ORIGINAL RESEARCH:

Emergency maternal referral worksheet as a clinical decision-making tool

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ABSTRACT

Objective: This study aimed at discovering some different delivery outcomes from maternal emergency referral cases in referral health facilities (RHF) for those who used did not use Emergency Maternal Referral Worksheet (EMRW) at public health facilities (PHF).
Materials and Methods: This study was a quantitative research with observational case control. It used in-depth interviews to several health centers in Tuban by using Mann Whitney statistic test.
Results: The results of statistical test Mann Whitney, 161 referral cases were found to have p value of 0.036. It indicated significant differences in delivery outcomes. The differences were found in groups of mothers in mortality, high morbidity, and survived groups who used and did not use EMRW. Supporting and resisting factors from 22 respondents examined were socialization and technical support, leadership and supervision by the heads of PHF and Regional Health Ministry, as well as coordination and synergy among policy makers and related parties.
Conclusion: The use of EMRW affects the outcome of patients so that EMRW can be used as a clinical decision making tool in other maternal and non-maternal health services.

Keywords: Maternal mortality rate; EMRW; clinical decision making tools; referral decision support tools.

ABSTRAK

Tujuan: Penelitian ini bertujuan untuk menemukan hasil persalinan yang berbeda dari kasus rujukan kegawatdaruratan ibu di rumah sakit rujukan bagi mereka yang menggunakan dan tidak menggunakan Emergency Maternal Referral Worksheet (EMRW) di puskesmas.
Bahan dan Metode: penelitian ini adalah penelitian kuantitatif dengan kontrol kasus observasional. Penelitian ini menggunakan wawancara mendalam ke beberapa puskesmas di Tuban dengan menggunakan uji statistik Mann Whitney.
Hasil: Pada 161 kasus rujukan, uji statistik Mann Whitney menunjukkan nilai p=0,036, yang berarti ada perbedaan signifikan pada hasil persalinan dalam kelompok ibu mortalitas, morbiditas tinggi, dan kelompok ibu yang bertahan hidup yang menggunakan EMRW dan tidak menggunakan EMRW. Faktor pendukung dan menolak dari 22 responden yang diteliti meliputi sosialisasi dan dukungan teknis, kepemimpinan dan pengawasan oleh kepala puskesmas dan Dinas Kesehatan Daerah, serta koordinasi dan sinergi di antara pembuat kebijakan dan pihak terkait.
Kesimpulan: Penggunaan EMRW mempengaruhi hasil pasien sehingga EMRW dapat digunakan sebagai alat pengambilan keputusan klinis di layanan kesehatan ibu dan layanan kesehatan lainnya.

Kata Kunci: AKI; EMRW; alat pengambil keputusan klinis; alat penunjang keputusan rujukan

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pISSN:0854-0381 ● eISSN: 2598-1013 ● doi: http://dx.doi.org/10.20473/mog.V29I12021.6-12
● Maj Obs Gin. 2021;29:7-13 ● Received 30 Nov 2020 ● Revised 21 Jan 2021 ● Accepted 5 Feb 2021

INTRODUCTION

Maternal Mortality Ratio (MMR) in Indonesia is still high, especially in East Java Province. The high MMR reflects the low quality of health services especially maternal health services. The decline of maternal mortality occurred, but at the same time, the decline of life births in East Java was significant from 92.04 / 100, 000 in 2016 to 92.34/100,000 in 2017.[1]

One of the efforts to reduce significant MMR is by handling maternal complications especially quick and adequate treatment for emergencies.[2] Efforts to reduce MMR require an effective referral system, especially for emergency cases. One fundamental aspect of the referral system is an effective reciprocal communication between the first health facility and a higher referral health facility as it is reflected in an effective referral system in the area.[3]

Around 15% of pregnancies and deliveries will experience complications as maternal emergency cases. Even, some of them will cause mortality. Complications treated by hospitals require a continuum of care, such as a reciprocal service from community, primary health-care to the referral hospitals.

Adequate hospital services will not help much patients who had inadequate referral pre-treatment and arrived at the hospitals in bad conditions. A retrospective review of maternal mortality cases conducted by POGI in 2015 found that pre-referral stabilization in the first-level health facility was very low, only 50% of referral cases which had been pre-stabilized or adequately treated. Handling maternal emergency cases in the first-level health facility requires adequate clinical decision-making. If health staffs at the first-level healthcare fail to provide adequate treatment, it can cause severe maternal morbidity and even death.[4]

The Indonesian Ministry of Health in 2013 made an action plan to reduce the maternal mortality rate in Indonesia. One of the programs and activities is the Guaranteed Effective Referral Implementation Program for complication cases to ensure the availability of the referral guidelines by developing clear regional referral guidelines and operations in the first-level health facility.[5]

EMAS (Expanding Maternal and Neonatal Survival) program was introduced in Tuban District in 2015. Then, Antenatal Emergency Referral Worksheet was introduced as a clinical decision-making tool and written referral communication tool in 2016 at the first-level health facility. As a result, first-level health facilities can provide treatment based on the standards for maternal emergency cases.

The referral worksheet contains steps for handling pregnant women with complications in a form of check-lists to ease health staffs assess. In the first part of the check-list, they need to identify early symptoms of complications, initial structurally stable treatDment according to the medication standard, observation stages and final conditions referring to higher health facilities. The Antenatal Emergency Referral Worksheet is used as a medical record sheet and means of communication with the referral health facilities.

MATERIALS AND METHODS

The study was conducted in Tuban District, East Java in 2017 and invited pregnant mothers who were referred to a referral hospitals from 2016 to 2017. Maternity cases with emergency complication were referred to the referral public or private hospitals. These maternity cases were classified into survived pregnant mother, maternal morbidity, and maternal mortality.

The technique of data collection was random sampling with 161 samples including maternal cases with emergency complications (survived maternity, maternal morbidity, and maternal mortality) referred to the referral public or private hospitals. The quantitative data were collected by exploring the documentation data of medical records of pregnant women with emergency cases referred to the referral hospitals inside and outside Tuban District from 2016 to 2017. The observation was done by identifying the referring public health centers, prior referred patients' condition and the evidence of EMRW use in the hospital's archives.

Furthermore, the research collected qualitative data by crosschecking with the referee and patients with interview method. The interview was conducted in two stages. The early stage was conducted to 161 patients, and with the second stage was conducted to 22 public health staffs as referees and hospital officers as the referral health facilities.

The statistical test for observational case control assessed the correlation between nominal/categorical data of survived mother, high maternal morbidity and maternal mortality and the use of Antenatal Emergency Referral Worksheet by using the Mann-Whitney statistical test.

This research had passed ethic code test by the Ethics Committee of the Health Researchers of the Medical Faculty of Universitas Airlangga, Surabaya No.7/EC/

KEPK/FKUA/2018 with the title "The Analysis of Antenatal Emergency Referral Worksheet Associated with Delivery Outcomes in the Referral Hospitals: A Mix-method Research in Tuban District from 2016 to 2017.

RESULTS AND DISCUSSION

This study collected emergency cases of referral maternity at the first-level health services to three referral hospitals in Tuban from 2016 to 2017. The total samples who met the criteria were 161 cases consisting of 61 cases which did not use EMRW for referral pregnant mothers and 100 cases which used EMRW for referral pregnant mothers.

Quantitative Research Results

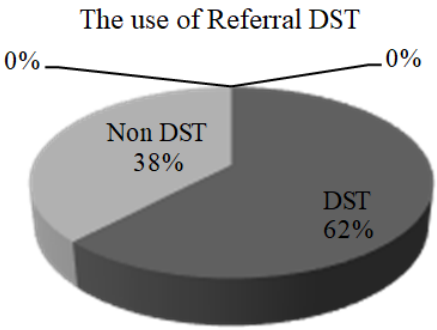

Figure 1. Percentage of EMRW usage (EMRW Referral) in Tuban District.

Based on Diagram 1, It can be interpreted that out of 161 referral cases that met the criteria, there were 61 cases (38%) which did not use EMRW referrals and 100 cases (62%) which had used EMRW referrals when referring to the referral hospitals. Distribution of referral cases in three referral hospitals in Tuban District shows that Koesmo Hospital had 53 referral cases, NU Hospital had 85 referral cases, and Muhammadiyah Hospital had 23 referral cases.

Based on Diagram 2, it illustrates the distribution and details of referral cases using or not using EMRW. At Koesmo Regional Hospital, out of 33% referral cases, only 16% cases did not use EMRW, and 17% cases used EMRW referred by public health centers or independently practical midwife. At NU Hospital, there were 14% cases that used EMRW out of 53% referral cases that met the criteria. Meanwhile, 8% referral cases at Muhammadiyah Hospital used EMRW, and 6% cases did not use EMRW.

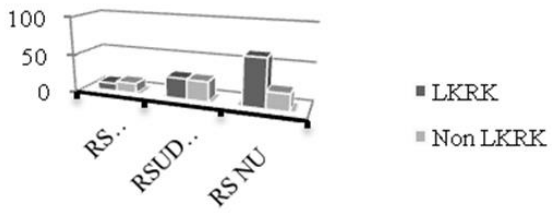

Figure 2. Distribution of referrals in three hospitals in Tuban District.

Table 1. Overview of cases referred to referral hospitals

	EMRW Use		
	Non EMRW	EMRW	Total Percentage %
Ages			
< 20	5 (3%)	11 (7%)	16 (10%)
20-30	34 (21%)	61 (37%)	95 (58%)
30-40	21 (13%)	26 (16%)	47 (29%)
40<	1 (1%)	2 (2%)	3 (3%)
Parity			
Primi	39 (24%)	75 (47%)	114 (71%)
2-3	17 (11%)	20 (12%)	37 (23%)
3<	5 (3%)	5 (3%)	10 (6%)
	EMRW Use		
	Non EMRW	EMRW	Total Percentage %
At the referral			
Ante Partum	31 (19%)	62 (38%)	93 (57%)
Intra Partum	25 (16%)	36 (22%)	61 (38%)
Post Partum	5 (3%)	2 (2%)	7 (5%)
Origin of referral			
Non Poned/BPM	48 (30%)	39 (24%)	87 (54%)
Poned	13 (8%)	61 (38%)	74 (46%)

Table 1 shows that 54% cases originally came from Non-PONED hospitals and 46% from BPM or Non-Poned. 24% of poned public health centers used EMRW, and 38% non-poned public health centers also used EMRW. 30% of non-poned public health centers have not used EMRW while only 8% of poned public health centers have not used EMRW.

Out of 57% cases were referred in ante partum stage, 38% were referred in intrapartum stage, and the remaining 5% was referred in post-partum stage. 38% cases referred in Antepartum mostly had used EMRW while the remaining 19% had not used EMRW referrals. In terms of age, there were 58% of 20-30 year-old patients, 29% of those aged 30-40 years old, 10% of those aged less than 20 years old, and 3% of those aged 40 years old at the referrals. In terms of parity, there were 71% primigravida cases, 23% parity 2-3 cases and 6% parity more than 3 cases. In terms of primigravida cases, 47% primigravida cases had used EMRW referrals.

Table 2. Referral cases that used EMRW and did not use EMRW for delivery outcomes

	Delivery outcome			
	Save	Morbidity	Mortality	Total Percentage %
Non DST	32 (20%)	23 (14%)	6 (4%)	61 (38%)
DST	54 (33%)	44 (27%)	2 (2%)	100 (62%)
Total	86 (53%)	67 (41%)	8 (6%)	161(100%)

Table 2 illustrates the delivery outcomes in using EMRW rather than without EMRW. There were three groups of delivery outcomes observed, namely survived pregnant mother, high maternal morbidity, and maternal mortality. From the total emergency referral cases, pregnant women who delivered safely were 53% which 33% used EMRW while 20% did not use EMRW for the referral. 27% pregnant women experienced high morbidity and used EMRW while 14% of those did not use EMRW. 6% cases came to mortality with only 2% cases using EMRW and 4% cases without EMRW at the referrals.

Qualitative research results

The result of quantitative case control study found that some public health centers used EMRW, but others did not in receiving patients to be referred to the referral hospitals. Both issues carried a qualitative research to identify the supporting factors and resisting factors in using EMRW.

This qualitative study involved 22 informants consisting of 8 informants from two out-patient and non-poned public health centers who had not used EMRW consisting of executive midwives, coordinating midwives, general doctors in charge and head of public health centers. Seven informants came from two inpatient and PONED public health centers that used EMRW referrals. These informant consist of executive midwives, independently practical midwives as a cadre of public health centers, regional coordinator midwives, general doctors in charge and head of public health centers. Seven informants from two referral hospitals consist of midwives in charge of maternity room and general doctors in charge of the maternity room and emergency installation.

Out of 15 respondents at the referral public health centers, the usage pattern, supporting factors, and resisting factors in using EMRW were found. Viewed from the use of EMRW, most of them have been actively using EMRW for referring to the hospitals. However, there are also respondents who used EMRW to refer patients, but the use of EMRW was still rare or ineffective. Meanwhile, there was a small percentage of those that never used EMRW in making referrals. They used maternal forms instead.

In terms of socialization, the majority had already got socialization as a support for the usage effectiveness and understanding of EMRW by midwife coordinators and team EMAS or Health Department of Tuban. Some also stated that they had already received socialization, but had a little knowledge about EMRW usage. In addition some respondents stated already god socialization, but did not understand about the use of EMRW. Even, some respondents never got a good socialization from the Health Department or midwife coordinator.

Based on the worksheet procurement as a running tool for ERMW, some respondents stated that EMRW procurement had been duplicated by the public health centers or midwife coordinator. In fact, the procurement was not available at the village health center or independent midwife's clinic. Whereas, most respondents stated that EMRW procurement had been duplicated and disseminated by the midwife coordinator as the stock could be found in their clinics.

Based on filling form of EMRW, few of them could not and did not know how to fill out and use EMRW. However, some of them already knew about EMRW sheet, but still have no idea how to use. They claimed to not refer patients when EMAS program was currently implemented. Some of them also ever heard about EMRW, but never saw EMRW sheet. However, most of them already knew and understood the use of EMRW sheets.

Based on archiving and reporting, most respondents stated that they had never filed EMRW either at the hospitals or in the first-level health facilities. However, few of them stated that they left the EMRW sheet in the hospitals and did not bring it back to the first-level health facilities, or they took from the public health centers and brought it back there. When the investigation was conducted, some data of EMRW in the hospitals were found, but they were not found in the public health centers as the first-level health facilities. However, some respondents also stated that they archived the data of EMRW in the public health centers and hospitals.

In terms of leadership role to enhance the use of EMRW, some respondents stated that the heads of the health centers still do not really support or monitor the use of EMRW in the first-level health facilities. However, some respondents stated that the heads supported the use of EMRW, but did not monitor its use. Most of respondents stated that the heads supported and monitored the use of EMRW in each health center.

Based on the hospital staff's response, most respondents stated that the staffs did not ask for EMRW referral, but they asked for only the maternal referral. Likewise, few respondents gave a good feedback since they understood about EMRW. Some respondents gave feedback by using EMRW as a treatment guidance. Nevertheless, some of them did not give any feedback since they never received patients who brought EMRW referral.

Based on the outcome of the patient, a number of respondents stated that the patients experienced mortality. A small proportion of respondents stated that patients had morbidity status after being referred to EMRW, and most respondents stated that the patients survived after being referred to EMRW.

Regarding the response towards the implementation of EMRW, some respondents said that using EMRW only add more duties to midwives who referred a patient. Meanwhile, a small part of respondents did not feel burdened when using EMRW. Most of respondents got easier and not burdened at all for using EMRW during the referral.

Based on the interview with the referral hospitals, in terms of input, such as referee's knowledge and understanding of EMRW, only a small percentage of respondents understood or knew the information, functions and uses. Meanwhile, most of them only knew information, but did not understand the function and use. There were also respondents who did not know the information about EMRW.

Based on the hospital's response, only a small proportion of respondents gave perfect feedback because they really understood EMRW. Nevertheless, there were also respondents who gave feedback by using EMRW as a guide for action, and some did not provide feedback because they did not know or never had patients bringing EMRW at the referral. Based on the usefulness of EMRW, the majority of respondents could monitor the treatment given by the referees, but some said EMRW was not that helpful.

In Table 3, the calculations of Mann-Whitney test showed H1 was accepted due to p value 0.036 <0.005, which means there was any significant difference between the use of EMRW with delivery outcomes.

In this study, there were different delivery outcomes between maternal emergency referral cases with EMRW and without EMRW having alpha <0.05. The observed delivery outcomes include survived pregnant mother, maternal morbidity and maternal mortality. Similar to research about the effect of using a surgical checklist, the decline of mortality was amounted from 1.5 % to 0.8%.[6]

Table 3. Results of Mann-Whitney statistical test analysis

Ranks

	DST Use	N	Mean Rank	Sum of Ranks
Delivery outcome	DST	100	75.81	7581.00
	Non DST	61	89.51	5460.00
	Total	161		

Statistical Test

	Maternal delivery outcome
Mann-Whitney U	2531.000
Wilcoxon W	7581.000
Z	-2.097
Asymp. Sig. (2-tailed)	0.36

a. Grouping variable: DST Use

This research also analyzed the data by using decision-making tools to determine non-Valvular Atrial Fibrillation patients who require anticoagulant or not. In conclusion, atrial fibrillation decision support tools were very helpful to predict the bleeding risk in the use of anticoagulants.[7] In addition, there was a study about the use of decision-making tools to determine which patients need implant defibrillators recommending their use.[8]

In qualitative research, the use of EMRW was proven to improve delivery outcomes from maternal emergency referral cases of survived pregnant mothers, maternal morbidity and maternal mortality. Therefore, it is expected that EMRW can be used in maternal emergency referral cases from the first-level health facilities to the referral hospitals. Until the end of 2017, 62% maternal emergency referral cases used EMRW referrals, so data were needed to find out the supporting factors and resisting factors for the use of EMRW.

Qualitative research was conducted to identify supporting and resisting factors from those that used EMRW and did not use EMRW referrals and maternal emergency referral cases at the hospitals. In transcribing the interview results from health staffs at the public health centers and referral hospitals, keywords of each issue were identified in terms of input, process, and output due to the use of EMRW.

The socialization and technical guidance for the use of EMRW at the public health centers were conducted to find out the supporting and existing factors on the use of EMRW. It showed that this was indispensable for the successful use of EMRW in all Tuban Districts. There were some differences of the method and socialization

frequency as well as the technical guide at the PONED PONED public health centers and non-PONED and non-treatment public health centers.

In the PONED public health centers, socialization and technical guide were better and were accomplished by all health staffs who were mentored by Health Department of Tuban and mentors from EMAS program in handling some cases. The mentoring program was carried out once year. When the program ended, EMRW was still being used due to an internalization process and had become a part of the standard steps for handling emergency cases at the public healt centers.

Unlike the non-PONED public health centers, the socialization from Health Department of Tuban was only conducted to representatives (the heads or senior midwives) from the public health centers, so the activity could vary widely in each public health center. For non-PONED public health centers, they did not get special technical guidance for real use of EMRW so that most health staffs did not understand the use of EMRW when there was an emergency patient in the public health centers.

Data about EMRW usage show that 54% of all referral cases came from non-PONED public health centers. Thus, socialization and technical guidance should not be differentiated for all public health centers in Tuban District. It is in accordance with the recommendations of the JHPIEGO-USAID 2000 Quality Assurance which said although EMRW as a Job Aids can improve the performance of health staffs, but organizational policy is needed as the most important factor that supports its successful implementation. The policy starts from the effort to get job aids from all health teams in all health facilities, improves the feedback process. There was theoretical and practical technical guidance for the implementation, and the development of job aids was tailored to the real conditions.[9]

Head of public health centers also supervised the implementation of EMRW to discover the supporting and resisting factor as important indicators to determine how successful the use of EMRW was at the public health centers. The leadership factor possessed by the heads of public health centers is needed to share vision in terms of motivating health staffs, providing understanding, supervising and monitoring the use of EMRW and as well as providing responses and solutions if there are obstacles in the implementation. The head of public health centers need to carry out budget allocation for the availability of RKRK sheet. The Society for Maternal-Fetal Medicine 2017 also recommended to periodically review the output of EMRW usage as a checklist of decision making tool at health facilities over the district as a top management level.[10]

In terms of emergency response by emergency team at a health facility, the American College of Obstetrician and Gynecologsts recommended the heads of health facilities have to prepare emergency equipment in one place (Trolly Emergency), build a responsive emergency team and effective communication aids among emergency teams in health facilities and referral health facilities, conduct emergency drills and emergency case simulations by using EMRW as a decision aid tool according to standards.[11]

The role of peer supervision in terms of health personnel compliance with health service guidelines is very important. Bedwell et al. studied the use of partograph as a clinical decision making tool by the midwives on-duty. They concluded that the knowledge, behavior of midwives and supervision from superiors greatly influence their performance in giving treatment to patients.[12]

A study by Islami concluded that the level of education, managerial function of the head at the public health centers and the personal motivation of midwives had a significant effect on the low implementation of the Standard Operating Procedure for early detection of preeclampsia at the public health centers in Surabaya.[13] Setiyana et al. in their study suggested to improve the head's perception about supervision by improving supervision techniques, preparation, and schedule.[14]

The synergy and synchronization EMRW with the standard flow of referrals and previous referral administration issues may be a resisting factor that also needs attention and resolution by coordinating with relevant institutions or creating new rules. Another study on the factors influencing healthcare service quality mentioned that leadership role at the policy-maker level and collaboration with other institutions are needed to develop coordination and program synchron-ization.[15]

The design and content of EMRW material that become an obstacle must also be continuously improved and monitored and evaluated for its use. From the quantitative data on the referral causes, it turns out that the case of Dystocia or Power Passage Passanger disorder during the delivery process was 14 % of all referral cases. There were also 14% other cases out of the total 28% cases unlisted in EMRW material Updated and redesign of EMRW should be executed to suit the needs of users. Periodic studies, assessment of the results of EMRW implementation, assessing compliance

and adaptation of health workers in the field need to be carried out.[16]

The results show the relationship between pregnant mothers who used EMRW as a referral and those with high morbidity and mortality. It illustrates that the use of EMRW can improve the quality of maternal delivery outcomes so that it is useful in improving emergency services in the first-level health facilities. In the implementation, not all first-level health facilities used EMRW. Some factors that influence the success and development of EMRW can be considered by improving socialization and technical guidance, leadership and supervision from the head of the public health centers and Health Department, coordination and synergy between policies and related institutions, the design and contents of EMRW material according to the users' needs of health staffs based on the results of regular evaluation and monitoring.

CONCLUSION

This study conclude from the Mann-Whitney statistical test that t there was a difference between the use of EMRW and patient output, with accepted H1 and p value 0.036 <0.005. There were significant differences in delivery outcomes between users of antenatal emergency referral worksheet and those who did not use it. The delivery outcomes observed in the study include survived pregnant mothers, severe maternal morbidity, and maternal mortality.

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