. Formerly curable diseases are becoming increasingly difficult to treat due to the antimicrobial resistance. Microbial resistance to antibiotics could roll back the world back to a pre-antibiotic age.

Antimicrobial resistance is a natural biological phenomenon. From that first case of resistant staphylococcus half a century ago, the problem of antimicrobial resistance has snowballed into a serious public health concern today. Multi drug-resistant tuberculosis (MDR-TB) is no longer confined to any one country. Resistant malaria is on the rise, disabling and killing millions of children and adults each year. In the developed world, as many as 60% of hospital-acquired infections are caused by drug-resistant microbes. These infections – the most notorious of which are vancomycin-resistant Enterococcus (VRE) and methicillin-resistant Staphylococcus aureus (MRSA), are now no longer confined to wards but have crept into the community.

Today, there is an urgent need for worldwide surveillance of antimicrobial resistance. Realising its impact on public health, WHO is committed to action. Fifty-first World health assembly endorsed and passed a resolution to that effect on 16th May 1998.

Factors Favouring Resistance

Natural Selection: When a microbial population is exposed to an antibiotic, more susceptible organisms will succumb, leaving behind only those resistant to the antimicrobial action. These organisms can then either pass on their resistance genes to their offspring by replication, or to other related bacteria through *"conjugation"* whereby plasmids carrying the genes *"jump"* from one organism to another. This process is a natural phenomenon exacerbated by the abuse, overuse and misuse of antimicrobials in the treatment of illness and in animal husbandry and agriculture.

Complacency: Since two decades health care professionals had been believing that infectious diseases have been conquered. Many manufacturers turned away from intensive antibacterial research, and concentrated their energies on seeking drugs for heart diseases and other chronic diseases. Thus

closing the door on further research into new drugs to combat bacterial infections.

Drug Access: Poverty and inadequate access to drugs continue to be the major problem in the development of resistance. Costly drugs means that most patients are forced to resort to poor quality products, or incomplete treatment.

Misdiagnosis: Overworked healthcare workers are not equipped to deal with the large number of patients inevitably tend to *"defensive"* and unnecessary prescribing. The absence of diagnostic facilities in poorer countries force the healthcare workers to engage in the symptom-based guesswork that often leads to misdiagnosis &/or the prescribing the wrong medication. In many developing countries poverty and a lack of information forces patients to purchase drugs taken only until the he feels better.

Today, there is an urgent need for worldwide surveillance of antimicrobial resistance. Realising its impact on public health, WHO is committed to action. Fifty-first World health assembly endorsed and passed a resolution to that effect on 16th May 1998.

Counterfeit Drugs: Counterfeit drugs are also a problem that directly contributes to antimicrobial resistance. These drugs may not contain the active ingredient or contained the wrong ingredient or contained weaker than recommended concentrations of active medication thus favouring resistance.

Broad Spectrum Antibiotics: Owing to fears of resistance, many health care workers are avoiding narrow-spectrum drugs in favour of broader-spectrum antibiotics that have wider applications. Unethical pharmaceutical companies sometimes pay a commission for recommending more expensive broader-spectrum medications in some countries. Such use of *"shotgun therapy"* accelerates the natural process of resistance.

Drug Advertising: At the other end of the spectrum, sometimes patients demand for antimicrobials – as the result of advertising media.

Lack of Education: In developed nations, the issue of antimicrobial resistance is not addressed adequately in medical schools or is confined only to specialist training. In developing nations, due to an acute shortage of qualified health care workers the situation is worse.

Hospital Acquired: In an analysis of 10 studies undertaken at teaching hospitals worldwide, researchers determined that between 40% and 91% of antibiotics prescribed in the hospitals were inappropriate.

Antimicrobial Resistance & Food: Currently, only half of all antibiotics produced are utilised for human consumption. The other 50% are used to treat sick animals, as growth promoters in livestock, and to rid cultivated foodstuffs of various destructive organisms. This ongoing and often low-level dosing for growth and prophylaxis inevitably results in the development of resistance in bacteria in or near livestock. Vancomycin-resistant Enterococcus faecium (VRE) is one particularly ominous example of a resistant bacterium appearing in animals that may have *"jumped"* into the human population. The emergence of VRE in food can be traced to the widespread use of *Avoparcin* (the animal equivalent of the human *antibiotic Vancomycin*) in livestock. Moreover, with livestock production increasing in developing countries, reliance on antimicrobials is likewise expanding – often without guidelines.

Globalisation & Resistance:

International travel and trade also play a role in the development of resistance. A microbe originating in Africa or South-East Asia can arrive in North America within 24 hours. In the United States, published reports show that the majority of multi drug-resistant typhoid cases originate in the six developing countries.

ARI & Pneumonia: Pneumonia remains the number one killer worldwide. About

(Continued on page 8)

Laboratory Containment of Poliovirus

Background

Sultanate of Oman, along with other countries in the Eastern Mediterranean Region, is moving rapidly towards the certification of poliomyelitis eradication. There is every reason to believe that the poliovirus will soon be eradicated from the humans, its only natural host. There is no natural animal reservoir of the poliovirus, and no long-term survival of the virus in the environment; therefore, the only known remaining sources of the wild poliovirus would be the laboratory materials. Hence the further step towards eradication of polio would be to contain the wild poliovirus from the laboratories.

The laboratories in the country may knowingly or unknowingly store specimens from known poliomyelitis cases or store other materials that are potentially infected with wild poliovirus materials in a frozen state that can preserve the infectivity. For this reason, there has been international realization that the task of poliomyelitis eradication will not be complete as long as there is any risk of re-introduction of the virus from the laboratory sources.

In the past there have been documented incidents of laboratory workers being infected with poliovirus. These examples indicate that there is a small but real risk of poliovirus infection in people and communities if materials containing the poliovirus are handled inappropriately in laboratories, particularly if international standards of bio-safety are not met. It is sobering to remember that the last clinical case of smallpox was due to exposure to laboratory materials, which resulted in a fatality. Therefore, a chance re-introduction of polioviruses from laboratories in the future into a population after cessation of immunization represents an unacceptable risk that has the potential to threaten global public health and seriously jeopardize current investments and achievements.

Polio Eradication in Oman

Massive efforts have been undertaken by the Ministry of Health in terms of routine immunization coverage under EPI, mop-up activities and National Immunization Day campaigns (NIDs). The last case of poliomyelitis in Oman was reported in December 1993. The fact that Oman has been polio free since then proves that wild poliovirus transmission has been interrupted in the country especially on the background of a highly sensitive and efficient AFP surveillance system. Hence, today it can be stated confidently that the only sources of wild poliovirus remaining in Oman are the laboratories.

In Oman, the Central Health Laboratory on behalf of the Ministry of Health has conducted a National Laboratory Survey that targeted all diagnostic, environmental, reference, research and teaching laboratories in the country.

The development of a wild poliovirus inventory is part of a larger worldwide containment process as outlined in the ***'WHO Regional guidelines for the implementation of laboratory containment of wild poliovirus'***.

In April 2000 HE the Minister of Health appointed the National Coordinator for laboratory containment of wild Poliovirus in Oman whose responsibilities included preparing a national plan, surveying laboratories, coordinating the implementation of plan, developing the national inventory, preparation of the final report for submission to the WHO EMRO and overseeing

"The only known remaining sources of the wild poliovirus would be the laboratory materials. Hence the further step towards eradication of polio would be to contain the wild poliovirus from the laboratories"

final destruction of the infectious materials.

National plan for containment

The WHO Regional Guidelines on containment were used and successfully adapted with minor modifications to develop the national plan. The plan outlined the methodology and various activities.

A series of meetings were conducted involving the laboratory personnel, members of the National Polio Certification Committee, Regional Health staffs etc. and were briefed with the survey methodology.

" Oman has successfully implemented the pre-global Eradication Phase of the ***WHO Global Action Plan for Laboratory Containment of Wild Poliovirus"***

National Laboratory Survey

It was necessary to identify every laboratory in both public and private sector. A total of 136 Biomedical laboratories were surveyed nationwide to determine the infrastructure and practices with respect to storing specified samples that may knowingly or unknowingly harbour polioviruses. Responses were received from 134 laboratories. From the survey, a total of 45 laboratories were identified as having the domestic freezers with capability to store materials at -20º C or less. Three laboratories had responded as having capabilities to store materials at -70º C and below.

The Department of Microbiology at the SQU Hospital & the National Poliovirus Laboratory at the Central Health Laboratories - Ministry of Health were identified as the only two facilities in the country that stored wild polioviruses or other potentially infectious materials. Both laboratories are operating under bio-safety level 2. The two laboratories prepared and submitted detailed inventories of relevant materials, and have stored them in designated freezers with restricted access. The Sultan Qaboos University has in storage wild poliovirus isolates and un-typed enteroviruses and potentially infected stool specimen collected for Rotavirus study prior to 1993. The National Poliovirus Laboratory currently has no wild poliovirus in storage. All Sabin isolates and non-polio enteroviruses have been documented in detail in the inventory.

Plans are underway to destroy (according to the WHO Guidelines) all wild polioviruses and potentially infectious materials that have been stored within these 2 identified institutions and to vaccinate all the relevant laboratory staff with IPV. The MoH has decided after a general consensus with all parties involved to destroy all above-mentioned stored materials in order to totally eliminate any risk of infection from the laboratories. Moreover, all wild poliovirus isolates from Oman have already been sent to the WHO designated repository (CDC Atlanta).

Conclusion

Oman has successfully implemented the Pre-global Eradication Phase of the *'WHO Global Action Plan for Laboratory Containment of Wild Poliovirus'*. So far in Oman, there are no laboratories involved in Biological Control, Biomedical Research, Culture Collection, Military Research, Producers of Biological/Vaccine materials or Laboratories unique to poliovirus.

Several factors helped and contributed to the ease of implementation, including readily available statistics and information on biomedical laboratories, high response rate to survey, few private laboratories, and the good communication links.

Acknowledgements:
The coordinator wishes to thank all those who have contributed in various ways in implementing this assignment.

Morbidity due to Ocular Trauma in Oman

Introduction

Injury to eye is a leading cause of unilateral loss of vision in the world. The limited data available at present suggests that more than one million people are blind due to ocular trauma. The severity of trauma with eye complications is on the rise. Fortunately, injuries involving eye, although very common, do not cause complications and loss of vision in most of the events. In view of apprehension caused among patients and their relatives and Disability Adjusted Life Years' saved, the prevention and first aid for ocular trauma is crucial. It includes a broad range of activities like public education, safety standards, legislation and provision of rapid and appropriate eye care when trauma has occurred [1].

In Oman, Ministry of Health initiated organized efforts for care of ocular trauma cases through Eye Health Care Program. Standard operating procedures for primary eye care of ocular trauma were laid down in 1995 [2] and revised in 1999[3]. The exact magnitude of ocular injury was not known however, the community based survey conducted in 1996-97 suggested that of the 65 phthsical eyes observed in survey sample, 18.5% were due to ocular trauma. To collect the scientific information, the Ministry of Health introduced health Information System for eye diseases as per ICD codes and their management from all ophthalmic units in 1999. In Oman, the emergency ophthalmic service to a large extent is provided by Governmental Health Institutions and it being easily accessible, the data from these institutions is more likely to represent the ocular trauma events in the community.

The members of National Eye Health Care Committee felt that management of ocular trauma at secondary and tertiary levels need revised as per the international standards and therefore current situation of ocular trauma should be reviewed.

The Eye Health care Program reviewed the data on ocular trauma for the year 1999 and 2000 [4 & 5] to understand the profile of ocular trauma, their risk factors and coverage of management.

Results and Discussion

The results are divided into those related to morbidity and management of ocular trauma.

A. Ocular trauma Morbidity

3.7% and 4.1% of the reported eye cases in the year 1999 and 2000 were with principal diagnosis of ocular trauma. Thus, the proportion of eye injury is small in overall morbidity of eye diseases.

Ocular trauma at primary health centres

Many non-sight threatening eye conditions are diagnosed reported and managed at primary health centres by physicians trained in eye care. Therefore minor ocular trauma information from these institutions should be taken into consideration. Of the total cases of conjunctival foreign bodies, 474 (65%) were reported by primary health centres. However, corneal foreign bodies and other ocular trauma cases were mainly reported by health institutions with ophthalmic unit. Thus it is evident that many patients of ocular trauma approach directly to ophthalmologists rather than first going to nearby primary institution for first aid and then getting referred to ophthalmologists according to the severity of condition.

Ocular trauma at Ophthalmic units

The new cases of ocular trauma of different types reported by twenty-five ophthalmic units in last two years are compared in Table 1.

"In view of the Disability Adjusted Life Years (DALY) saved preventive & prompt intervention measures, ocular trauma is an important component of Eye Health Care Programme"

Table-1
Coverage of Ocular Trauma & its Management
1999 & 2000

Type of Ocular Trauma	1999 # & % (A)		2000 # & % (B)		(A-B) A
Foreign Body in Conjunctival Sac	482	7.5	570	7.7	**- 0.2**
Foreign Body in Cornea	1,369	21.4	1,338	18	**3.4**
Foreign Body in External Eye	27	0.4	68	0.9	**- 0.5**
Congenital & Corneal Abrasion	2,099	32.8	2,570	34.5	**- 1.7**
Ocular Laceration (Corneal Tare)	304	4.8	224	3	**1.8**
Contusion of Eye & Orbital Tissue	728	11.4	1,062	14.3	**- 2.9**
Penetrating Injury	100	1.6	72	1	**0.6**
Injuries of Eye Lid	487	7.6	557	7.5	**0.1**
Injuries of Orbital tissue	261	4.1	150	2	**2.1**
Injuries of Lachrymal Apparatus	538	8.4	838	11.2	**- 2.8**
Total	**6,395**		**7,449**		

"The risk of ocular trauma is more in males than in females and the risk of ocular injury in adults is significantly high compared to children".

In view of 7% annual increase of population, 17% rise in reported ocular trauma cases is unusually high. Contusion and injuries to lachrimal apparatus constituted the main bulk in this rise

Ocular trauma by gender

Two third of ocular trauma reported in 2000 were males and the rest were females. The risk of ocular trauma was significantly high in male compared to female.

Ocular trauma by age group

Two thirds of cases of ocular trauma were adults while the rest were below 12 years. In Oman population of children below 12 being nearly 50%, the risk of ocular injury in adult is significantly high compared to children. The proportion of contusion and lid injuries was high in children than adult. While corneal foreign bodies cases were very high in adult than in children. Occupational risk of corneal foreign bodies in adult and unsafe and hazardous playing practices in children could be the reason for the difference.

Ocular trauma by regions

High proportion of reported ocular injuries in Muscat, Dakhliyah, North and South Batinah regions were matching with high population proportion of these regions. Perforating eye injuries were reported in unusually high numbers in North Batinah region. While blunt trauma cases were significantly in higher proportion in Dakhliyah region.

B. Management of Ocular trauma:

The ocular trauma cases managed were grouped into external adnexal surgeries (wound of face and lid repair, orbital injuries) minor eye injuries (conjunctival, corneal foreign body removal and conjunctival injury repair) and major trauma surgeries (corneal scleral repair, repair of globe injury, intraocular foreign body removal)

Coverage of ocular trauma management

The surgeries for ocular injuries were correlated with reported cases to estimate the management coverage of different types of ocular trauma. The numbers and percent proportion of coverage for last two years is given in Table: 2.

Table-2
Surgical Management of Ocular Trauma: 1999 & 2000

Type	Cases	Surgery	1999 (%)	2000 (%)
Major	1358	438	20.3	32.3
Minor	4546	1348	34.6	29.7
External & Adenexal	1545	194	16.3	12.6

Since blunt trauma do not require surgeries in all cases and conjunctival as well as corneal foreign bodies are managed as out patient procedures, their management are not listed in the operation theatre log book and hence were not reported. Hence coverage of their management might be less than actual figures. The coverage of surgeries for major ocular trauma in 2000 compared to 1999 was significantly high.

Ocular trauma surgeries by Gender

The proportion of surgeries in female was significantly low compared to male. Statistical validation suggests that although morbidity of ocular trauma was low in female, the low coverage of surgeries in female was due to factors other than low morbidity of ocular trauma in female. Less female availing surgical facilities for ocular trauma management could be a reason for this difference.

Ocular trauma surgeries by region

Major injury repair and orbital surgeries are skilled surgeries and need follow up for a long time. Regional proportion of management of this group was high in Muscat region as it has tertiary centre for eye care. 32% of total surgeries were performed by South Batinah region.

Limitations

Information on surgical outcome of trauma cases, role of visual outcome of ocular trauma cases and visual outcome of blunt trauma was not available. Such information should be generated through operational research mainly at tertiary level institution.

Recommendations

The Ministry of Health with the help of tertiary eye care unit at Al Nahdhah hospital proposes to lay down standard protocol for trauma management and initiate Ocular Trauma Registry' at all ophthalmic units.

Although the referral protocols are followed for most cases coverage, the health care staff should ensure that time between injury and surgical intervention is minimum. The cases should be instructed to reach ophthalmologist as early as possible and remain empty stomach so that they could be operated promptly if required. In case of multiple injuries, role of eye care to the staff of accident and emergency units should be properly explained. In open wound of eyeball, eye ointment must never be applied. In all ocular trauma cases, vision should be recorded before referring them for further care.

Conclusions

The review of ocular trauma enabled the program to know the magnitude, profile of different ocular injuries and their management. The need for further action was also identified. Care of ocular trauma

"Although the coverage of surgical management is high, the health care staff should ensure that time between injury &surgical intervention is minimum".

cases would be further strengthened by implementing these recommendations.

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Acknowledgements:
The contribution of regional & national eye health care in this study staffs is gratefully acknowledged.

(Continued from page 2)

70% samples of chest infections are resistant to one of the first-line of antimicrobials. This alarming situation is due, in part, to widespread confusion over the difference between viral and bacterial respiratory infections. Both forms present the same clinical symptoms that can often only be distinguished by expensive laboratory tests that are not available in many parts of the world. Treating viral illness with antibiotics is not only ineffective but contributes to the development of resistance. This is particularly true when it comes to treating children. Recent studies undertaken by WHO indicate that 80% of patients are treated with unnecessary medications thereby leading to resistance.

" International travel and trade also play a role in the development of resistance. A microbe originating in Africa or South-East Asia can arrive in North America within 24 hours".

Vaccines have been developed to prevent some of the bacterial pneumonias e.g. Hib & Pneumovac vaccines. They offer the best hope in combating resistance by reducing the number of infected individuals and thereby minimizing transmission, infection and the need for treatment.

Diarrhoeal Diseases: Multi drug-resistance is also occurring in microbes that cause diarrhoeal diseases. One such agent, *Shigella dysenteriae*, is a highly virulent microbe that is resistant to almost every available drug. Today, nearly all shigella are non-responsive to co-trimoxazole , while resistance to ciprofloxacin appears to be just around the corner.

The bacteria that cause cholera and typhoid are also revealing the ease with which they acquire resistance. Salmonella typhi have developed resistance to first-line, second-line and now, third-line drugs. In India two-thirds of reported cases in 1992 were chloramphenicol-resistant.

AIDS: The antiretroviral drugs for treating AIDS are not accessible to the majority. A small but growing number of patients are showing primary resistance to zidovudine (AZT). A growing body of evidence indicates that when HIV develops resistance to one protease inhibitor it quickly becomes insensitive to the entire family of drugs, thus outwitting antiretrovirals that took years to develop at a huge cost.

AIDS is a particularly significant disease because those infected become reservoirs for resistant TB, leishmaniasis, pneumonia and other opportunistic agents.

Tuberculosis: Tuberculosis is another disease that is staging a major comeback, and is becoming increasingly resistant to routine anti-TB drugs. The estimated number of multi drug-resistant TB cases are between 1% and 2% that translates to more than quarter million cases. Adding to the resistance crisis is the length of TB treatment. The DOTS strategy if followed

minimizes the development of resistance by preventing treatment failure. With MDR-TB the cost of treatment rises to more than 100 times.

Malaria: Malaria affects estimated 300 to 400 million people globally each year. Malaria is reappearing in areas of the world formerly considered disease-free. Resistance to chloroquine is now widespread in 80% of the 92 countries where malaria continues to be a major killer. Resistance to newer second and third-line drugs continues to grow. Mefloquine resistance emerged in South-East Asia almost as soon as the drug was introduced. A renewed commitment to research and development of newer, more effective medications is critical to the containment of drug-resistant malaria.

Hospital-Acquired Infections: Hospital wards are the breeding grounds of the resistant microbes viz. Staphylococci, Salmonella, Pseudomonas and Klebsiella. Other infections – for instance methicillin-resistant Staphyloccocus aureus (MRSA) and vancomycin-resistant Enterococcus (VRE) are also wreaking havoc in hospital wards around the world. So far, the only drug available to treat MRSA is vancomycin – itself faltering in the face of a renewed attack by vancomycin-intermediate Staphyloccocus aureus (VISA). This emerging microbe is already showing

Because hospitals and nursing homes typically hold large numbers of immunocompromised patients. So far, current preventive methods emphasizing aggressive infection-control measures have only slowed the spread of resistant bacteria.

An added concern that many resistant infections like MRSA and VRE erupted in hospital settings migrate to the community at large.

Leishmaniasis: Leishmaniasis is showing resistance to the highly toxic, heavy metal-based antimonials at rates of 64% in some developing nations. Left untreated, the disease is fatal. Like MDR-TB, drug-resistant leishmaniasis results when treatment courses are too short, interrupted, or consist of poor-quality or counterfeit drugs. Once infected, victims remain vulnerable to potentially fatal flare-ups throughout their lifetime. In developed Mediterranean nations, drug-resistant leishmaniasis continues to spread as the number of patients co-infected with HIV increases.

Gonorrhoea: The development of antimicrobial resistance in gonorrhoea is one of the major health care disasters of the 20th century. In most of South-East Asia, resistance to penicillin has been reported in nearly all strains at a overall rate of 98%. Newer, more expensive drugs like ciprofloxacin – are showing an increasing failure rate. Untreated, gonorrhoea enhances the likelihood of infection with HIV, causes infertility in both men and women, miscarriages, still births and blindness in newborn babies.

Common Worms: Another area where drug resistance poses a threat is in the treatment of food-borne and soil-transmitted helminths. These remain a leading cause of chronic illness throughout the developing world. Currently, some two billion people are infected with soil-transmitted worms (hookworm, roundworm and whipworm) while schistosomiasis afflict another 200 million in sub-Saharan Africa.

Among livestock, resistance in helminths has already a problem. In humans, resistance has not yet emerged, but remains a real threat.

Antimicrobial resistance a complex global issue

The systematic monitoring of antimicrobial resistance of relevant pathogens fulfil fol-

"Hospital wards are the breeding grounds of the resistant microbes viz. Staphylococci, Salmonella, Pseudomonas & Klebsiella".

lowing broad and long term goals:

1. To reduce morbidity & mortality associated with infections caused by antimicrobial resistant pathogens.
2. To reduce the rate of emergence & spread of antimicrobial resistance.

At the international level, one of the main concern is to gather and share information on antimicrobial resistance; assess its magnitude and trends, ongoing surveillance activities, and policies and practices to contain resistance.

Antibiotic Resistance Monitoring (ARM) Programme

*"The goal of the **Antibiotic Resistance Monitoring (ARM) programme** is to reduce the impact of antimicrobial resistance by improving surveillance of resistance and promoting rational use of antimicrobials worldwide".*

In order to address the issue of antimicrobial resistance World Health Organization recommends to establish the ARM programme in its member states.

The goal of the ARM programme is to reduce the impact of antimicrobial resistance by improving surveillance of resistance and promoting rational use of antimicrobials worldwide. It is done through:

1. Establishing international linkages
2. Strengthening national laboratories
3. Reinforcing national infrastructure

The purpose and the components of this programme are:

1. Improve performance of antimicrobial susceptibility tests
2. Encourage use of test results to identify outbreaks
3. Promote establishment of national surveillance & quality assurance programmes
4. Assist in development of national policies for antimicrobial usage & infection control
5. Gather data on emergence & spread of resistant bacteria
6. Provide information to individuals, institutions, Govt. & Non-Govt. organizations & Pharmaceutical industry
7. Develop education & advocacy programmes to prolong the useful life of available antimicrobials
8. Encourage research & development of antimicrobial drugs

Information for Action

Information generated should be used to support decision-making and action from the local to the global level.

...Locally

- Patient therapy
- Infection control
- Prescribing guidelines
- Education

...Nationally

- Policies for rational use of antimicrobials
- Policies for containment of resistant infection
- Laboratory preparedness
- Education

...Globally

- International alert
- International collaboration
- Education
- Research

Recommended Types of Surveillance

All hospital should develop a mechanism to monitor the antimicrobial resistance with periodic reviews of unusual results, resistance profiles and trends.

WHO recommends minimum sentinel surveillance that should be geographically and demographically representative of the country. Case based and aggregated data should be collected for important pathogens to know their distribution by type, by age etc.

Uses of Data for Decision Making

- Monitor trends and issues in antimicrobial resistance.
- Monitor the impact of antimicrobial usage and infection control policies.
- Monitor outcome of treatment.

Antimicrobial Surveillance in Oman

In the context of ARM, Ministry of Health has launched a National antimicrobial Resistance Monitoring Program, with participation of all major laboratories of the country including those of Sultan Qaboos University Hospital, Royal Oman Police Hospital and Armed Forces Hospital. The central public health laboratory (CPHL) has developed the necessary capabilities to monitor the antibiotic resistance in the country and would function as a nodal agency.

Initially, six bacterial species have been identified to be the indicator organisms for monitoring their antibiotic sensitivity pattern. The bacterial organisms were selected based on their importance both in nosocomial and in community settings as well as on the basis of their occurrence in Oman. The selected organisms are:

1. *Staphylococcus aureus*
2. *Streptococcus pneumoniae*
3. *Haemophilus influenzae*
4. *Escherichia coli*
5. *Klebsiella*
6. *Salmonella*

A database is being generated that will help in analyzing the current situation in Oman. Analysis of the data gathered for these selected bacteria during a specified period of time would help formulate national antibiotic usage guidelines, as well as consolidate WHO's efforts of supporting antibiotic resistance surveillance program.

At present the antimicrobial resistance surveillance activities are being carried out at the level of the secondary and tertiary health care level. These institutions usually address the issue through the **'Infection Control Committees'.** These committees meet periodically and discuss different aspects of antibiotic resistance and generate local guidelines. However, as recommended by WHO there is a need of concerted and coordinated efforts to deal with antimicrobial resistance at the national level.

It is envisaged that the component of antimicrobial resistance would be the integral part of the existing national communicable disease surveillance system with standardised national guidelines and investigation protocols, eventually generating relevant information for action.

"Six bacterial species have been identified as the indicator organisms based on their importance both in hospital & in community as well as on the basis of their common occurrence in Oman"

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CORRIGENDUM

Refer to article titled ***"Review of Maternal Mortality in Oman: 1992-2000"*** published in Community Health & Disease Surveillance Newsletter, Volume 9, No. 4 (Oct-Dec 2000) & correct as follows:

1. Page 1- Data on maternal mortality, read as for the year 1991-2000
2. Page 1- Causes of mortality in figure 1, read as Direct 49% & Indirect 30%
3. Page 2- Table 1 showing direct causes of death ignore last 4 rows & read causes as PPH 15 (32%), Pulmonary Embolism 15 (32%), Sepsis 11 (23%) & Amniotic Fluid Embolism 6 (13%).

Communicable Diseases Quarterly Report

First Quarter (January to March 2001)

ICD Code	Diseases	2001 First Quarter Jan	Feb	Mar	Total	2000 Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec
GROUP 'A' DISEASES									
A00	Cholera	-	-	-	**0**	0	2	5	2
A20	Plague	*Never Reported*							
A36	Diphtheria	*Last Case in 1992*							
A39	Meningococcal infection	-	-	8	**8**	4	18	4	1
A80	Poliomyelitis	*Last Case in 1993*							
	Acute Flaccid Paralysis	1	3	1	**5**	4	1	2	3
B05	Measles	-	-	1 (i)	**1(i)**	1	10	3	-
B06	Rubella & [CRS]	-	[1]	-	**[1]**	-	3	-	-
A95	Yellow fever	*Never Reported*							
A82	Rabies	-	-	-	**0**	-	-	-	-
A75.0	Louse-borne typhus	*Never Reported*							
A68	Relapsing fever	*Last Case in 1997*							
A33	Tetanus Neonatorum (NNT)	*Last Case in 1995*							
A99	Viral Hemorrhagic fever	-	-	-	**0**	-	-	-	-
GROUP 'B' DISEASES									
A03.0	Typhoid fever	2	6	11	**19**	22	24	40	27
A01.4	Paratyphoid fever	2	1	1	**4**	2	11	5	2
A02	Food poisoning	39	40	81	**160**	95	313	361	176
A22	Anthrax	*Never Reported*							
A23	Brucellosis	11	11	3	**25**	70	76	104	52
A37	Pertussis	7	7	2	**16**	42	58	79	11
A35	Tetanus (Excluding NNT)	-	-	-	**0**	1	3	1	1
A90	Dengue	*Never Reported*							
	Viral Hepatitis - Total	**167**	**119**	**90**	**376**	**273**	**296**	**253**	**290**
B15.9	Viral Hepatitis - HBsAg '+' (ELISA)	3	5	1	**9**	11	14	11	12
B15.0	Viral Hepatitis - HBsAg Negative	138	94	67	**299**	196	217	180	220
B17	Viral Hepatitis - Unspecified	26	20	22	**68**	66	65	62	58
B55	Leishmaniasis	1	2	-	**3**	4	1	2	10
B65	Schistosomiasis	2	-	-	**2**	-	1	2	-
B74	Filariasis	-	-	-	**0**	-	1 (i)	1 (i)	-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*							
G00.0	Haemophilus Meningitis	2	-	-	**2**	4	4	5	7
G00-G03	Meningitis - (All others)	11	8	-	**19**	35	45	41	33
A30	Leprosy	-	1	-	**1**	3	1	4	4
A15-A19	Pulm. Tuberculosis Sputum Positive	17	9	12	**38**	32-1*=31	29	33	22
	Pulm. Tuberculosis Sputum Negative	-	-	1	**1**	9	13-1**=12	5	4
	Extra Pulmonary Tuberculosis	7	7	4	**18**	21	29	33	15
B50-B54	Malaria (All sources)	34	32	34	**100**	117	147	281	151
A50-A53	Syphilis	12	15	4	**31**	49	58	64	48
A54	Gonococcal Infections	28	22	31	**81**	71	94	91	74
GROUP 'C' DISEASES									
A03	Shigellosis	229	147	109	**485**	349	348	372	497
A06	Amoebiasis	649	460	322	**1,431**	924	1,069	1,094	1,246
A09	Acute Gastro-Enteritis & Diarrhoea	12,359	9,775	10,387	**32,521**	29,301	23,461	25,855	33,591
B01	Chicken Pox	1,106	1,255	1,525	**3,886**	4,763	5,996	2,204	2,766
B26	Mumps	316	236	257	**809**	3,556	4.842	1,463	1,175
A71	Trachoma	60	35	44	**139**	296	297	275	148
J10-J11	Influenza	265	314	322	**901**	1,279	1,077	850	1,209

* *One case of Atypical Mycobacterial infection reported from Al Amerat Wilayat is deleted from records.*

** *One case of infection due to Non-Tuberculous organism from Wilayat B. B. B. Hassan is deleted from records.*

Communicable Diseases Quarterly Report by Regions

First Quarter (January to March 2001)

ICD Code	Diseases	Total	Muscat	Dhofar	Dakhliyah	North Sharqiyah	South Sharqiyah	North Batinah	South Batinah	Dhahira	Musandum	AlWusta
GROUP 'A' DISEASES												
A00	Cholera	**0**	-	-	-	-	-	-	-	-	-	-
A20	Plague	*Never Reported*										
A36	Diphtheria	*Last Case in 1992*										
A39	Meningococcal infection	**8**	2	-	1	2	1	-	1	1	-	-
A80	Poliomyelitis	*Last Case in 1993*										
	Acute Flaccid Paralysis	**5**	1	-	2	-	-	2	-	-	-	-
B05	Measles	**1 (i)**	-	-	-	-	-	1 (i)	-	-	-	-
B06	Rubella & [CRS]	**[1]**	-	-	-	-	-	-	-	-	-	[1]
A95	Yellow fever	*Never Reported*										
A82	Rabies	**0**	-	-	-	-	-	-	-	-	-	-
A75.0	Louse borne typhus	*Never Reported*										
—A68	Relapsing fever	*Last Case in 1997*										
A33	Tetanus Neonatorum (NNT)	*Last Case in 1995*										
A99	Viral Haemorrhagic fever	**0**	-	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES												
A03.0	Typhoid fever	**19**	5	2	4	3	-	1	4	-	-	-
A01.4	Paratyphoid fever	**4**	1	-	1	-	-	-	2	-	-	-
A02	Food poisoning	**160**	13	-	58	3	8	49	13	16	-	-
A22	Anthrax	*Never Reported*										
A23	Brucellosis	**25**	-	25	-	-	-	-	-	-	-	-
A37	Pertussis	**16**	6	4	1	1	1	1	-	2	-	-
A35	Tetanus (Non NNT)	**0**	-	-	-	-	-	-	-	-	-	-
A90	Dengue	*Never Reported*										
	Viral Hepatitis - Total	**376**	**18**	**62**	**54**	**39**	**68**	**37**	**53**	**3**	**7**	**35**
B15.9	V. Hepatitis - HBsAg Positive (ELISA)	**9**	1	-	1	2	1	-	4	-	-	-
B15.0	Viral Hepatitis - HBsAg Negative	**299**	5	53	46	32	57	29	47	2	-	28
B17	Viral Hepatitis - Not Tested	**68**	12	9	7	5	10	8	2	1	7	7
B55	Leishmaniasis	**3**	-	3	-	-	-	-	-	-	-	-
B65	Schistosomiasis	**2**	1	-	-	-	-	-	-	1	-	-
B74	Filariasis	**0**	-	-	-	-	-	-	-	-	-	-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*										
G00.0	Haemophilus Meningitis	**2**	1	-	-	-	-	1	-	-	-	-
G00-G03	Meningitis (Others)	**19**	3	-	2	2	1	6	2	2	-	1
A30	Leprosy	**1**	-	-	-	1	-	-	-	-	-	-
A15-A19	Pulm. Tuberculosis Sputum Positive	**38**	12	5	3	2	3	7	5	1	-	-
	Pulm. Tuberculosis Sputum Negative	**1**	-	-	-	1	-	-	-	-	-	-
	Extra Pulmonary Tuberculosis	**18**	5	2	3	-	-	5	2	1	-	-
B50-B54	Malaria (All sources)	**100**	62	2	1	7	1	15	9	3	-	-
A50-A53	Syphilis	**31**	-	7	6	-	-	14	-	3	1	-
A54	Gonococcal Infections	**81**	20	8	7	-	10	18	3	6	3	6
GROUP 'C' DISEASES												
A03	Shigellosis	**485**	88	11	160	114	19	1	26	17	35	14
A06	Amoebiasis	**1,431**	64	2	472	166	220	198	70	114	30	95
A09	Acute Gastro-Enteritis & Diarrhoea	**32,521**	5,963	3,494	3,348	2,219	2,985	6,456	4,748	2,357	536	415
B01	Chicken Pox	**3,886**	1,105	191	723	127	85	690	632	222	99	12
B26	Mumps	**809**	153	96	166	35	54	89	75	141	-	-
A71	Trachoma	**139**	9	-	33	10	4	23	55	5	-	-
J10-J11	Influenza	**901**	425	3	4	2	-	368	-	99	-	-

Selected Communicable Diseases by Wilayat, First Quarter 2001

Region	Wilayat	Acute Flaccid Paralysis	Measles	Rubella	Pertussis	TB (Total)	TB Sputum Positive	Tetanus (Ex. NNT)	Malaria (All)	Viral Hepatitis (Total)	Leprosy	Meningo. Infection	Leishma-niasis
MUSCAT	Muscat				1	2	1			1		1	
	Seeb				2	3	3		38	4			
	Muttrah					4	3		3	3			
	Bowsher	1			2	4	2		15	9			
	Al Amerat				1	1	1		6	1		1	
	Quriyat					3	2						
DHOFAR	Salalah				1	6	4		2	48			1
	Thumrait				3					9			1
	Taqah									2			
	Mirbat					1	1			1			
	Sudah									1			
	Rakhyut									1			1
	Dhalqut												
	Muqshan												
	Shaleem												
NORTH BATINAH	Sohar		1		1	3	2		3	3			
	Shinas	1								6			
	Liwa								1	2			
	Saham					5	3		6	1			
	Khabura					1			1	8			
	Suwaiq	1				3	2		4	17			
SOUTH BATINAH	Rustaq								2	19			
	Nakhl								2	4			
	Wadi Maawil								1	2			
	Al Awabi									10			
	Musanah					4	3		2	3			
	Barka					3	2		2	15		1	
DAKHLIYAH	Nizwa					1			1	11			
	Bahla					2	2			10			
	Adam												
	Hamra	1								2			
	Manah												
	Sumail	1			1	2	1			6			
	Izki									17		1	
	Bid Bid					1				8			
DHAHIRA	Ibri								2	1			
	Yanqul												
	Dhank												
	Buraimi				2	2	1			2		1	
	Mahda								1				
NORTH SHARQIYAH	Ibra					1	1		2	7			
	Mudhaibi				1				4	4	1	2	
	Bidiyah												
	Al-Qabel					1	1		1	1			
	Dima Al-Tayeen					1				26			
	Wadi Bani Khalid									1			
SOUTH SHARQIYAH	Sur				1	1	1		1	12			
	Masirah					1	1			3			
	Al Kamil & Al Wafi									1			
	BBB Ali					1				43		1	
	BBB Hassan									9			
MUSANDUM	Khasab									5			
	Dibba									1			
	Bukha												
	Madha									1			
AL-WUSTAH	Haima									15			
	Duqum									18			
	Mahoot												
	Al-Jazer									2			
NATIONAL TOTAL		5	1	0	16	57	38	0	100	376	1	8	3

Age Distribution of Communicable Diseases

First Quarter (January to March 2001)

ICD Code	Diseases	Total	Age Groups in Years								
			< 1	1-5	5-10	10-15	15-19	20-24	25-34	35-44	> 45
GROUP 'A' DISEASES											
A00	Cholera	**0**	-	-	-	-	-	-	-	-	-
A20	Plague	*Never Reported*									
A36	Diphtheria	*Last Case in 1992*									
A39	Meningococcal infection	**8**	2	-	1	1	-	1	2	1	-
A80	Poliomyelitis	*Last Case in 1993*									
	Acute Flaccid Paralysis	**5**	-	4	1	-	-	-	-	-	-
B05	Measles	**1 (i)**	-	1	-	-	-	-	-	-	-
B06	Rubella & [CRS]	**[1]**	-	[1]	-	-	-	-	-	-	-
A95	Yellow fever	*Never Reported*									
A82	Rabies	**0**	-	-	-	-	-	-	-	-	-
A75.0	Louse borne typhus	*Never Reported*									
A68	Relapsing fever	*Last Case in 1997*									
A33	Tetanus Neonatorum	*Last Case in 1995*									
A99	Viral Haemorrhagic fever	**0**	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES											
A03.0	Typhoid fever	**19**	-	3	6	3	1	-	3	2	1
A01.4	Paratyphoid fever	**4**	-	-	2	1	-	-	-	1	-
A02	Food poisoning	**160**	3	21	43	18	15	15	22	17	6
A22	Anthrax	*Never Reported*									
A23	Brucellosis	**25**	-	4	4	3	4	2	3	3	2
A37	Pertussis	**16**	10	-	3	3	-	-	-	-	-
A35	Tetanus (Non NNT)	**0**	-	-	-	-	-	-	-	-	-
A90	Dengue	*Never Reported*									
	Viral Hepatitis - Total	**376**	**3**	**117**	**162**	**43**	**10**	**10**	**14**	**4**	**13**
B15.9	V. Hepatitis - HBsAg +ve (ELISA)	**9**	-	1	-	1	-	2	2	2	1
B15.0	V. Hepatitis - HBsAg Negative	**299**	3	98	140	37	8	3	5	1	4
B17	V. Hepatitis - Unspecified	**68**	-	18	22	5	2	5	7	1	8
B55	Leishmaniasis	**3**	-	1	-	1	-	-	1	-	-
B65	Schistosomiasis	**2**	-	-	-	1	-	-	-	-	1
B74	Filariasis	**0**	-	-	-	-	-	-	-	-	-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*									
G00.0	Haemophilus Meningitis	**2**	2	-	-	-	-	-	-	-	-
G00-G03	Meningitis (Others)	**19**	5	2	7	2	1	1	-	-	1
A30	Leprosy	**1**	-	-	-	-	-	1	-	-	-
A15-A19	Tuberculosis: Sputum Positive	**38**	-	-	-	1	3	5	5	6	18
	Tuberculosis: Sputum Negative	**1**	-	-	-	-	-	-	-	-	1
	TB Extra-Pulmonary	**18**	-	1	-	-	-	1	4	4	8

Note:

1. *The quarterly data are provisional & should be scrutinized & verified by the focal point of communicable diseases in the regions. A feedback report should be sent to DSDC.*
2. *Previous quarter data would be finalized in the following quarter after receiving the feedback.*
3. *Tuberculosis & Leprosy data are for nationals only.*
4. *(i) = imported case.*

Animal Bite Surveillance by Regions of Oman

First Quarter (January to March 2001)

Region	Population at Risk	Type of Animal					Total Animal Bites	Annualised Rate/ 10,000
		Fox or	***Dog***	***Cat***	***Other***	**Others**		
Muscat	*644,334*	-	*41*	*22*	*2*	*3*	*68*	*4.2*
Dhofar	*220,692*	*1*	*3*	*5*	*3*	-	*12*	*2.2*
North Batinah	*418,909*	*1*	*27*	*9*	*9*	-	*46*	*4.4*
South Batinah	*241,113*	-	*16*	*18*	*11*	*1*	*46*	***7.6***
Dakhliyah	*269,924*	-	*3*	*22*	-	*1*	*26*	*3.8*
Dhahira	*211,955*	*1*	*11*	*5*	*4*	-	*21*	*3.9*
North Sharqiyah	*138,995*	*2*	*6*	*24*	*7*	-	*39*	***11.2***
South Sharqiyah	*164,491*	*1*	*18*	*4*	*2*	-	*25*	***6.1***
Musandam	*33,590*	-	*1*	-	-	-	*1*	*1.2*
Al-Wustah	*19,926*	-	-	*1*	*2*	-	*3*	***6.0***
National Total	***2,363,929***	***6***	***126***	***110***	***35***	***5***	***287***	***4.9***

Note: Rodent Bites excluded

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