



The Performance of Midwives in Managing Childbirth Using a Digital Partograph



Ida Laila Nur^a, Mardiana Ahmad^b, Syafruddin Syarif^c, Hamdiah Ahmar^d

Manuscript submitted: 9 March 2021, Manuscript revised: 18 April 2021, Accepted for publication: 27 May 2021

Corresponding Author^a



Keywords

digital partograph;
field performance;
labor management;
managing childbirth;
monitor labor;

Abstract

The routine use of partographs has been recommended to monitor labor progress, and information to make clinical decisions in carrying out midwifery service tasks, such as the main component that is key in the development of performance management for midwives in midwifery care is Professional Standards, Web-based digital partographs are used as learning media for care. Standard delivery is considered capable of being a solution in filling the partograph. This research is a mixed-method (R&D and quantitative). Assessment of application feasibility is carried out using the Technology Acceptance Model (TAM) approach. This research was conducted at RSKD Ibu and Anak Pertiwi Makassar on March 8 - March 29, 2021, with a total sampling of 60 midwives. To see an increase in performance in filling partographs, using a parametric test, namely Wilcoxon. The significance of the p-value is $0.000 < 0.05$; it can be concluded that there is an increase in the performance of midwives in the use of digital partographs as a means of monitoring labor. Based on the results of the analysis, the results of the digital partograph test affect improving the performance of midwives; this can be seen in the completeness of filling between digital and conventional partographs.

International Journal of Life Sciences © 2021.

This is an open access article under the CC BY-NC-ND license
(<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

Contents

Abstract	26
1 Introduction	27
2 Materials and Methods	28
3 Results and Discussions	29
4 Conclusion	32
Acknowledgments	32
References	33
Biography of Authors	35

^a Master of Midwifery Science Postgraduate School Hasanuddin University, Makassar, Indonesia

^b Master of Midwifery Science Postgraduate School Hasanuddin University, Makassar, Indonesia

^c Faculty of Engineering, Hasanuddin University Makassar, Indonesia

^d Undergraduate Midwifery program, Institute Kesehatan Mitra Bunda, Batam, Indonesia

1 Introduction

The routine use of partographs has been recommended to monitor labor progress and information to make clinical decisions; most developing and developed countries use partographs to ensure mothers and babies receive safe, adequate, and timely delivery care and prevent life-threatening complications. The most common conventional partograph and is often used as a labor monitoring tool and recommended by WHO when midwives monitor labor progress, this is by the Minister of Health regulation number HK.01.07 / MENKES / 320/2020 concerning the professional standard of midwives that is one of the basic skills of a midwife. The 5th competency is to monitor the progress of labor using a partograph (Dalal, et. al. 2018; Van der Heijen et al., 2019; Chaturvedi et al., 2015, Sanghvi et al., 2019; Khan et al., 2019; Permenkes nomor 320, 2020).

The partograph has been endorsed by the World Health Organization (WHO) since 1994, which presents an algorithm for assessing the condition of the mother and fetus and the development of labor. Monitoring labor with a partograph can reduce adverse pregnancy outcomes such as prolonged labor, emergency cesarean section, birth asphyxia, and intrauterine fetal death. However, partograph usage is still shallow, especially in low and middle-income countries (LMICs). In Bangladesh, the reported rates of partograph users vary from 1.4% to 33.0%. Recently, a digital partograph version, with the provision of online data entry and user assistance for clinical support emergencies, has been successfully tested in various countries and matches the results when midwives use conventional partographs. (Begum et al., 2018; Smith et al., 2018; Lavender et al., 2018; Yadav et al., 2016).

Data from the World Health Organization (WHO) in 2016 shows that 532,000 women died due to childbirth. Meanwhile, 2017 shows that as many as 542,000 women died, lower than the number of maternal deaths in 2018 of 579,000 women died. For ASEAN countries such as Thailand and Brunei Darussalam, it reached 67,268 people in 2017. According to the Indonesian Health Demographic Survey (IDHS) in 2015, the Maternal Mortality Rate (MMR) in Indonesia was 102/100,000 live births. This figure is following the previous target achievement. Data obtained from the South Sulawesi Provincial Health Office in 2016 the Maternal Mortality Rate (MMR) was 42 / 100,000 live births. Whereas in 2017, the Maternal Mortality Rate (MMR) was 39 / 100,000 live births, and in 2018, the Maternal Mortality Rate (MMR) was 36 / 100,000 live births (Health Profile Ministry of Health, 2018).

Southeast Asian countries show a significant reduction in the need for prolonged labor through expected delivery and cesarean section where the partograph is used in conjunction with appropriate labor management guidelines. Although the Cochrane review (2016) was unable to recommend partographs for routine use based on the studies included in their review, it left the decision to include partographs as part of the standards for individual countries in monitoring deliveries. The use of partographs in childbirth can reduce maternal and perinatal mortality so that it can support the health system towards the level of community welfare. (Rahman et al., 2019; Yisma Engida et al., 2016; Sarsam et al., 2014).

Research conducted in Kenya found that the partograph user rate was 88%, but only 24% was filled incorrectly. Apart from knowledge, several factors cause inappropriate use of partographs, namely from service providers who consider them only as an administrative / reporting tool, absence of the same rules, inadequate training of service providers, and insufficient partograph paper supplies. The partograph should be used for all active phase on-time deliveries that are performed anywhere. One indicator to determine the health status is characterized by high or low mortality rates for mothers and babies. This phenomenon has a significant influence on the success of health development. (Wahyuni et al., 2018; Pusdatin et al., 2017; JNPKR, 2012).

So in carrying out midwifery service tasks, the main components that are key in the development of performance management for midwives in midwifery care are Professional Standards, Standard Operating Procedures (SOP), and guidelines used by midwives in health care facilities. Midwifery standards are helpful as a reference and basis for midwives in implementing quality health services so that every action and activity carried out is oriented towards a quality culture in providing midwifery services (Schweers et al., 2016; Lavender & Bernitz, 2020; Rolim et al., 2020).

This research is follow-up research that has been done previously in 2017, namely a digital partograph designed using a computer system (Trisnawati et al., 2019; Lavender et al., 2019; Amelia et al., 2020). In 2018 a digital partograph with a computer system was developed into a Web-based partograph by Deviant et al. until 2019, the Web-Based Digital Partograph was used as a learning medium for regular childbirth care. Moreover, the authors continued the research by developing anamnestic and SOAP features. The difference between this study and previous research is that in the previous study, features were not provided for midwives in the service, then in

Nur, I. L., Ahmad, M., Syarif, S., & Ahmar, H. (2021). The performance of midwives in managing childbirth using a digital partograph. *International Journal of Life Sciences*, 5(2), 26-35.
<https://doi.org/10.29332/ijls.v5n2.1219>

monitoring the fetal heart rate and maternal vital signs, the numbers were still reversed, and the data could not be edited. So, as a researcher, he developed a digital partograph application so that midwives could use it in health services, improved fetal heart rate monitoring charts and vital signs, and provided editing features. The output results from the examination are in pdf form and can be printed out to be used as documentation at RSKD Mother and Child Mother Earth (Brush, 1992; Yongshou et al., 2010; Lumpkin et al., 2001; Daniyan et al., 2017; Kawiana et al., 2018).

Based on preliminary observations made by researchers at RSKD Mother and Child Mother Earth, by asking directly to the midwife on duty. In general, midwives still use conventional partographs (100%). This is, of course, an obstacle in itself for midwives because in monitoring childbirth, they are still busy with filling in partographs manually and also take up additional time at the same time, many patients are intrapartum, making midwives work less optimally in monitoring labor and often experience errors in filling in which requires the midwife to start over from scratch. One of the reasons the researchers raised this title was because researchers wanted to know the extent to which the performance of midwives in managing labor was compared using both digital partographs and conventional partographs. It was hoped that with the presence of digital partographs, midwives would have another alternative in monitoring labor, namely by using digital partographs. Based on the description above, the researcher is interested in researching "Midwives' Performance in Managing Childbirth Using a Digital Partograph (Trubatu et al., 2010; Shimpalee et al., 2007; Yuyu, 2018)."

2 Materials and Methods

This research is a mixed methods research, namely R&D and quantitative. The conclusion from the needs analysis is then made at a product manufacturing stage; at this stage, a product trial is carried out. In product trials, one-one tests, small group tests, and extensive group tests, then continued with design revisions, validation tests, and other tests. Assessment of application feasibility is carried out using the Technology Acceptance Model (TAM) approach; the followings are the research and development steps.

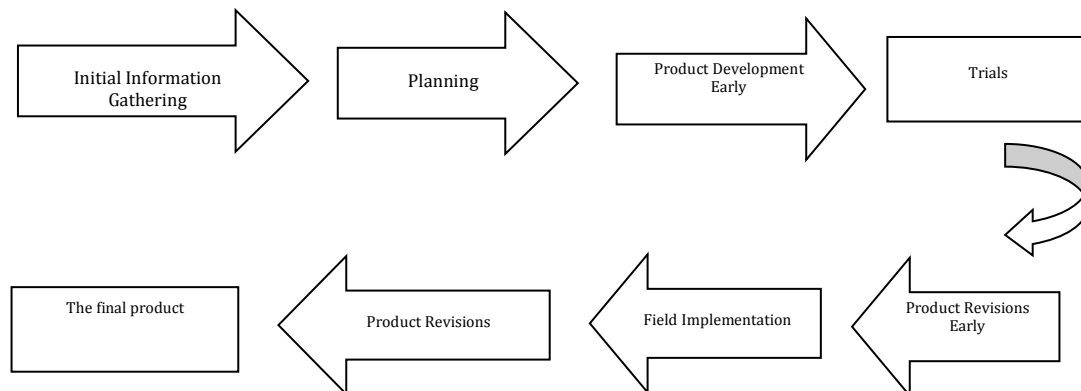


Figure 1. The research and development steps

This research was conducted at RSKD Mother and Child Pertiwi Makassar on March 8 - March 29, 2021. The sampling technique was total sampling. The sample in this study were all midwives who served in RSKD Ibu and Anak Pertiwi Makassar and was willing to be respondents, amounting to 60 midwives. Data processing and analysis in this study were obtained from research instruments in quantitative and qualitative data. Quantitative data were obtained from the recapitulation of the validation questionnaire of media experts, material experts, one-on-one trials, small sample tests, and pretest and post-test trials. Meanwhile, qualitative data were obtained from suggestions/input from media and material experts after assessing the digital partograph application. To see an increase in performance that occurs in filling the partograph, using a parametric test, namely the T-test.

3 Results and Discussions

Assessment of the feasibility of learning media products

The feasibility of the digital partograph product being developed was assessed through a validity test questionnaire. The following is the implementation and presentation of data on the validation of digital partograph learning media products:

Media expert validation

Product validation in this study was carried out by one media expert who shows the percentage of feasibility in terms of display aspects with a percentage value of 82.00%, based on programming aspects with a percentage value of 93.33% and aspects of media presentation with 90.00%. In comparison, the total percentage of all aspects obtained from media experts is 88.44%, so that it can be concluded that the product of the digital partograph learning model as a learning medium for ordinary childbirth care was categorized as very feasible to use.

Material expert validation

The validation test results by material experts are in the form of responses and judgments from material experts, then the data obtained are analyzed, and the product revisions are carried out according to suggestions and input from material experts. The results of the material expert's assessment are depicted in the percentage of feasibility in terms of the aspect of display with a percentage value of 82.00%, based on programming aspects with a percentage value of 93.33% and aspects of media presentation with a percentage of 90.00%, while the total percentage of all aspects obtained from media experts is 88.44% so that it can be concluded that the product of the digital partograph learning model as a learning medium for ordinary childbirth care was categorized as very feasible to use.

Material expert validation

The validation test results by material experts are in the form of responses and judgments from material experts, then the data obtained are analyzed, and the product revisions are carried out according to suggestions and input from material experts. Two material experts carried out material validation in this study. the percentage of feasibility in terms of the content aspect with an average value of 96.25%, based on the presentation aspect with an average value of 96.67%, the language aspect with an average of 97.14%, and the contextual aspect with an average of 90.00%, as for the total percentage From all aspects obtained from material experts is 95.01%, so it can be concluded that the digital partograph development product as a monitoring tool during labor is categorized as very feasible to use.

Implementing midwife validation

Furthermore, media products were tested on the implementing midwife starting from small group trials then proceeding to large group trials. The following is the appendix of the results of product trials for small groups and large group trials:

Small group trials

Fifteen midwives carried out the small group trial at the Special Hospital for Mother and Child Areas in Makassar. The results of the small group trial are illustrated shows that the percentage of feasibility in terms of the Ease To Use aspect with an average value of 87.33%, the Perceived Usefulness aspect with an average value of 88.80%, the Attitude Toward aspect with an average of 89.90%, the Behavioral Intention aspect with an average of 90.80%, the Actual Usage aspect with an average value of 81.13%. In comparison, the total percentage of all aspects obtained by the small group trial was 87.45%, so it can be concluded that the digital partograph development product as a medium for monitoring normal labor is categorized as feasible to use.

Large group trials

Sixty midwives carried out the large group trial at the Special Hospital for Mother and Child Areas in Makassar. The results of the large group trial are shows that the percentage of feasibility in terms of the Ease To Use aspect with an average value of 86.61%, the Perceived Usefulness aspect with an average value of 84.33%, the Attitude Toward aspect with an average of 86.83%, the Behavioral Intention aspect with an average of 83.53%, the Actual Usage aspect with an average value of 78.78%. In comparison, the total percentage of all aspects obtained by the large group trial was 84.02%, so it can be concluded that the digital partograph development product as a medium for monitoring ordinary childbirth care is categorized as feasible to use.

Midwife performance analysis

Obtaining research data follows the results of observations of filling in partograph completeness and questionnaires for midwife performance appraisals carried out during the research process to analyze the performance of midwives in monitoring labor using digital partographs. The results of data analysis are as follows:

Table 1
Static descriptive results of digital partograph assessment based on aspects of planning, implementation and evaluation

Subject	Mean	Min - Max	SD
<i>Planning aspect</i>	19.63	19 – 20	0.486
<i>Implementing aspect</i>	19.50	17 – 20	0.725
<i>Evaluating aspect</i>	19.25	17 - 20	0.751

From the table, the results of the descriptive digital partograph analysis show the Mean value of the planning aspect is 19.63, the implementation aspect is 19.50, and the evaluation aspect is 19.25, while the Min-Max value for the planning aspect is 19-20, the implementation aspect and the evaluation aspect are 17-20 with a standard deviation value. For the planning aspect, it was 0.486, the implementation aspect was 0.725, and the evaluation aspect was 0.751.

Table 2
Data Normality Test

Data	Statistic	P-Value	Conclusion
<i>Digital</i>	0.921	0.001	$p < 0,05$ (Abnormal distribution)
<i>Conventional</i>	0.925	0.001	$p < 0,05$ (Abnormal distribution)

*Kolmogorov-Smirnov Normality Test ****

Based on the data normality test of the digital and conventional partograph filling results, it is known that the data has a p-value of 0.001. Thus, because the p-value < 0.05 , it can be concluded that the data are not normally distributed.

Table 3
The results of the midwife's performance test on the digital partograph

	Mean	Minimum – Maximum	P-Value
<i>Pretest (n=60)</i>	88.78	97 - 89	0,000
<i>Posttest (n=60)</i>	94.44	100 - 94	

Wilcoxon test analysis

The table above shows the median pretest value of 88.78. From this data, it can be concluded that the performance of midwives is in a Good category; after conducting training and introducing the digital partograph application, the performance of midwives increased with a mean value of 94.44, which was categorized as very good. Meanwhile, with the p-value significance results of $0.000 < 0.05$, it can be concluded that there is an increase in the performance of midwives in using digital partographs as a means of monitoring labor.

Adherence in using partograph is one of the most important things for a midwife to make clinical decisions, monitor, evaluate, treat labor, detect problems and complications in labor early so that they can plan actions to overcome these problems or refer mothers in the right conditions. Research on technology development in the health sector is certainly not free from technological developments that are increasingly sophisticated; there have been many types of research engaged in health technology with several ideas and innovations that can have a positive impact on health services, one of which is research conducted by Sriwahyuni on Mobile Partographs where the results of The research carried out by the Android-based mobile partograph application is beneficial for midwives in delivery assistance. Monitoring and documenting care becomes more effective and efficient, so it can be concluded that the Android-based partograph mobile application can be a means of electronic documentation in monitoring labor progress by midwives. In the Evaluation study of an educational board game to improve the use of the partograph in sub-Saharan Africa with the results Board games can increase workforce monitoring knowledge. Retention of information is apparent, and the application of learning in practice is very encouraging. Health system barriers need to be resolved so that midwives can apply theory in practice.

Several previous studies that compared the use of computer-based digital partographs with conventional partographs with the results of research that computer-based partographs were better than conventional partographs in terms of a shorter time speed of 8.6 hours, the aspect of ease of filling in partographs with a significant degree of truth, namely 100 %, the completeness of the data is 100%. There are differences between the computer system-based partograph and the conventional partograph in monitoring reporting records from the aspect of convenience, namely the p-value of 0.004, the security aspect, namely the p-value of 0.001, the aspect of speed, which is the p-value of 0.000 and the aspect of data relevance, which is the p-value of 0.005. In line with Ningrum M Widya., (2019) the results of this study indicate that the information system contained in the digital partograph has met aspects of system quality, information quality, and user satisfaction. The application of the digital partograph from the usefulness aspect has fulfilled clinical decision-making, monitoring of labor progress, monitoring the condition of the mother and fetus, and documentation .

Digital partographs are considered to make it easier for midwives to monitor labor, this is in line with the research of Harshadkumar Sanghvi, Diwakar Mohan with the title Research Effectiveness Of An Electronic Partogram: A mixed-Method, Quasi-Experimental Study Among Skilled Birth Attendants In Kenya, which compared data from 842 clients inactive labor using ePartogram with data from 1,042 clients who were monitored using partograph paper. SBA using an ePartogram was more likely than those using a paper partograph to take measures to maintain a normal delivery, such as ambulation, feeding, and fluid intake, and to address abnormal measurements of fetal well-being (14.7% versus 5.3%, customized relationship). active risk = 4.00, 95% confidence interval [CI] = 1.95-8.19). An ePartogram was associated with a 56% (95% CI = 27% –73%) lower likelihood of a suboptimal fetal outcome than a paper partograph program users are more likely to comply with the observations of forced labor. The SBA states that the technology is easy to use but raises concerns about its use on high-volume sites. Further research is needed to evaluate costs and benefits and incorporate the latest WHO guidelines on workforce management.

In this study, the results of the significance test for the acquisition of performance values between digital partographs and conventional partographs were the results of data analysis using SPSS by conducting the Wilcoxon test with a p-value of $0.000 < 0.05$, it can be concluded that statistically, digital partographs affect improving the performance of midwives in performing labor monitoring. In line with the research on the effectiveness of computer-based partographs on clinical decision making in childbirth, with the results of the research, the value on the effectiveness of the aspects of planning, implementing, and evaluating data, namely 0.017 (p-value < 0.05), means that there are significant differences in effectiveness from the aspects of ease, speed, and relevant data on conventional (manual) partographs and computer system-based partographs on clinical decision making in the delivery process.

This research implies that in addition to improving the performance of midwives in monitoring labor, it is also hoped that midwives can always use this application in monitoring childbirth to facilitate the recording system and recapitulation of labor reports.

4 Conclusion

Based on the assessment of the material expert test based on content, presentation, language, and contextual aspects, the digital partograph learning media is very feasible to use. Based on the assessment of media experts based on display, programming, and media presentation, the digital partograph learning media is very feasible to use. Based on the assessment of midwife respondents in large group trials using the TAM questionnaire, the digital partograph learning media is feasible to use. Based on the results of the analysis, the results of the digital partograph test affect improving the performance of midwives; this can be seen in the completeness of filling between digital and conventional partographs.

Acknowledgments

Our gratitude goes to all those who played a role in doing this research. Thank you to the Director of RSKD Ibu and Anak Pertiwi Makassar and the Head of the Nursing Section for providing permission and information so that this research can be appropriately researched and Thank you to all respondents who took the time to answer the research questionnaire so that the results in this study were obtained.

References

- Amelia, K., Asril, L. O., & Febrianti, L. (2020). Pemodelan Incident Rate Demam Berdarah Dengue Di Indonesia Yang Berkaitan Dengan Faktor Lingkungan Menggunakan Metode Geographically Weighted Regression (Gwr). *Ekologia: Jurnal Ilmiah Ilmu Dasar dan Lingkungan Hidup*, 20(2), 64-73.
- Begum, T., Ellis, C., Sarker, M., Rostoker, J. F., Rahman, A., Anwar, I., & Reichenbach, L. (2018). A qualitative study to explore the attitudes of women and obstetricians towards caesarean delivery in rural Bangladesh. *BMC pregnancy and childbirth*, 18(1), 1-11.
- Brush, C. G., & Vanderwerf, P. A. (1992). A comparison of methods and sources for obtaining estimates of new venture performance. *Journal of Business venturing*, 7(2), 157-170. [https://doi.org/10.1016/0883-9026\(92\)90010-O](https://doi.org/10.1016/0883-9026(92)90010-O)
- Brush, C. G., & Vanderwerf, P. A. (1992). A comparison of methods and sources for obtaining estimates of new venture performance. *Journal of Business venturing*, 7(2), 157-170.
- Chaturvedi, S., De Costa, A., & Raven, J. (2015). Does the Janani Suraksha Yojana cash transfer programme to promote facility births in India ensure skilled birth attendance? A qualitative study of intrapartum care in Madhya Pradesh. *Global health action*, 8(1), 27427.
- Dalal, A. R., & Purandare, A. C. (2018). The partograph in childbirth: an absolute essentiality or a mere exercise? *The Journal of Obstetrics and Gynecology of India*, 68(1), 3-14.
- Daniyan, A. F., & Brentjens, R. J. (2017). Hiding in plain sight: immune escape in the era of targeted T-cell-based immunotherapies. *Nature Reviews Clinical Oncology*, 14(6), 333-334.
- Daniyan-Bagudu, H., Khan, S. J. M., & Roslan, A. H. (2017). The effect of mobile banking on the performance of commercial banks in Nigeria. *International Research Journal of Management, IT and Social Sciences*, 4(2), 74-80.
- Hasbiah, H., & Rohaya, R. (2013). Analisis Penerapan Partograf Dalam Asuhan Persalinan Normal (APN) Oleh Bodan Praktik Mandiri Di Kecamatan Seberang Ulu 1 Kota Palembang Tahun 2012. *JPP (Jurnal Kesehatan Poltekkes Palembang)*, 2(12), 29-34.
- JNPK-KR. 2012. "Asuhan Persalinan Normal. Jakarta.
- Kawiana, I. G. P., Dewi, L. K. C., Martini, L. K. B., & Suardana, I. B. R. (2018). The influence of organizational culture, employee satisfaction, personality, and organizational commitment towards employee performance. *International research journal of management, IT and social sciences*, 5(3), 35-45.
- Kawiana, I. G. P., Dewi, L. K. C., Martini, L. K. B., & Suardana, I. B. R. (2018). The influence of organizational culture, employee satisfaction, personality, and organizational commitment towards employee performance. *International research journal of management, IT and social sciences*, 5(3), 35-45.
- Khan, A. N. S., Karim, F., Chowdhury, M. A. K., Zaka, N., Manu, A., El Arifeen, S., & Billah, S. M. (2019). Competence of healthcare professionals in diagnosing and managing obstetric complications and conducting neonatal care: a clinical vignette-based assessment in district and subdistrict hospitals in northern Bangladesh. *BMJ open*, 9(8), e028670.
- Lavender, T., & Bernitz, S. (2020). Use of the partograph-Current thinking. *Best Practice & Research Clinical Obstetrics & Gynaecology*. <https://doi.org/10.1016/j.bpobgyn.2020.03.010>
- Lavender, T., Cuthbert, A., & Smyth, R. M. (2018). Effect of partograph use on outcomes for women in spontaneous labour at term and their babies. *Cochrane database of systematic reviews*, (8).
- Lavender, T., Cuthbert, A., & Smyth, R. M. (2018). Effect of partograph use on outcomes for women in spontaneous labour at term and their babies. *Cochrane database of systematic reviews*, (8).
- Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of business venturing*, 16(5), 429-451. [https://doi.org/10.1016/S0883-9026\(00\)00048-3](https://doi.org/10.1016/S0883-9026(00)00048-3)
- Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of business venturing*, 16(5), 429-451.
- Ollerhead, E., & Osrin, D. (2014). Barriers to and incentives for achieving partograph use in obstetric practice in low-and middle-income countries: a systematic review. *BMC pregnancy and childbirth*, 14(1), 1-7.
- Pusdatin Kemenkes, R. I. (2017). Data dan Informasi Profil Kesehatan Indonesia 2016. *Kementerian Kesehatan Republik Indonesia*, 164.
- Rahman, M. M., Wahid, A., & Asiri, A. M. (2019). Development of highly sensitive 1, 4-dioxane sensor with semiconductor NiO-doped Nd 2 O 3 nanostructures by electrochemical approach. *New Journal of Chemistry*, 43(44), 17395-17402.
- Nur, I. L., Ahmad, M., Syarif, S., & Ahmar, H. (2021). The performance of midwives in managing childbirth using a digital partograph. *International Journal of Life Sciences*, 5(2), 26-35. <https://doi.org/10.29332/ijls.v5n2.1219>

- Rolim, K. M. C., Pinheiro, M. C. D., Pinheiro, P. R., Frota, M. A., de Vasconcelos Filho, J. E., de Sousa Martins, I., ... & Albuquerque, F. H. S. (2020). Mobile Partogram—m-Health technology in the promotion of parturient's health in the delivery room. In *Innovation in Health Informatics* (pp. 245-259). Academic Press. <https://doi.org/10.1016/B978-0-12-819043-2.00010-1>
- Sanghvi, H., Mohan, D., Litwin, L., Bazant, E., Gomez, P., MacDowell, T., & Muia, R. (2019). Effectiveness of an electronic partogram: a mixed-method, quasi-experimental study among skilled birth attendants in Kenya. *Global Health: Science and Practice*, 7(4), 521-539.
- Sarsam, S. D., Flayeh, R. M., & Alnakkash, U. M. (2014). Implication of the two who partographs, (composite and simplified) regarding maternal and neonatal outcome. *International Journal of Scientific Research in Knowledge*, 2(9), 433.
- Satjaritanun, P., Hirano, S., Shum, A. D., Zenyuk, I. V., Weber, A. Z., Weidner, J. W., & Shimpalee, S. (2018). Fundamental understanding of water movement in gas diffusion layer under different arrangements using combination of direct modeling and experimental visualization. *Journal of The Electrochemical Society*, 165(13), F1115.
- Schweers, J., Khalid, M., Underwood, H., Bishnoi, S., & Chhugani, M. (2016). mLabour: Design and evaluation of a mobile partograph and labor ward management application. *Procedia engineering*, 159, 35-43. <https://doi.org/10.1016/j.proeng.2016.08.061>
- Shimpalee, S., & Van Zee, J. W. (2007). Numerical studies on rib & channel dimension of flow-field on PEMFC performance. *International journal of hydrogen energy*, 32(7), 842-856. <https://doi.org/10.1016/j.ijhydene.2006.11.032>
- Smith, L. A., Burns, E., & Cuthbert, A. (2018). Parenteral opioids for maternal pain management in labour. *Cochrane Database of Systematic Reviews*, (6).
- Tina Lavender, Anna Cuthbert, Rebecca MD Smyth. 2017. *Effect Of Partograph Use On Outcomes For Women In Spontaneous Labour At Term And Their Babies*. *Cochrane Database of Systematic Reviews 2018, Issue 8*. Art. No.: CD005461. DOI: 10.1002/14651858.CD005461.pub5
- Trisnawati, T., Sari, W. R., & Utami, B. H. S. (2019). The Enhancement of Learning Mathematic's Motivation by Using Application of Quantum Learning Model Teaching. *International Journal of Trends in Mathematics Education Research*, 2(4), 197-201.
- Trubat, R., Cortina, J., & Vilagrosa, A. (2010). Nursery fertilization affects seedling traits but not field performance in *Quercus suber* L. *Journal of arid environments*, 74(4), 491-497. <https://doi.org/10.1016/j.jaridenv.2009.10.007>
- Van der Heijden, J., Gray, N., Stringer, B., Rahman, A., Akhter, S., Kalon, S., & Biswas, A. (2019). 'Working to stay healthy', health-seeking behaviour in Bangladesh's urban slums: a qualitative study. *BMC Public Health*, 19(1), 1-13.
- Wahyuni, S., Nuryuniarti, R., & Nurmahmudah, E. (2018). Mobile Partograf: Aplikasi Untuk Memantau Kemajuan Persalinan. *Jurnal Riset Kebidanan Indonesia ISSN*, 2(2), 75-80.
- Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production*, 135, 732-739.
- Yayu, Z. H. A. N. G. (2018). Foster's Theory of Marx's Metabolism Fracture Reconstruction. *Journal of Sichuan Vocational and Technical College*, 04.
- Yisma Engida, Astatkie Ayalew And Fesseha Nebreed. 2016. "Yadav P. Et Al." Ccomparison Of Spontaneous Labour With Induced Labour In Nulliparous Women Using Modified Who Partograph. *International Journal Of Reproduction, Contraception, Obstetrics And Gynecology*, 5: 37-47
- Yongshou, L., Xiaojun, S., Jun, L., & Zhufeng, Y. (2010). Finite element method and experimental investigation on the residual stress fields and fatigue performance of cold expansion hole. *Materials & Design*, 31(3), 1208-1215. <https://doi.org/10.1016/j.matdes.2009.09.031>
- Yongshou, L., Xiaojun, S., Jun, L., & Zhufeng, Y. (2010). Finite element method and experimental investigation on the residual stress fields and fatigue performance of cold expansion hole. *Materials & Design*, 31(3), 1208-1215.

Biography of Authors

	Ida Laila Nur, S.ST Educational Background: Diploma IV of Mega Rezky University (2018), Master of Science in midwifery at Hasanuddin University Makassar (September 2019 until now) Email: bidanidalailanur@gmail.com
	Dr. Mardiana Ahmad, S.SiT, M.Keb Is a lecturer as well as the Secretary of the study program in the Postgraduate School of Midwifery Masters study program, Hasanuddin University Makassar. With a history of education from D-III Midwifery Akbid Department of Health Ujung Pandang (1999), D.IV Educator Midwife FK-UGM in 2004. Master of Midwifery FK-UNPAD 2009, Doctoral Program in Medical Sciences UNHAS 2016 Email: mardiana908@gmail.com
	Prof. Dr. Ir. Syafruddin Syarif, M.T Is one of the professors at Hasanuddin University Makassar, with a field of expertise in Telecommunications Engineering in the Electrical Engineering department of Hasanuddin University Makassar Email: syafruddin.s@eng.unhas.ac.id
	Hamdiah Ahmar, S.ST, M.Keb Lecturer in the Undergraduate Program of Education and Midwifery Professionals, Mitra Bunda Health Institute. Educational Background: Diploma III of Midwifery, Universitas Muslim Indonesia Makassar (2011), DIV Midwifery Respati Yogyakarta University (2014) Master of Midwifery, Hasanuddin University Makassar (2020) Email: hamdiah@mbp.ac.id