

Perception of measures for dealing with Ebola disease in primary care

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Background: An epidemic of Ebola virus disease (EVD) occurred in West Africa in 2014. In Catalonia, primary care is the first level of healthcare so it has a key role in the detection and initial management of possible cases of EVD and in identifying contacts. **Aim:** This study aimed to find out how the staff of primary care centers perceived the measures for dealing with EVD. **Method:** An online questionnaire was distributed to all primary care workers in Catalonia during the period February–March 2015. **Findings:** The estimated response rate was 10.1%. They reported having received training/information, that a specific circuit had been organized and that the necessary equipment was available. They considered it unlikely that a patient with suspected EVD would present at the center and were aware of the action to take but were worried about this possibility. Rigorous scientific training in international health is essential to take on new global health challenges.

Key words: Ebola virus; infectious disease; primary care

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Introduction

Ebola virus disease (EVD) is a viral hemorrhagic fever caused by the Ebola virus (EV) that affects humans and other primates. It is a serious illness that can reach lethality rates of 50–90%. Human beings are infected by wild animals and the virus spreads by transmission from person to person, primarily by contact with blood, secretions, other body fluids, tissues or organs of persons who have developed symptoms of the disease or have died from it. The distribution area of EV coincides with the habitat of fruit bats of the family *Pteropodidae*, which could be the normal carrier of the virus in nature.

The incubation period is 2–21 days. Clinically it is characterized by sudden onset of fever, intense

weakness and muscular pain, headache and throat irritation, followed by vomiting, diarrhea, rashes, liver and kidney dysfunction, and in some cases internal and external bleeding. In the final stage patients develop multiple organ failure that can lead to death. There is currently no specific cure or preventive treatment for this disease, though much research is being done in the field. EV was first detected in 1976 in two simultaneous outbreaks in Nzara in Sudan and in Yambuku, a village in the Democratic Republic of the Congo close to the Ebola River, which gave its name to the virus [World Health Organization (WHO, 2014)].

The 2014 epidemic in West Africa probably began in Guinea Conakry in late 2013 and spread to neighboring areas of Liberia and Sierra Leone. Because there was a risk of the disease spreading to other countries because of its virulence, the pattern of transmission and the fragility of the health system in the countries concerned, on 8 August 2014 the WHO declared the outbreak a public health emergency of international concern. A coordinated international response

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was considered necessary because the magnitude and complexity of the outbreak were unprecedented (Republic of Liberia, 2007; Falleh *et al.*, 2015; WHO, 2015). Guinea Conakry, Liberia and Sierra Leone were the epicenter of the outbreak, but patients were diagnosed with the disease in seven other countries: Mali, Nigeria, Senegal, the United States, Spain, the United Kingdom and Italy.

The first case of EVD outside the African continent was caused by secondary transmission from an imported case in Spain (Rodríguez-Caravaca *et al.*, 2015) and gave rise to great social alarm and media coverage (Revuelta *et al.*, 2015). The risk of importation and transmission of EV in the European Union is now considered minimal. The disease may be imported either by humanitarian workers or by travelers returning from affected areas. In both cases the risk is low because specific mechanisms of detection and control have been established. Protocols have also been established for reducing the risk of secondary transmission from an imported case (Ministry of Health, 2015).

Primary care (PC) is the first level of health care in Catalonia and in Spain and the ideal framework for promoting health and preventing and detecting disease. As PC is in direct contact with the community, it has a key role in detecting possible cases of EVD, initial management of the disease and identification of contacts (Arranz Izquierdo *et al.*, 2015). To meet this challenge, PC staff urgently needed to update their knowledge of relevant aspects of EVD and receive technical training to ensure protection of themselves, their colleagues and other patients. Furthermore, health education and awareness had to be fostered among the general public (Eiros Bouza and Pérez-Rubio, 2015). To this end, the health authorities and scientific societies drew up specific guidelines and protocols for PC (Health Department, 2014; SEMFyC, 2014) and many classroom and distance learning activities were organized to improve the training of all staff (SEMERGEN, 2014; SEMG, 2014). Cascade training was used PC centers: a few professionals of each team were trained and taught to train their teammates.

In view of the urgency of the situation, the great media coverage and the alarm created by the recent outbreak of EVD, we designed a study to determine how health professionals perceived measures aimed at addressing EVD in PC.

Materials and methods

Cross-sectional study

Questionnaire

Using Google Forms we designed an online questionnaire containing 22 questions, including single and multiple-response questions. The questionnaire is shown in Table 1. It was open from 1 February to 31 March 2015.

Participants

During the months of February and March 2015 the questionnaire entitled 'Primary Care and Ebola Disease' was distributed to all PC staff in Catalonia (Spain). It was sent by email using a 'roots' method, that is it was sent to the Catalan Society of Family and Community Medicine and the Catalan Association of Family and Community Nursing, who forwarded it to all their members. Each researcher also sent it to all their contacts and everyone was asked to collaborate by forwarding it to friends and acquaintances who met the criteria of being PC workers in Catalonia. It was also sent to the health authorities for distribution.

Whereas it could not guarantee the distribution of the questionnaire to 100% of the population who was aimed, the objective agreed was to achieve a response rate of 10%.

Statistical analysis

The answers were stored directly in the Google Forms response sheet. Statistical analysis was performed using SPSS 18.0. A χ^2 test was used for the hypothesis of independence between two categorical variables, followed by a Fisher test when the conditions were not met. A two-tailed confidence interval of 95% was used to test all the hypotheses.

Results

According to the 2013 figures (Health System Observatory of Catalonia, 2014), the 369 PC teams scattered throughout the country had a total workforce of 15408. Of the total of 1563 respondents, 1223 (78.2%) were women and 340 (21.8%) were men; 68% were in the 36–55-year age range.

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Table 1 The questionnaire primary care and ebola disease

Drawn up by the Commission for International Cooperation and Health (COCOOPS) of the Catalan Society for Family and Community Medicine (CAMFiC)

The aim is to collect information on how staff of primary care centers perceive the measures for dealing with Ebola hemorrhagic fever

We wish to reach all primary care staff in Catalonia in order to achieve a high response rate and thus obtain the most representative results possible

We hope the results will allow us to draw conclusions that will lead to improvements

It should take you about 10 min to respond to this questionnaire

We appreciate your participation and encourage you to pass the link on to your contacts

Thank you!

1. Sex

- Male
- Female

2. Age

- Under 25
- 25–35
- 36–45
- 46–55
- 56–65
- Over 65

3. Profession

- Family doctor
- Primary care nurse
- Primary care pediatrician
- Primary care pediatric nurse
- Administrative staff
- Resident family doctor
- Resident primary care nurse
- Other

4. What health region do you work in?

- Alt Pirineu i Aran
- Lleida
- Camp de Tarragona
- Terres de l'Ebre
- Catalunya Central
- Barcelona
- Girona

5. What type of center do you work in?

- Institut Català de la Salut
- Subsidized
- Entitat de Base Associativa (cooperative health center)
- Other

6. At the center where you work, have you received any of the following types of training on Ebola disease (you can check more than one option)?

- Classroom training at the center
- Classroom training outside the center
- Distance training (PowerPoint, videos, etc.)

Table 1 (Continued)

- Trainer training
- Training emails with protocols, circuits, etc.
- Training has been scheduled but not given yet
- Other
- I have received no training

7. At the center where you work, have you received any of the following types of information on Ebola disease (you can check more than one option)?

- Emails with information on the state of the disease
- Posters on the disease
- Information on the disease through other information systems such as SMS, WhatsApp, written information, notes in the health IT system, etc.
- I have received no information on the disease
- Other

8. What other sources of information/training have you consulted on your own initiative (you can check more than one option)?

- Accredited international websites (CDC, WHO, etc.)
- Accredited national websites (CAMFiC, Barcelona Medical Association, Catalan Ministry of Health, AIFiC, SEMFyC, Spanish Ministry of Health, etc.)
- Social networks (Twitter, Facebook, YouTube, etc.)
- Other websites
- Exhibitions, talks and radio or television debates
- I have not consulted any other sources
- Other

9. In general, how much information/training on Ebola disease have you have received?

- A lot
- Quite a lot
- Enough
- Not enough
- None

10. In general, how would you rate the quality of information/training on Ebola disease that you have received?

- Excellent (broad, clear and useful)
- Good (sufficient, clear and useful)
- Poor (confusing, contradictory or unhelpful)
- Very poor (very confusing or very contradictory or not suited to the center)
- I have not received any

11. Has a specific circuit been organized and have the room and the material to be used in a suspected case of Ebola disease been clearly identified at the center where you work?

- Yes
- No
- Don't know

12. Have information posters about Ebola disease been put up in the center where you work?

- Yes
- No
- Don't know

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Table 1 (Continued)

-
13. Do you have basic protective equipment (surgical cap, surgical mask, short nitrile gloves and waterproof gown) at the center where you work?
 - Yes
 - No
 - Don't know
 14. Do you have personal protective equipment (surgical caps, goggles, FFP2 grade mask, short nitrile gloves, long latex gloves, coveralls and overboots) at the center where you work?
 - Yes
 - No
 - Don't know
 15. Has specific training on putting on and removing individual protective equipment been given at the center where you work? Did you attend?
 - Yes and I attended
 - Yes but I did not attend
 - No training has been given
 - Don't know
 16. In your opinion, how likely is it that a patient suspected of Ebola disease will present at your center?
 - Very likely
 - Fairly likely
 - Fairly unlikely
 - Unlikely
 - Highly unlikely
 17. How confident are you about the action you must take if a patient suspected of Ebola disease presents at your center?
 - Very confident
 - Confident
 - Not very confident
 - Not at all confident
 18. How worried are you about the possibility of dealing with a suspected case of Ebola disease?
 - Extremely worried
 - Very worried
 - Fairly worried
 - A little worried
 - Not worried
 19. What is the incubation period of Ebola disease?
 - 7–21 days with an average of 12 days
 - 1–21 days with an average of 18 days
 - 2–21 days with an average of 8 days
 - 10–21 days with an average of 14 days
 - Don't know
 20. Which of these statements about the mechanisms of transmission of the disease is true?
 - It is transmitted by direct contact with fluids and/or secretions or indirect contact with objects contaminated with body fluids of asymptomatic patients and by sexual transmission
 - It is transmitted by direct contact with fluids and/or secretions or indirect contact with objects

Table 1 (Continued)

-
- contaminated with body fluids of symptomatic patients and by sexual transmission
 - Transmission from an asymptomatic person to a healthy person is considered the main mechanism of transmission
 - Transmissibility decreases as the disease evolves
 - Don't know
21. What are the clinical manifestations of Ebola disease?
 - It begins abruptly with fever, muscular pain, weakness, headache and throat irritation
 - It evolves with vomiting, diarrhea, skin rash, kidney and liver failure, and possible massive internal and external bleeding
 - In the final stage, patients develop multiple organ failure
 - All of the above
 - Don't know
 22. Mark the answer you think is correct
 - Ebola disease is highly contagious
 - The risk of infection by Ebola virus in Catalonia is considered very high
 - The fatality rate in Africa is 50–90%
 - There is a specific treatment

Observations: If you wish, here you can write anything not dealt with in the above questions that you think might be interesting for the study

Thank you!

Your response has been processed correctly

We appreciate the time you have spent

We are committed to publishing the general results

Assuming an ideal setting in which the survey reached 100% of PC staff in Catalonia, which cannot be guaranteed, the response rate was 10.1%. Table 2 shows the distribution of responses according to profession. Table 3 shows the distribution of the respondents according to health region and type of center. Table 4 shows the training and information on EVD provided by the centers and the training and information obtained by the respondents on their own initiative. Physicians responded that they had received less information ($P = 0.008$) and had obtained more training and information on their own initiative ($P = 0.007$) than the other professionals. Administrative staff had obtained less training information on their own initiative ($P < 0.0001$) than the other.

Regarding the information and training received, 80.1% of respondents considered that they had received enough, quite a lot or a lot

Table 2 Response rate according to profession

	No. of primary care workers to whom the survey was addressed ^a	Workers who responded to the survey	% response
Total	15408	1563	10.1
Family doctors	4391 (28.5%)	775 (49.6%)	17.6
Nurses	5100 (33.1%)	433 (27.7%)	8.5
Administrative staff	3190 (20.7%)	203 (13%)	6.4
Pediatricians	1032 (6.7%)	39 (2.5%)	3.8
Social workers	247 (1.6%)	6 (0.4%)	2.4
Others	1448 (9.4%)	53 (3.4%)	3.7

^a According to the 2013 figures of the Health System Observatory of Catalonia (2014).

Table 3 Distribution of respondents by health region and type of center

	n (%)
Health region	
Barcelona	868 (55.5)
Girona	231 (14.8)
Central Catalonia	182 (11.6)
Tarragona	127 (8.1)
Lleida	112 (7.2)
Alt Pirineu and Aran	23 (1.5)
Terres de l'Ebre	20 (1.3)
Type of center	
Institut Català de la Salut	1122 (71.8)
Subsidized	298 (19.1)
EBA	78 (5)
Others	65 (4.2)

EBA = Entitats de Base Associativa (cooperative health centers)

and 75.6% considered that its quality was good or excellent.

Organization of the PC center: Of the respondents, 91.6% stated that a specific circuit had been organized at the center and that the room and the material to be used for a suspected case of EVD had been clearly identified; 46.2% that posters on the disease had been hung up in the center; 91.2% that basic protection kits (surgical caps, surgical masks, short nitrile gloves and waterproof gowns) had been prepared (5% did not know); 79.8% that individual protective equipment (surgical caps, goggles, FFP2 grade mask, short nitrile gloves, long latex gloves, coveralls and overboots) had been prepared (10.5% did not know); 77.4% that specific training in putting on and removing personal protective equipment had been carried

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Table 4 Training and information provided by the center

	n (%) ^a
Training given by the center	
Classroom training at the center	1286 (83)
Classroom training outside the center	298 (19.2)
Distance training (PowerPoint, videos, etc.)	420 (27.1)
Trainer training	206 (13.3)
Training emails with protocols, circuits, etc.	877 (56.6)
Training has been scheduled but not given yet	29 (1.9)
I have received no training	36 (2.3)
Information given by the center	
Emails with information on the state of Ebola disease	1340 (87)
Posters on Ebola disease	331 (21.5)
Other information systems such as SMS, WhatsApp, written information, notes in the health IT system, etc.	644 (41)
I have received no information	43 (3)
Sources of information/training consulted on own initiative	
Accredited international websites (CDC, WHO, etc.)	624 (40.4)
Accredited national websites (CAMFiC, Barcelona Medical Association, Catalan Ministry of Health, AIFiC, SEMFyC, Spanish Ministry of Health, etc.)	974 (63.1)
Social networks (Twitter, Facebook, YouTube, etc.)	197 (12.8)
Other websites	190 (12.3)
Exhibitions, talks and radio or television debates	188 (12.2)
I have not consulted any other sources	236 (15.3)
Others	62 (4)

^a The respondents were able to choose multiple responses.

out; and 63% that they had attended such training (3.9% did not know).

Table 5 shows the respondents' subjective perception of the likelihood of a patient suspected of

Table 5 Subjective perception

In your opinion, how likely is it that a patient suspected of Ebola disease will present at your center?	<ul style="list-style-type: none"> • Very likely 7 (0.5%) • Fairly likely 76 (4.9%) • Fairly unlikely 793 (51%) • Unlikely 327 (21%) • Highly unlikely 351 (22.6%)
How confident are you of the action you must take if a patient suspected of Ebola disease presents at your center?	<ul style="list-style-type: none"> • Very confident 343 (22.1%) • Confident 947 (61.1%) • Not very confident 226 (14.6%) • Not at all confident 33 (2.1%)
How worried are you about the possibility of dealing with a suspected case of Ebola disease?	<ul style="list-style-type: none"> • Extremely worried 97 (6.2%) • Very worried 160 (10.3%) • Fairly worried 339 (21.8%) • A little worried 605 (38.9%) • Not worried 356 (22.9%)

EVD presenting at the PC center, their confidence about dealing with it and the extent to which they were worried about it. Women worried more about the possibility of having to deal with a suspected case of EVD than men ($P = 0.0001$).

Clinical knowledge: Of the respondents, 442 (28.6%) responded correctly on the incubation period, 1287 (82.9%) on the mechanisms of transmission of the disease and 1400 (89.9%) on the clinical manifestations. In response to Question 22, a total of 772 (49.7%) chose the wrong answer that EVD is highly contagious and 761 (49%) chose the right answer that the fatality rate in Africa is 50–90%.

Table 6 shows the the distribution of the frequencies according to sex, age and type of staff and the Qui square analysis results (P -values).

Discussion

The EVD epidemic has raised awareness of the globalization of infectious diseases among the general public and health professionals (Trilla, 2014). This globalization is a challenge for health systems, which must improve and provide a coordinated response to possible future threats to public health (Dzau and Rodin, 2015), such as the current Zika virus epidemic (WHO, 2016).

PC teams have responsibilities in international health alerts: early detection, early management of possible cases and monitoring and management of potential infection. As in many other infectious diseases, good coordination between health authorities, specialized hospital units, family doctors and other health professions is a key factor.

A literature search found no similar studies to compare the results. In our study, half the respondents were physicians: the fact that the study was conceived by physicians may have increased the dissemination and interest among this group. Half the respondents worked in urban areas. They had received training (mainly in the classroom) and information (mainly by email) and had sought training and information on their own initiative (especially on accredited national websites) and their evaluation of both the quantity and quality of the training and information received was good. Technology now plays an important role in the transmission of information (Gidado *et al.*, 2015). However, the training was mostly in classrooms. Research is needed to compare the level of knowledge obtained through online training versus classroom training, taking into account the current trend of promoting self-directed learning skills (Monroe, 2016).

A study conducted in the North Metropolitan Area of Barcelona (Valerio *et al.*, 2015) assessed knowledge of viral hemorrhagic fever among PC doctors and nurses before a trainer training workshop on EVD. The results (117 responses from 138 participants) indicated a low knowledge (78.6%), and having attended specific training was significantly and independently associated with having suitable knowledge ($P < 0.001$); OR = 8.6 (CI 95%: 3.199–23.623).

In most centers a specific circuit had been organized and the room and the material to be used for patients with suspected EVD had been identified. Basic protective equipment and personal protective equipment had been prepared, and specific training in their use had been given to the staff.

In analyzing the responses on subjective perception, 77% were worried about the possibility of having to deal with a patient with suspected EVD at the center, although they considered it not very likely, unlikely or highly unlikely and were confident of the action to be taken. As stated by Blaya-Novakova V (Blaya-Nováková *et al.*, 2015) ‘we have to keep in mind that physicians are not

Table 6 Distribution of the frequencies according to sex, age and type of staff

	Training	Information	Training and information consulted on own initiative	Clinical knowledge			Subjective perception about		
				Incubation period	Mechanisms of transmission	Clinical manifestations	Likelihood of a patient suspected of EVD presenting at the PC center	Their confidence about dealing with it	The extent to which they were worried about it
Sex									
Female	1178 (97.1%)	1166 (97%)	1018 (84.3%)	338 (27.6%)	1002 (81.9%)	1094 (89.4%)	1157 (94.6%)	1004 (82%)	968 (79.1%)
Male	329 (97.9%)	328 (97.%)	291 (86.3%)	104 (30.5%)	285 (83.8%)	306 (90%)	322 (94.7%)	296 (87%)	233 (68.5%)
<i>p</i>	ns*	ns	ns	ns	ns	ns	ns	0.03	<0.001
Age in years									
<35 and >55	497 (97%)	480 (97.6%)	438 (87.6%)	137 (27.4%)	414 (82.8%)	447 (89.4%)	451 (89.3%)	412 (81.6%)	391 (77.4%)
35–55	1024 (97.4%)	1014 (96.7%)	890 (83.7%)	305 (28.7%)	873 (82.1%)	953 (89.6%)	1009 (95.3%)	892 (84.3%)	814 (76.9%)
<i>p</i>	ns	ns	0.048	ns	ns	ns	<0.0001	ns	ns
Physicians	855 (96.6%)	845 (96%)	767 (87.3%)	254 (28.7%)	780 (88%)	844 (95.2%)	846 (95.5%)	728 (82.8%)	675 (76.2%)
Not physicians	652 (97.4%)	649 (98.3%)	542 (81.3%)	178 (26.7%)	507 (74.8%)	556 (82.1%)	634 (93.6%)	572 (83.6%)	530 (78.2%)
<i>p</i>	ns	0.008	0.007	ns	<0.0001	0.007	ns	ns	ns
Nurse	438 (98%)	441 (98.8%)	380 (85%)	134 (29.7%)	362 (80.2%)	399 (88.4%)	401 (92.6%)	370 (82%)	359 (79.6%)
Not nurse	1069 (97%)	1053 (96.2%)	929 (84.7%)	308 (27.7%)	925 (83.1%)	1001 (90%)	1077 (95%)	930 (83.6%)	846 (76%)
<i>p</i>	ns	ns	ns	ns	ns	ns	ns	ns	ns
Administrative staff	209 (96.7%)	207 (97.6%)	159 (74.6%)	54 (24.5%)	145 (66%)	154 (70%)	210 (95.4%)	192 (87.2%)	168 (76.3%)
Not administrative	1298 (97.3%)	1287 (96.9%)	1150 (86.4%)	388 (28.9%)	1142 (85%)	1246 (92.7%)	1270 (94.5%)	1108(82.5%)	1037(77.2%)
<i>p</i>	ns	ns	<0.0001	ns	<0.0001	0.0002	ns	ns	ns

ns*, no statistically significant differences.

immune to experiencing fear in the face of EVD, that they may worry about the legal consequences of not detecting EVD in a patient or feel responsible for possibly exposing the rest of the health-care team, other patients and ultimately even their own family to a severe disease.' The mechanisms of infection and clinical manifestations were well known.

The main limitation was that we did not know the denominator for calculating the response rate. To minimize this limitation, we decided to work with the most optimistic hypothesis possible (the questionnaire reached 100% of the people to whom it was addressed). We also tried to minimize the non-response bias by mass emailing with the link to the questionnaire and a reminder half-way through the study period. A study of the perception of risk of EVD in the general German population (Rübsamen *et al.*, 2015) through online questionnaires obtained a response rate of 9%.

In conclusion, the perception of PC staff in Catalonia who responded to the survey on EVD was that they had received training and information and that the centers had organized the specific circuit and the necessary equipment. The respondents considered it unlikely that a patient with suspected EVD would present at the PC and were aware of the action to be taken in such cases but they were worried about this possibility.

Careful, rigorous scientific training in international health issues at both undergraduate and graduate level is now essential to take on the new challenges of global health.

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