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RESEARCH ARTICLE

Midwives Knowledge, Infrastructure Facilities, and Supervision-Monitoring of Immunization Management in West Bandung Regency

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Abstract

The midwife mostly carries out immunization activities in the health care unit. The midwife is an injection officer and responsible for planning, transportation, storage, and vaccine usage. This study aims to determine the effect of knowledge midwives on vaccine management, infrastructure availability, and immunization management supervision by midwives in the West Bandung regency. A total of 38 self-employed midwives who met the inclusion criteria were taken from the West Bandung regency from July 2017 to February 2018. This research was an observational analytical research with a cross-sectional design. Analysis of bivariate data using correlation regression. The multivariate correlation using multiple linear regression. The result showed that midwife knowledge about vaccine management influenced 33.3% (p=0.0001), infrastructure 54.2% (p=0.010), and the supervision 34.65% (p=0.010) to managing immunization. The linear regression test between the variables shows that the determinant factor in managing is the facilities' immunization availability (beta coefficient=0.615). In conclusion, midwife knowledge, infrastructure facilities, and supervision on immunization management in West Bandung regency affected the immunization processes.

Keywords: Immunization, infrastructure facilities, knowledge, supervision-monitoring

Pengetahuan Bidan, Sarana Prasarana, dan Supervisi-Pemantauan Manajemen Imunisasi di Kabupaten Bandung Barat

Abstrak

Kegiatan imunisasi sebagian besar dilakukan oleh bidan di unit pelayanan kesehatan. Bidan sebagai petugas injeksi bertanggung jawab atas perencanaan, pengangkutan, penyimpanan, dan penggunaan vaksin. Penelitian ini bertujuan mengetahui pengaruh pengetahuan bidan terhadap manajemen vaksin, ketersediaan sarana prasarana, dan supervisi manajemen imunisasi oleh bidan di Kabupaten Bandung Barat. Sebanyak 38 bidan wiraswasta yang memenuhi kriteria inklusi diambil dari Kabupaten Bandung Barat periode Juli 2017 hingga Februari 2018. Penelitian ini merupakan penelitian analitik observasional dengan desain *cross-sectional*. Analisis data bivariat menggunakan *correlation regression*. Korelasi multivariat menggunakan *multiple linear regression*. Hasil penelitian menunjukkan pengetahuan bidan tentang pengelolaan vaksin berpengaruh sebesar 33,3% (p=0,0001), sarana prasarana 54,2% (p=0,010), dan supervisi 34,65% (p=0,010) terhadap pengelolaan imunisasi. Uji *linear regression* antarvariabel menunjukkan bahwa faktor determinan dalam pengelolaan adalah ketersediaan sarana prasarana imunisasi (koefisien beta=0,615). Simpulan, pengetahuan bidan, fasilitas infrastruktur, dan supervisi tentang manajemen imunisasi di Kabupaten Bandung Barat berpengaruh terhadap proses imunisasi.

Kata kunci: Imunisasi, pengetahuan, sarana prasarana, supervisi-pemantauan

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Introduction

Immunization is preventive health care that becomes one of the Ministry of Health's priority activities to achieve Sustainable Development Goals (SDGs). The main objective of immunization is to reduce morbidity and mortality from preventable diseases by immunization.[1,2] The main problem with immunization is the storage of vaccines (temperature issues). If the temperature in storage does not conform to the recommended temperature, then the vaccine's potential decreases and even broken.[3,4]

According to the Ministry of Health New Zealand, there are two essential elements of immunization management, such as the regulating officers in storage and distribution on who work on health services. Both of the equipment used for storage, transportation, and monitoring of vaccines up to the patient.[5]

The providers should have good knowledge and understanding of vaccine management. Midwives must understand clearly about the transportation and storage of the vaccine until the vaccine is given.[6,7] The results of the study from Global Alliance for Vaccine Immunization (GAVI) and the Ministry of Health and the University of Padjajaran in 2011 in West Java was related to the availability of vaccine storage facilities of thermostats of 87.9%, while those with no monitoring sheets the temperature was 85.9%. Based on the data, it can be concluded that a community health center cannot control and supervise the temperature of the existing vaccine.[8]

The midwife mostly carries out the management of immunization in the health service. It explains that midwives are not only vaccine injectors but also managers of immunization programs, ranging from availability planning, storage transport to vaccine injections.[9,10] The findings in West Bandung regency that immunization management has not been appropriate even though coverage has been met. Moreover, there are still cases of diseases that can be prevented by immunization. It indicates that there are still many applications in the management of vaccines that are not appropriate, such as assuming that if the vaccines are stored in the refrigerator, they are safe. All vaccines will be damaged if they are exposed to heat or direct sunlight. Some vaccines are also not resistant to freezing. Even it can be permanently damaged in a shorter time compared to vaccines that are exposed to heat.[11,12,13]

This study was conducted to determine the effect of midwives' knowledge about vaccine management, availability of infrastructure facilities, and supervision-monitoring of immunization management in West Bandung regency.

Methods

This research is observational analytical research with a cross-sectional design. A total of 38 self-employed midwives who met the inclusion criteria were taken from the West Bandung regency area from July 2017 to February 2018. They are midwives who provide immunization services in their practice using vaccines taken from the community health care.

The sampling was conducted using a multistage sampling technique. The first step is determining the primary sampling unit (sub-districts), then the secondary sampling units, and the tertiary sampling units (independent midwifery practices in the community health center's work area that has been selected randomly).

Questionnaires and observations were used to collect the data. A questionnaire given to midwives contains questions about the midwife's knowledge about vaccine management tested for validity and reliability previously. This questionnaire also contains questions regarding the supervision and monitoring of the community health centers involved in immunization services. The process of collecting infrastructure data is conducted by observation using a checklist sheet. Likewise, immunization management is obtained from a checklist based on the Minister of Health Regulation Number 12 of 2017 concerning the Implementation of Immunizations. The observation is carried out three times in each midwife, starting from planning, transportation, storage, and use of vaccines.

Bivariate analysis in this research aims at determining the effect of midwife knowledge, availability of infrastructure, and supervision on the immunization management by midwives using regression correlation. If p value$<\alpha$ (0.05), the hypothesis is accepted, whereas the value is obtained from the coefficient of determination (R^2). Multivariate analysis to determine the most dominant factor in the management of immunization using multiple linear regression analysis can be seen from the most significant beta coefficient.

This research received ethical clearance from the Health Research Ethics Committee of Post Graduate Program of Midwifery Applied STIKes Dharma Husada Bandung Number 015/STIKes-DHB/SKet/PSKBS2/X/2017.

Results

Nearly half of the respondents were ≤30 years old. The majority of midwife education in this study is DIII Midwifery and most have never received any training.

Based on Table 3, most self-employed midwives already have facilities for injecting vaccines such as vaccines, syringes, body temperature thermometers, safety boxes, baby scales, baby length gauges, and Maternal and Child Health (MCH) handbook. It is just for cold chain infrastructure such as vaccine carrier, cold pack, cool pack, and thermometer more than half are not available in independent practice midwife (*bidan praktik mandiri*, BPM). As well as a temperature-monitoring card of 38 BPM only four self-employed midwives provide. Also, based on the univariate analysis of supervision-monitoring variables in independent midwives in West Bandung regency obtained 33 out of 38 self-employment, midwives stated that there were no supervisors related parties in their practice regarding immunization.

Based on the data processing results in Table 4 obtained the management of immunization in West Bandung regency in planning, transportation, and vaccine usages, more than half of the midwives already implement it according to the procedure. Only half the respondents did not perform according to the procedure, especially maintaining the vaccine cold chain.

Based on Table 5, there is a strong and positive relationship between midwives' knowledge and immunization management. Midwife knowledge influences immunization management by 33.3%, and other variables influence 66.7% immunization management. Likewise, the variable availability of immunization management infrastructure appears to have a strong positive relationship (r=0.736).

Determination coefficient value 0.542, meaning that the availability of infrastructure means to influence the management of immunization equal to 54.2% and the rest 45.8% immunization management influenced by other

Table 1 Characteristics of Midwives in West Bandung Regency

Parameter	n=38
Age (year)	
≤30	16
31–40	11
41–50	9
>50	2
Educational background	
DIII midwifery	36
DIV midwifery	2
Cold chain training	
Join	10
Never	28

Table 2 Analysis Descriptive of Knowledge Midwife about Vaccine Management Variable

Knowledge Midwife	Frequency (n=38)	Mean	Min Value	Max Value
Poor	19	10.11	4	19
Good	19			

Table 3 Analysis Descriptive of Infrastructure Facilities Variable

Availability of Facilities	Frequency (n)	
	Yes	No
Special refrigerator	17	21
Vaccine carrier (thermos/ cold box)	18	20
Cold pack	14	24
Cool pack	17	21
Thermometeric vaccine temperature	26	12
Temperature-monitoring card	34	4
Freeze watch or freezer tag	23	15
Vaccine	2	36
Solvent	2	36
Syringe 1 mL	1	37
Syringe 3 mL	1	37
Safety box	2	36
Thermometer	3	35
Stethoscope	2	36
Baby scales	3	35
Baby length gauge	2	36
MHC handbook	1	37

Table 4 Immunization Management

Parameter	Frequency (n=38)
Planning	
Corresponding	26
Not corresponding	12
Transportation	
Corresponding	22
Not corresponding	16
Storage	
Corresponding	19
Not corresponding	19
Vaccine used	
Corresponding	15
Not corresponding	23

variables. Supervision-monitoring has a value of determination coefficient of 0.120, meaning that supervision affects immunization management of 12.0. The linear regression test between the variables shows the result determinant factor in the management of immunization availability of facilities (beta coefficient=0.615).

Discussion

Midwives mostly carry out immunization management in health service units. From the results of research, most midwives have insufficient knowledge. Most midwives do not know the refrigerator's vaccine arrangement, the refrigerator temperature monitoring, the handling of the vaccine under special conditions, and the refrigerator maintenance. A research was conducted by Mboe et al.,[14] which states 55% of midwives in the Bandung city region had poor knowledge.

This study's results are in line with the research results conducted by de Timóteo Mavimbe and Bjune[15] in Mozambique against 44 vaccine management officers indicating that most officers have insufficient knowledge about vaccine storage. Another research study conducted in Vancouver[16] found good knowledge and followed up with acceptable vaccine management practices will decrease the number of damaged vaccines. In the study of 170 respondents, only 23% of officers with good knowledge and 49% of service units found damaged vaccines. Training programs can influence work behavior in two ways, and the most obvious is to directly improve the skills required by the officer to complete his or her job.[17,18]

The research conducted by Mallik et al.[19] revealed that based on 20 vaccine management officers in government and private health facilities, most of them had less knowledge about vaccine storage.

Knowledge is a fundamental domain in the formation of an action. From experience and research, the behavior based on knowledge will be better than the one with no knowledge because it is based on awareness, interest, consideration, and a positive attitude. On the other hand, the increased the amount of information or knowledge about a particular object of action, the greater the chance for the formation of behavior concerning the object.[14,20] Therefore, midwives need to improve their knowledge because they mostly carry out immunization management in the health service unit. In other words, in addition to injecting vaccines, midwives also have to manage immunization programs, starting from planning availability, transportation, and storage of vaccines.[7,10,21]

The test results obtained the influence between the availability of infrastructure and immunization management. Another study conducted by researchers by Kristini et al.[17] in Semarang city showed that the refrigerator's function is a factor influencing the way the midwife keeps the vaccine that undoubtedly affects the quality of vaccine management. The Ministry of Health Republic of Indonesia and WHO vaccine management guidance stated that the vaccine should always be at a temperature of 2–8°C without exception. It means that they have

Table 5 Analysis Bivariate and Multivariate Midwife Knowledge, Availability of Facilities, and Supervision-Monitoring with Immunization Management

Variables	r	R^2	p Value	Beta
Midwife knowledge	0.577	0.333	0.0001	0.242
Availability of facilities	0.736	0.542	0.0001	0.615
Supervision-monitoring	0.346	0.120	0.0100	0.214

to keep the vaccine temperature at a required temperature. It is necessary to support storage facilities, transportation, and vaccine. The guidelines describe what equipment is needed to store vaccines at optimum temperatures. Thus, good infrastructure will support improving the quality of immunization management.[2,10,22]

The cold chain needs to be maintained to achieve the effectiveness of vaccines. Therefore, it requires supporting infrastructure to keep the potency of vaccines. Only 12 out of 38 midwives have thermometers, which is considered the primary indicator of vaccines' cold chain. A depiction of the vaccines remains at the recommended temperature, both when delivering, storing, and injecting vaccines. All vaccines will be damaged if they are exposed to heat or direct sunlight. Some vaccines are also not resistant to freezing. Even it can be permanently damaged in a shorter time compared to vaccines that are exposed to heat.[11,12,23]

Maintenance and monitoring of vaccine temperature are essential in quickly determining whether vaccines are still suitable for use or not. The research on 379 clinics serving immunizations in Karachi, Pakistan, in 2014 states that only 38.5% of clinics routinely monitored the vaccine temperature twice a day.[22]

The problem of infrastructure is a classic problem in almost all fields because it is directly related to funding. The facilities and infrastructure in the management of immunization are a supporting factor for maintaining a cold chain in immunization management that is not negotiable. The vaccine has a fixed temperature that can not be reduced or so that the availability of facilities and facilities existence is necessary to manage immunization.[17,24,25]

Supervision-monitoring has a positive effect on immunization management. This study's results are in line with research conducted by Kristini et al.[17] that supervision with adequate frequency and quality can improve immunization services. Also, Robbins and Judge's[26] research state a correlation between the quality of supervision and performance improvement. A systematic form of supervision will be able to improve the service significantly.[5]

The contents of supervision include coverage, immunization targets by time, region, immunization preventable disease data by time and place, personnel, immunization equipment, vaccines, cold chain, recording, reporting, cross-program/sectoral cooperation results, and the problems found.[2,10] Similarly, Mboe et al.[14] suggest that the parties did not supervise many midwives. Some midwives who have never received supervision gain knowledge of vaccine storage from other midwives so that the truth of the substance of the knowledge can not be guaranteed and impact the management of immunization and public health.

To achieve the immunization program's ultimate goal is to reduce the mortality and mortality of immunization preventable diseases (*penyakit yang dapat dicegah dengan imunisasi*, PD3I) to see the high coverage and be accompanied by improvement of program quality by guidance and supervision. It is done among others West Bandung regency officials to supervise to the sub-district level, while the sub-district officers held guidance to the village/field by discussing it with puskesmas.[6,9]

Simultaneously, the knowledge variables, the availability of infrastructure facilities, and the supervision have a significant effect on immunization management. The influence given by the three independent variables is positive, means that the higher knowledge of midwife, supervision, and infrastructure means that the higher the management of immunization.

The most dominant variable is the availability of infrastructure.

In the implementation of the immunization program, facilities and infrastructure are very important. If there is no means, then immunization activities can not be implemented. Facilities include the availability of equipment, equipment, and space needed to support the immunization program's implementation. Suggestions and infrastructure required to consist of vaccines, vaccine storage equipment, vaccine use equipment, space comprised of space for immunization, counseling, counseling, vaccines, and medication activities. Facilities and infrastructure is one of the supporting activities and affecting individual performance.[10,12]

In conducting immunization services, activities can be implemented inside buildings, outside buildings, and private institutions. Vaccine storage at each administration level is different. At the central level, a vaccine storage facility is a cold room. This whole room is insulated to prevent heat from entering the room. The facility is equipped with a backup generator to cope with power outages. At the provincial level, the vaccine is stored in a cold room with a temperature of −20°C to −25°C, whereas at

the district level, vaccine storage facilities use refrigerators and freezers.[2,24,27]

In addition to infrastructure, compliance in the management of immunization is the supervision-monitoring, which is a series of activities undertaken.[14,20]

Conclusions

There is the influence of midwives' knowledge, infrastructure availability, and supervision on immunization management in the West Bandung regency. The infrastructure is determinant factor in the management of immunization.

Conflict of Interest

All researchers do not have a conflict of interest with the subjects of this study.

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