




Knowledge, Awareness, and Compliance of Disease Surveillance and Notification Among Jordanian Physicians in Residency Programs

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Abstract

Health professionals' knowledge and awareness of the disease surveillance is essential for reporting diseases to health departments. This study aimed to assess the knowledge and attitudes of Jordanian physicians toward public health surveillance of communicable disease. A cross-sectional study was conducted among resident doctors who were working in 4 main Ministry of Health hospitals and 2 teaching hospitals in Jordan in September 2017. A self-administered paper-based questionnaire was used to collect the data. The questionnaire collected information about sociodemographic and practice-related characteristics of physicians and included items to assess their knowledge of surveillance and reporting practices. This study included 223 physicians (152 males and 71 females). About 60.1% of the residents were graduates from medical schools in Jordan and the remaining (39.9%) were graduates from medical schools in other countries. Approximately two thirds of residents (62.3%) were doing their residency in Ministry of Health hospitals and the rest (37.7%) in 2 teaching hospitals. Only 44.8% of physicians had defined surveillance correctly. Only 27.4% of physicians had been educated or trained on surveillance. About 39.5% of physicians had filled at least one report form during their practice. The main reasons for not reporting mandatory diseases were high workload (49.8%) and being not trained on reporting diseases (46.6%). A relatively high percentage of physicians have insufficient knowledge of surveillance and reporting of notifiable communicable diseases. Training of physicians on surveillance and diseases notification is highly needed. The practice of disease notification should be enforced in Jordanian hospitals.

Keywords

epidemiological surveillance, knowledge, notifiable communicable diseases, field epidemiology, Jordan

What do we already know about this topic?

Incomplete and untimely reporting of notifiable communicable diseases are one of the main challenges facing the effective implementation of the disease surveillance systems.

How does your research contribute to the field?

This research helps to understand the physicians' knowledge, awareness, and compliance of disease surveillance and notification in Jordan.

What are your research's implications toward theory, practice, or policy?

Undergraduate and postgraduate health professionals programs should be restructured to include surveillance education and training.

Introduction

Communicable disease control is a public health priority to prevent the spread of contagious diseases.¹ The increase of emerging and re-emerging communicable diseases such as Middle East respiratory syndrome coronavirus (MERS-CoV), cholera, and ebola has attracted the attention to the importance of communicable diseases reporting and surveillance systems.^{2,3} Epidemiological surveillance of communicable diseases through the mandatory-reporting system is

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crucial in the planning and evaluation of disease prevention and control programs, monitoring the health of the public, identifying public health problems, and triggering action to prevent further illness.⁴ Disease surveillance depends on the definition of case and recognition of illness, compilation of individual data, analysis, and reporting.

The National Public Health Surveillance System (NPHSS) in Jordan reports 44 diseases divided into 2 groups: A group—reported immediately and B group—reported weekly or routinely and then feedback by electronic official report. Notification is mandatory by law for all health care providers.⁵ During the last 2 years, NPHSS has improved by using consistent standards for data collection, management, reporting, and use. The system is case-based and integrated disease surveillance system that employs mobile information technology to aid collection of real-time and standardized data to inform decision-making process at different levels of the health system.⁵ According to the Public Health Law No. 47, issued by a Royal decree in 2008, the Ministry of Health (MOH) is in charge of all health matters in the Kingdom, including the maintenance of public health by offering preventive, treatment and health control services and supervision and organization of health services offered by the public and private sectors.

Health professionals' knowledge and awareness of the disease surveillance is essential for reporting diseases to health departments.⁶ In most countries, notifiable disease surveillance systems rely on mandatory reporting of cases by physicians and laboratory personnel.⁷ However, one of the challenges facing the effective implementation of the disease surveillance systems is incomplete and untimely reporting.⁸

Studies in various countries showed low compliance of physicians with notification systems because of insufficient feedback of surveillance data to the physicians and lack of clarity of the data submission responsibilities.⁹⁻¹¹ Despite scarcity of studies on the knowledge, attitudes, and compliance of physicians regarding surveillance of reportable diseases, it was reported that physicians' knowledge about notifiable disease surveillance is poor.¹²⁻¹⁴ To the best of our knowledge, there are no previous studies about knowledge, attitudes, and compliance of physicians regarding surveillance of reportable diseases in Jordan. This study aimed to assess the knowledge and attitudes of Jordanian physicians toward public health surveillance of communicable disease. Identification of physician's knowledge will help to implement roadmap to improve the knowledge and close the identified gaps.

Methods

A cross-sectional study was conducted among resident doctors who were working in MOH and university teaching hospitals in Jordan during the period September 2017 to January

2018. The 4 main MOH hospitals out of 32 hospitals and 2 teaching hospitals that have residency programs were selected. All residents in the selected hospitals from all specialties including emergency medicine, internal medicine, pediatric, and family medicine were visited by the researcher and invited to participate in this study.

A self-administered paper-based questionnaire was used to collect the data. The questionnaire collected information about sociodemographic and practice-related characteristics of physicians and included 11 (yes or no) questions, 9 multiple-choice questions, and 21 case scenarios to assess their knowledge of surveillance and reporting practices. Their knowledge and awareness of surveillance was assessed by specific questions with a multiple-choice format. They were asked about the purpose of surveillance, sources of public health surveillance data, characteristics of surveillance data, and physician's role in public health surveillance.

In another section of the questionnaire, the physicians were presented with 21 selected conditions and were asked whether they report that condition immediately or weekly or don't report it. The list of conditions was obtained from the MOH, and the case definition of all events in the questionnaire was set according to the Communicable Disease Surveillance Guide, Jordan, MOH, 2015. Questions in the questionnaire varied between cases that should be reported immediately and those that were reported weekly and which should not be reported. Moreover, they were asked about the barriers of not reporting mandatory diseases. The content validity of the questionnaire was assessed by 3 experts in the area. The questionnaire was pilot tested among 50 physicians who were not included in the study sample and was revised accordingly.

Data were described using percentages and means (SD). The differences between the proportions were compared using chi-square test. Data were analyzed using IPM-SPSS version 23. A *P* value of less than .05 was considered as statistically significant.

Results

Physicians' Characteristics

This study included 223 physicians (152 males and 71 females) with a response rate of 44.6%. Their age ranged between 21 and 38 years with a mean (SD) of 31.2 (7.4) years. A total of 145 (66.5%) respondents had working experience of less than 5 years. Of all respondents, 38 residents were in their first-year residency program. About 60.1% of the residents were graduates from medical schools in Jordan and the remaining (39.9%) were graduates from medical schools in other countries. Approximately two thirds of residents (62.3%) were doing their residency in MOH hospitals and the rest (37.7%) in the 2 teaching hospitals.

Table 1. Jordanian Physicians' Knowledge and Awareness of Surveillance.

	Sector				Total	P value	
	Ministry of Health	Teaching hospitals					
The purpose of surveillance							
Assess the trend of disease occurrence	115	82.7	79	94.0	194	87.0	.015
Prevent and control diseases	102	73.4	55	65.5	157	70.4	.210
Detect and notify disease outbreaks	102	73.4	72	85.7	174	78.0	.031
Health education and advocacy	86	61.9	57	67.9	143	64.1	.366
Research purpose	96	69.1	68	81.0	164	73.5	.051
Determine the prevalence of disease	104	74.8	71	84.5	175	78.5	.088
Sources of public health surveillance data							.016
Controlled clinical trials	28	20.1	6	7.1	34	15.2	
Case studies	10	7.2	10	11.9	20	9.0	
Direct observations	34	24.5	15	17.9	49	22.0	
Population surveys and case reporting	67	48.2	53	63.1	120	53.8	
Surveillance data must be							.244
Rapidly collected	15	10.8	4	4.8	19	8.5	
Use simple case definitions	24	17.3	19	22.6	43	19.3	
Provide very precise estimates	28	20.1	22	26.2	50	22.4	
Rapidly collected and use simple case definitions	72	51.8	39	46.4	111	49.8	
Physician's role in public health surveillance							
Diagnosis and reporting	90	64.7	63	75.0	153	68.6	.110
Collect the data and analyze it	68	48.9	49	58.3	117	52.5	.173
Provide recommendation on the disease	57	41.0	34	40.5	91	40.8	.938
Believe in that reporting an event to surveillance system is a professional obligation	73	52.5	44	52.4	117	52.5	.118

Knowledge and Awareness of Surveillance

Only 44.8% of physicians had defined surveillance correctly as an ongoing, systematic collection, analysis, and interpretation of health-related data (Table 1). When they were asked about the purpose surveillance, most of them (87.0%) reported that the purpose of surveillance is to assess the trend of disease occurrence, 78.5% reported "to determine the prevalence of disease", and 78.0% reported "to detect and notify disease outbreaks." Only 53.8% identified population surveys and case reporting as a source of public health surveillance data. Almost half of physicians (49.8%) reported that surveillance data must be both rapidly collected and use simple case definitions.

More than two thirds (68.6%) of physicians reported that their role in public health surveillance is to diagnose diseases and report them, 52.5% reported "collect and analyze the data," and 40.8% reported "provide recommendation on the disease". Only 52.5% believed in that reporting an event to surveillance system is a professional obligation. (The Jordanian Public Health Law Chapter Five Article 20.)

The physicians' knowledge of whether selected diseases (conditions) should be reported immediately or weekly (routinely) is shown in Table 2. A relatively high proportion of physicians had poor knowledge of when to report some selected mandatory diseases (conditions) that should

be reported. Less than one third of physicians had correctly identified that the following conditions should be reported immediately: "fever and nonvesicular rash", "cough lasting at least 2 weeks with inspiratory whooping", and "laryngitis or pharyngitis or tonsillitis with an adherent membrane of the tonsils." Less than half of physicians correctly stated that animal bite or hepatitis A should be reported weekly.

Practice of Disease Notification

Only 27.4% of physicians had been educated or trained on surveillance. About two thirds (62.8%) believed in that health care professionals should be trained or educated on surveillance. Although that all physicians diagnosed at least one communicable disease under surveillance, only 39.5% of them had filled a report form. The main reasons for not reporting mandatory diseases are shown in Table 3. When they were asked about the reasons of not reporting mandatory diseases, 49.8% reported high workload and 46.6% reported being not trained on reporting diseases.

Discussion

The doctor-based surveillance systems provided critical information for early detection of communicable diseases, so

Table 2. The Physicians' Knowledge of the Diseases (Events) That Should Be Reported Immediately or Weekly.

Event	Report immediately		Report weekly (routinely)		Do not report	
	N	%	N	%	N	%
10-year-old boy complain of acute weakness in one extremity or more	134	60.1 ^a	45	20.2	44	19.7
A patient complain of fever and nonvesicular rash	50	22.4 ^a	81	36.3	92	41.3
Animal bite	90	40.4	104	46.6 ^a	29	13.0
Hepatitis A	81	36.3	104	46.6 ^a	38	17.0
Food poisoning	147	65.9 ^a	41	18.4	35	15.7
Meningococcal encephalitis	181	81.2 ^a	28	12.6	14	6.3
Rabies	175	78.5 ^a	37	16.6	11	4.9
A person with a cough lasting at least 2 weeks with inspiratory whooping	68	30.5 ^a	106	47.5	49	22.0
Pancreatitis	22	9.9	34	15.2	167	74.9 ^a
Laryngitis or pharyngitis or tonsillitis and an adherent membrane of the tonsils	60	26.9 ^a	55	24.7	108	48.4
Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting 2 or more days	67	30.0	94	42.2 ^a	62	27.8
Acute appendicitis	30	13.5	24	10.8	169	75.8 ^a
Chickenpox (varicella)	80	35.9	114	51.1 ^a	29	13.0
Sudden onset of fever; jaundice, and hemorrhagic signs	122	54.7 ^a	54	24.2	47	21.1
Diarrhea twice daily	23	10.3	59	26.5	141	63.2 ^a
Child under 5 years old with watery diarrhea and fever	70	31.4	93	41.7 ^a	60	26.9
Otitis media	16	7.2	35	15.7	172	77.1 ^a
Cutaneous leishmaniasis	88	39.5	110	49.3 ^a	25	11.2
Brucellosis	84	39.2	107	50 ^a	23	10.7
Hydatid cysts (echinococcosis)	48	21.5	103	46.2 ^a	72	32.3
Corona (Middle East respiratory syndrome coronavirus)	180	80.7 ^a	27	12.1	16	7.2

^aThe correct answer.

Table 3. The Self-Reported Reasons for Not Reporting Notifiable Diseases.

	Sector				Total	P value	
	Ministry of Health		Teaching hospitals				
Shortage of human resources for reporting	52	37.4	39	46.4	91	40.8	.184
High workload	66	47.5	45	53.6	111	49.8	.378
The lack of incentive to report diseases	42	30.2	31	36.9	73	32.7	.302
Not aware of reporting system and rules	45	32.4	41	48.8	86	38.6	.015
Interfere of reporting system with clinical practice	42	30.2	22	26.2	64	28.7	.520
Lack of skills in using the technology used in the disease reporting	40	28.8	28	33.3	68	30.5	.474
Not trained on reporting diseases	56	40.3	48	57.1	104	46.6	.014

that immediate public health intervention can curtail the number of illnesses and deaths and reduce negative effects on international travel and trade.¹⁵

The MoH of Jordan had one of the best health systems in the region, with surveillance as one of its success stories. However, the Syrian refugee crisis had introduced new challenges to the surveillance system because of their instability and the difficulty of reaching them and following them up. Therefore, NPHSS should always regularly update data and

constantly explore opportunities for improvement.⁵ In Jordan, the reporting of notifiable diseases is mandated by the MoH (The Jordanian Public Health Law Chapter Five Article 20). However, only half of physicians believed in that reporting an event to surveillance system is a professional obligation.

This study revealed unexpected findings about the attitudes and practices of Jordanian physicians regarding surveillance and reporting communicable diseases. This study showed that Jordanian physicians in residency programs

have poor knowledge regarding notifiable disease reporting. This finding is in agreement with the findings of other studies in South Africa,⁹ the Syrian Arab Republic,¹⁶ Taiwan,¹⁷ Canada,¹⁸ Nigeria,¹⁹ and Madrid.¹²

This study identified gaps in the awareness of physicians from 2 major health sectors in Jordan, MoH and university hospitals. This finding is explained by that undergraduate and graduate curricula in medical schools in Jordan do not cover surveillance and its importance. Moreover, hospitals' training programs do not stress on disease notification. This underscores the need to provide physicians with proper training on surveillance and repeatedly inform physicians about the notifiable disease under surveillance. Such training has been shown to improve the awareness and practice in New South Wales²⁰ and Washington.¹³

To assess the physicians' practices of reporting communicable diseases, the most common notifiable diseases/conditions, according to the list of the MOH, were presented to physicians and were asked to determine whether they had ever filled the notification forms for these diseases. Among all physicians who diagnosed at least one communicable disease under surveillance during their practice, only 39.5% of them had filled a notification form. A similar level of underreporting in other studies proposes a need of knowledge of the study of disease transmission of a few notifiable infections. Consequently, this may cast question on the esteem of the notification process and illness surveillance framework. Feedback to doctors showing that preventive action is taken as a result of their notifications may be the most effective way to improve notification practices.⁹

The most common reasons for not reporting notifiable diseases were work overload among MOH physicians and not being trained on reporting diseases among universities' hospitals physicians. Similarly, these reasons had been reported by physicians in other countries.^{12,13,21} One study reported that physicians did not know where to obtain a notification form and/or did not know whom to notify.¹⁹ While other studies identified the reporting process, which is too time consuming, difficult access to the local public health unit, and poor knowledge of the legal requirements for notifiable disease reporting as major barriers to notifiable disease reporting.^{12,21}

Despite varying experiences, the ability of physicians to diagnose the notifiable disease and report correctly according to the reporting list varied from 81.2% for meningococcal meningitis cases to 22.4% of suspected measles. This finding is consistent with findings of similar study among junior doctors in accident and emergency departments in Ireland.²² They recommended that it would be helpful to have a poster in the emergency departments listing the notifiable diseases and the telephone number of the local public health authority and to encourage accurate reporting.¹⁴ According to the participants, reporting rates could be enhanced through simple approaches, including a short, simple, readily intelligible, and accessible reporting form for physicians. Implementing workshops emphasizing the importance of and the process for notifiable

disease surveillance in undergraduate and postgraduate medical education also would be valuable, as would including other health care workers in assistant physicians in their reporting task. Institutional computerized reporting systems and feedback to physicians also may help improve reporting rates.¹⁷

This study has some limitations. First, health services providers in private sector were not included in the study. Therefore, the generalizability of study findings is potentially limited and the study findings can be generalized only to MoH and teaching hospitals' physicians. Another limitation is the low response rate.

In conclusion, Jordanian physicians in residency programs had poor knowledge and poor practice of reporting notifiable diseases. There should be regular awareness, information, education, and communication programs concerning NPHSS and its importance to the public and for health care facility workers on a regular basis. This will help them appreciate the importance of the system and thus improve their general attitude toward it. Moreover, undergraduate and postgraduate health professionals programs should be restructured to include surveillance education and training. Knowledge and incentive, eliminating barriers to disease reporting, and promoting some assisting factors could help reduce the underreporting of notifiable diseases. Further comprehensive studies that include all health care providers in all health sectors of Jordan are recommended. Such studies might be valuable to provide baseline data for future evaluation of the new reporting system in Jordan.

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