



Performance of Evaluation Instrument for EWARS Activities in Tanah Bumbu District and Banjar District, Indonesia

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Abstract. WHO suggests all countries including Indonesia to increase early awareness and respond quickly to cases that potentially spread. Indonesia has developed a system called Early Warning Alerts and responses (EWARS) to detect any threat or an indication of an infectious disease outbreak and reported weekly on a computer-based website. The cross-sectional study aimed to develop an instrument to systematically assess data management and reporting system for implementing the EWARS. The EWARS evaluation instrument was adopted and modified from the “Data Quality Assessment for Neglected Tropical Diseases: Guidelines for Implementation”. The instrument was used to obtain primary and secondary data by interviewing EWARS officers at each level. The instrument contains several indicators, including reporting data management, timeliness and accuracy of reports, linked to national systems and readiness for new infectious diseases. The indicator assessed value using Likert scale and visualized onto spider graph chart. The instrument’s effectiveness can be seen from the ability of the instrument to assess programs that are running following applicable guidelines and SOPs. There was a management gap between Tanah Bumbu District and Banjar District. The results of the instrumented assessment in the epidemiological week show that the data management activities and EWARS reporting system from Banjar District appear to be more organized and systematic. The instrument with good performance was used by program managers who carried out according to the established EWARS guidelines (above the average of 0.6). The low performance of the instrument in several areas was caused by officers who did not implement the program according to the guidelines.

Keywords: EWARS · assessment · instrument evaluation · outbreaks

1 Introduction

The threat of disease outbreaks will persist unless a range of national and international actions are taken. The World Health Organization (WHO) mandates that member countries develop, strengthen, and maintain basic surveillance and response capabilities at

every administrative level to detect, report, and manage public health risks [1]. Consequently, Indonesia has collaborated with WHO and the United States Center for Disease Control and Prevention (US-CDC) to develop a system for early detection and response to potential disease outbreaks. This system is known as the Early Warning Alert and Response System (EWARS) [2].

At the end of 2015, the Indonesia Ministry of Health launched the EWARS website to facilitate data processing and reporting to detect disease early and respond as soon as possible. Updates on illness warnings and disease case reports, as well as the accuracy and completeness of disease data given weekly by the Public Health Center (*INA: Pusat Kesehatan Masyarakat; Puskesmas*), are available on the EWARS website [3].

EWARS reports 23 diseases. Each disease has its reporting algorithm and the appearance of alerts and must always be recorded and reported weekly. With various diseases being observed and reported weekly, it is expected that less probable for outbreaks to arise. The accuracy and completeness of the weekly report will be significant in detecting diseases that have the potential for an outbreak. The higher the accuracy of the report, the faster the early warning signal (alert) for outbreaks is detected, and the higher the level of completeness of the report, the inclusive the warning signal. In addition, aggregate data at the Puskesmas level was sent to the District or City Health Official and the Ministry of Health every Monday morning [4].

According to EWARS data from the Sub-Directorate for Surveillance and Response to Outbreaks, in 2015 eight diseases were reported at the Puskesmas level with most of the early-warning happening within the 41st to 42nd week. Those diseases were suspected measles with 186 cases, Rabies-Transmitting Animal Bites, (*INA: Gigitan Hewan Penular Rabies; GHPR*) with 218 cases, ILI (Influenza Like Illness) with 40 cases, acute diarrhea with 38 cases, suspected typhoid fever with 32 cases, pneumonia 19 cases, and HFMD (Hand Foot Mouth Disease) 15 cases.

The EWARS program can be adequately implemented when it is built by a well-designed system. This system is supported by input, process, and output components [5]. The ongoing evaluation of EWARS refers to how to verify the number of cases that arise and identify the responses that have been made. This evaluation assesses whether the reporting is appropriate and correct but does not assess how the management was in it before this report was submitted. An integrated instrument was needed to assess a program system's performance. Its development was based on the Standard Operating Procedure (SOP) and EWARS guidelines following the guidelines issued by the Surveillance Sub-Directorate of the Indonesia Ministry of Health. The systematic assessment was carried out on existing data management, and the reporting system to the assessed performance of the instrument and to understand whether this instrument can assess properly and accurately.

2 Materials and Methods

2.1 Ethical Consideration

This research has received ethical approval from the Ethical Committee of the National Institute of Health Research and Development (Approval number LB.02.01/2/KE.678/2020).

Study design. The cross-sectional study using primary data collection was done by interviewing EWARS officers and observing the performance at every administrative level in Tanah Bumbu and Banjar District, South Kalimantan Province. Secondary data was gained by evaluation and documentation of EWARS working documents such as EWARS training certificates, Weekly reports form (W2) completeness and accuracy at Puskesmas, and other required files. The assessment time range was limited to the 32nd to 36th epidemiological weeks of 2020 due to limited research time.

2.2 Data Collection

This study used a spreadsheet instrument which was a modification of the “Data Quality Assessment for Neglected Tropical Diseases: Guidelines for Implementation, Working Draft September 2013” method developed by WHO and ENVISION/RTI [6]. The tool was a spreadsheet program that uses the EWARS data quality evaluation approach for reporting. There are two elements to this evaluation activity: 1) Data management and reporting (management system) questionnaire for EWARS officials; and, 2) Recalculate the records at each level and compare to the number reported to the level above (data verification). The calculation of case data, response objectives, and replies to the assessed unit and reporting unit are all included in the data verification part. The completeness and punctuality of reporting are important factors to consider while verifying relevant data. The management system section has five sub-assessments: a. Management strengths and weaknesses; b. Reporting performance related to timeliness and completeness of reporting; c. Performance reporting and feedback; d. Linkages to national systems; and, e. Readiness of the program in dealing with new infectious diseases (emerging diseases) in this case COVID-19.

Data Analysis

Instrument performance was tested by calculating the effectiveness of the instrument performance using the Aikens’ V equation: [7].

_____ with

where V: instrument validity index; : lowest score; c: number of categories; : score from validator assessment; n: number of validators.

After obtaining the V value for each instrument question, the average score of the instrument was calculated using the equation:

R=_____

where R: average score; Vi: Sum of the score in order; N: the number of instrument questions in the calculation.

If the average score was lower or equal to 0.6 then the instrument was qualified as invalid, and if the average is more than 0.6 then the instrument can be qualified as valid.

Table 1. Characteristics of EWARS Officers

No	Informant Characteristic	Frequency (%)
1	Gender – Male – Female	43% 57%
2	Educational background – Bachelor of Nurse – Bachelor of Public Health – Diploma of Nurse – Diploma of Environmental Health – Diploma of Midwifery	5% 14% 33% 10% 38%
3	Experience in managing EWARS – Less than 1 year – More than 1 year	62% 38%
4	Workload – At most 2 job assignments – More than 2 job assignments	57% 43%

3 Results

3.1 Characteristic of Study Participants (EWARS Officials)

By gender, there were slightly more women managing EWARS compared to men. About one-third of the officers have a diploma degree in midwifery (38%); the rest were diploma degrees in nursing, environmental health, bachelor's degree in public health, and nursing. Most of the officers were managing EWARS for less than a year (62%). Almost half of the officers who participate as subjects in this study have been given responsibility for handling more than two programs, while the rest were in charge of at most two programs (Table 1).

3.2 EWARS Performance

The results showed the officer could not show the W2 recap from the Puskesmas report within the assessed period. Unexpectedly, four of the five assessed epidemiological weeks were not reported to the EWARS website. Reports received at the district level through the WhatsApp[®] group from the Puskesmas reached 80% but only 12% were on time with an unstandardized format. In contrast to Tanah Bumbu, Banjar District showed a very decent reporting performance where the availability, completeness, punctuality, response, and response targets reached 100%. This can be seen in the suitability of the online data on the EWARS website and backup data by EWARS officers at the district level (Fig. 1).



Fig. 1. The results of the instrument assessment on EWARS Reporting performance in Tanah Bumbu and Banjar Districts

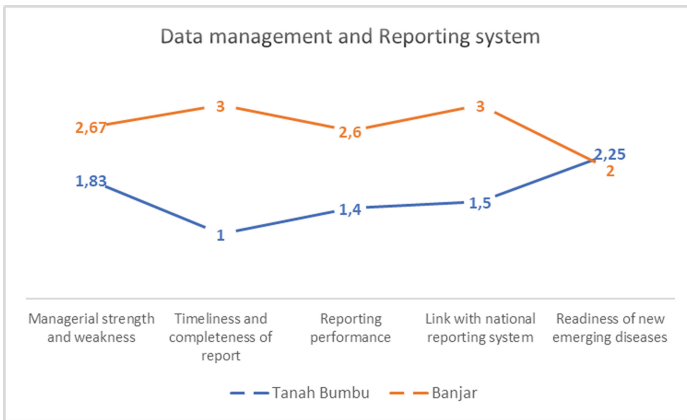


Fig. 2. The scoring results of the instrument assessment on Data Management and reporting system in Tanah Bumbu and Banjar Districts

3.3 Effectiveness of the Instrument

There was a management gap between Tanah Bumbu District and Banjar District, where the results of the instrument assessment in the epidemiological week show that the data management activities and EWARS reporting system from Banjar District appear to be more organized and systematic. The reporting in Banjar District has been carried out entirely through the EWARS website, while feedback was carried out by designing weekly bulletins which were then reviewed by the Head of Program Section and distributed to all Puskesmas and related programs at the Health Official for further follow up. The reporting management process was done by giving regular instruction to Puskesmas officers to report entirely on schedule. Tanah Bumbu District does not implement some of those variables properly. However, both districts have limited program readiness to cope with new diseases (Fig. 2).

Table 2. Instrument validation test

No	Level	Validator 1 (Tanah Bumbu)	Validator 2 (Banjar)
1	Village	0,433	0,352
2	Puskesmas	0,500	0,710
3	Health Office	0,471	0,884

Based on the validity test, it was shown that the instrument was ineffective in Tanah Bumbu District on every level, and valid in Banjar District on Puskesmas and Health Official level. At the village level, the instrument was invalid in both districts (Table 2).

4 Discussion

This instrument was developed based on the EWARS implementation guidelines from Indonesia Ministry of Health surveillance sub-directorate [3]. Each progression of making and developing this instrument involves all research members. EWARS officers from the Health Official, Puskesmas, and Poskesdes were providers of data and information for instrument development. This instrument was developed referring to the evaluation objectives: organizational strength and weakness; reporting and feedback, reporting quality related to accuracy; completeness and punctuality; as well as program readiness in dealing with new infectious disease cases, which in this case was COVID-19.

The limitation of this study was that it cannot fully assess whether the officers have completed their duties properly because the focus of the study is only based on output documents and brief interviews about the officers' work experience. This causes the effectiveness of the instrument to depend on the compliance of officers with predetermined work procedures.

We need to emphasize that the ability of an instrument to access a system accurately depends on the staff's educational background and experience in dealing with EWARS. The more experienced and trained an officer is, the better the instrument assessment results will be. Our result showed that most of the officers still have a different educational background from the requirements and neither receive adequate training, less than a year of experience in managing EWARS. Most of them have assigned overload work. A similar result was found from the study in West Papua where limited human resources, lack of epidemiological training, and technical limitations were the main obstructing factors for this program to take place [8]. There is no doubt that in several studies in other countries, it was shown that the EWARS program executed by trained personnel and untrained personnel has a significant difference in the implementation of the process [8–10].

The development of this instrument was based on the EWARS guidelines that have been socialized and implemented in all districts in Indonesia. The assessment results showed the difference between the two districts where Banjar District implements the EWARS program according to the applicable guidelines and Tanah Bumbu District

which does not implement EWARS according to the applicable guidelines. The officers felt that they have done the job following the duties taught by the previous officer and admitted that there has been a delay in reporting because of the double duty he is carrying. The performance of reporting, case recording, data verification, and the EWARS management system of the Banjar District was superior compared to Tanah Bumbu District. When this instrument was used in Tanah Bumbu District, many answer categories were found to be “NO” or “NOT APPLICABLE”. One concerning fact from this study was that Tanah Bumbu District does not show any linkage to the national system and its reporting performance was low. District health officers only collect report data from each puskesmas and submit reports manually to the provincial Health Office, but in the epidemiological week assessed, the officers did not send any reports at all. A consequence of the uneven distribution of answers on the instrument results in low instrument validity. A different result was shown by the performance of the instruments when assessed in Banjar District. This district implements most of the program actions following applicable guidelines and has decent reporting performance, thus indicating a higher instrument validity except at the village level.

However, the village level in both districts was under-performed and needs special consideration, especially in data recalculation and unstandardized reporting formats. Thus, this instrument has complied with the guidelines and can effectively measure its assigned variables [7, 11–13]. Further implementable study of this instrument is important in different districts and provinces since this study was instrument development stage and the result will generate broader validity and reliability of the instrument [14, 15].

5 Conclusion

In conclusion, the instrument was effective for program managers who implement the program according to the established EWARS guidelines but less effective if used in areas that do not implement EWARS according to the guidelines. However, the way that EWARS was implemented differed between sites and regions, and this merits more investigation.

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