

## Effect of the Lean Hospital Implementation on Nurse Satisfaction and Performance in PKU Muhammadiyah Delanggu Hospital

Naviatullaily Yarsiska<sup>1</sup>, Sagiran<sup>2</sup>, Nur Hidayah<sup>3</sup>

<sup>1</sup>Master of Hospital Management, Postgraduate Program, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

<sup>2</sup>Master of Hospital Management, Postgraduate Program, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

<sup>3</sup>Master of Hospital Management, Postgraduate Program, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

ARTICLE INFO	ABSTRACT
Publication Online: 23 October 2019	Background: Lean hospital has been widely used in the health sector. The goal is the occurrence of fewer medical errors and increasing utilization of available resources aimed at getting better patient care. This study aims to analyze effect of the perception of lean hospital implementation to the satisfaction and performance of nurses in PKU Muhammadiyah Delanggu Hospital. Subjects and Methods: This study was conducted at PKU Muhammadiyah Delanggu Hospital, and the subjects of this study were all nurses which consist of 130 people using total sampling. This questionnaire-shaped instrument is presented using a Likert scale size guide. This study uses the SEM method and uses smart PLS software and trend analysis using Microsoft Excel in analyzing the data. Results: The result is the implementation of lean hospital to nurse job satisfaction is has significant result and has effect. The implementation of lean hospital to nurse performance has significant results and has a negative or no effect, but the implementation of lean hospital to nurse performance has an indirect effect on the mediating factors of nurse job satisfaction. Nurse job satisfaction towards nurse performance is significant and affect. Nurses' performance on nurse job satisfaction is significant and affect. Conclusion: The implementation of lean hospital has an effect on job satisfaction. The implementation of lean hospital does not directly effect the performance of nurses, but indirectly influences the variable job satisfaction as mediation. Job satisfaction affects performance. Performance affects nurse job satisfaction.
Corresponding Author: Naviatullaily Yarsiska	
<b>KEYWORDS:</b> Lean Hospital, Nurse Job Satisfaction, Nurse Job Performance	

### I. INTRODUCTION

Lean is one of the latest management products for the health sector. When used in the health sector, its mean the occurrence of fewer medical errors and increasing utilization of available resources aimed at getting better patient care. [1] Lean aims to identify and eliminate waste or waste.[2] The concept of lean management can also be applied in hospitals to identify problems in an effort to build continuous improvement in their environment [3]. Job satisfaction has an important role for an employee in terms of his well-being and organization. Job satisfaction is the most studied variable in the literature because of its importance in organizational behavior[4]. Employees who have a sense of satisfaction will do positive things in the company. The positive impact of job satisfaction felt by employees will be able to improve the performance of employees themselves.[5] According to Nelson the satisfaction of an employee is priceless, dissatisfied employees are less committed to the organization

that affects their performance and ultimately affect company performance. [6]

PKU Muhammadiyah Delanggu Hospital has implemented complete Lean management since early 2017. In its journey, the management team requires some planning in the field. The problem that occurred in the debate was the number of employees who resigned since lean management being applied, counted 10 employees and 6 were nurses. Other problems that might be considered must be reviewed regarding employee satisfaction with employees, in this case satisfaction with incentives. The problem above can be compared with job satisfaction which can be done later. From the results of interviews with the Hospital Patient Safety Committee (HPSC) in the hospital there was an increase in patient safety data at the beginning when lean hospital was implemented as a whole since the beginning of 2018. Therefore, one needs to be investigated regarding the performance of nurse nurses, because there are the relationship between nurse performance and clinical action in

# “Effect of the Lean Hospital Implementation on Nurse Satisfaction and Performance in PKU Muhammadiyah Delanggu Hospital”

the field is one of them by looking at the incidence of patient safety.

## II. RESEARCH METHOD

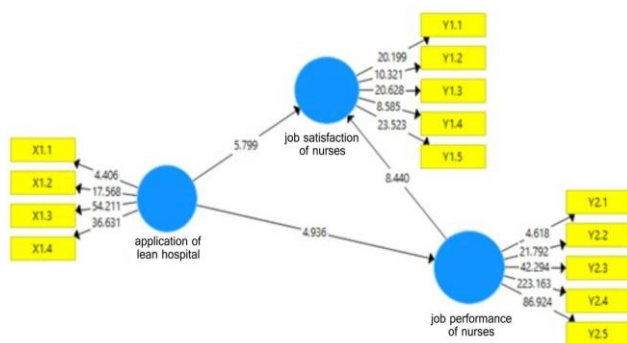
This research is a quantitative study using total sampling with a total of 130 nurses. Data retrieval is done by using questionnaires with a Likert scale. This study uses the SEM method and uses smart PLS software and trend analysis using Microsoft Excel in analyzing the data.

## III. RESULT AND DISCUSSION

The results of the descriptive analysis according to gender the number of respondents in this study was dominated by women at 83.2%. While according to age range, ages 26-35 years occupy the highest amount of 52.8%. Test the validity and reliability using smartPLS software. Test the validity using the convergent validity test and the Avarage Variance Extracted test. In the convergent validity test there is one loading factor with a value below 0.5 which should be invalid. But it can also be seen that the T-statistic value must be above 1.96 and the P-Value must be below 0.05. After being seen again the results are valid, and can be continued to the further test. The AVE test is all valued above 0.5 so it is declared valid. Composite reliability tests and alpha constraints are performed as reliability tests and the results are valid because the value is above 0.5.

The results of this analysis have evaluations with 2 inner models, they are inner model 1 and inner model 2, the difference between both is: inner model 1 has a correlation that is whether job satisfaction directly or indirectly affects performance, indicated by a down arrow (arrow from job satisfaction towards job performance). Whereas the inner model 2 illustrates the opposite, that is, whether performance has a direct or no effect on job satisfaction, which is indicated by an up arrow (arrow from job performance towards job satisfaction).

Hypothesis Test Results with Inner Model 1 are illustrated as below



**Figure 1:** Inner model 1

**Table 1.** Path Coefficient Inner model 1

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics (O/STERR)	P Values
Lean Hospital Implementation -> Nurses Job Satisfaction	0.685	0.690	0.059	11.659	0.000
Lean Hospital Implementation -> Nurses Job Performance	-0.197	-0.193	0.087	2.262	0.024
Nurses Job Satisfaction -> Nurses Job Performance	0.906	0.905	0.068	13.274	0.000

The results of the first hypothesis test: "The application of lean hospital has an effect on nurse satisfaction" obtains the coefficient value of the effect of the implementation of lean hospital on nurse job satisfaction with a value of 11,659 (p value 0,000 <0,05). The result of the coefficient value is positive, it can be concluded that the correlation between both is unidirectional, which mean that the better the implementation of lean hospital, the better of job satisfaction of nurse.

Based on the results of the t-test statistics in table above which amounted to 11,659, the t-statistic value was greater than t-table 2.00, so the first hypothesis stated "The application of lean hospital had an effect on nurse job satisfaction" was accepted.

The results of testing the second hypothesis: "The application of lean hospital" affects the performance of nurses obtains a value of 2.262 (p value 0.000 <0.05) interpreted as influential, but there are negative results at the original sample value of -0.197 and the mean sample at -0.193. The coefficient was negative mean that the higher the applied lean hospital directly on the performance of nurses, the less the performance of nurses, then the second hypothesis states "The implementation of lean hospital has an effect on nurse performance" is not accepted.

The results of testing the third hypothesis: "job satisfaction effect the performance of nurses" obtains a coefficient value of 13,274 (p value 0,000 <0,05). The result of the coefficient value is positive, it can be concluded that there is an effect between job satisfaction on nurse performance.

Based on the results of the statistical t-test of 13,274, because the t-statistic value is greater than t-table 2.00, the third hypothesis which states "Job satisfaction affects the performance of nurses" is accepted.

The inner model is a test of the structural model done by determining the R-Square as a test of the goodness of fit model. The R-Square value shows the amount of effect or contribution to the dependent variable. And the following R-Square values from inner model 1.

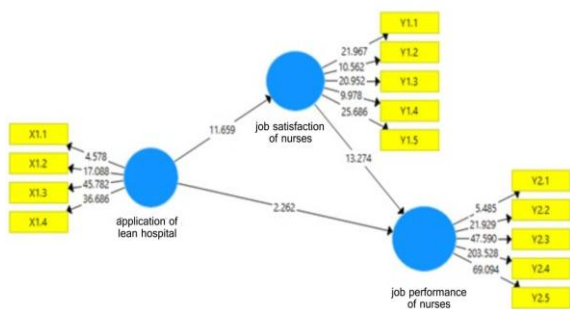
“Effect of the Lean Hospital Implementation on Nurse Satisfaction and Performance in PKU Muhammadiyah Delanggu Hospital”

**Table 2.** R Square Inner model 1

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics ( O/STERR )	P Values
Nurses Job Satisfaction	0.470	0.480	0.079	5.924	0.000
Nurses Job Performance	0.615	0.619	0.072	8.497	0.000

The results above show that the R-square value for the variable nurse satisfaction is 0.470. This means that nurse satisfaction is explained by the variable implementation of lean hospital by 47.0%. The R-square value for nurse performance variables is 0.615, which means that the nurse's performance is explained by the variables of implementing lean hospital and satisfaction at 61.5%.

While the results of the inner model 2 hypothesis test are described as below



**Figure 2 :** Inner model 2

**Table 3.** Path Coefficient Inner model

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics ( O/STERR )	P Values
Nurses Job Satisfaction	0.748	0.745	0.058	12.813	0.000
Nurses Job Performance	0.188	0.199	0.074	2.556	0.011

The results of testing the first hypothesis: "The implementation of lean hospital has an effect on nurse satisfaction" obtains value of 5.799 (p value 0.000 <0.05). The result of the positive coefficient value can be concluded that the correlation between both is positive, which mean that the better the implementation of lean hospital, the better the job satisfaction of nurses.

Based on the results of the statistical t-test of 5.799, because the t-statistic value is greater than t-table 2.00, the first hypothesis which states "The implementation of lean hospital has an effect on nurse job satisfaction" is **accepted**.

The results of testing the second hypothesis; "the implementation of lean hospital affects the performance of nurses" with the PLS approach obtains a coefficient value of the influence of the implementation of lean hospital affect the performance of nurses with a value of 4.936 (p value 0,000 <00,5). The result of the positive coefficient value can

be concluded that the correlation between them both positive, which mean that the better the application of lean hospital, the better the job satisfaction of nurses. In this picture shows that the effect of lean hospital on performance is an indirect influence with factors mediating nurse job satisfaction

Based on the results of the statistical t-test of 4.936, because the t-statistic value is greater than the t-table 2.00 it is of significant value. In Inner Model 2, the influence of the implementation of lean hospital on performance is mediated by the nurse's job satisfaction factor, so it can be concluded that the second hypothesis states "The implementation of lean hospital with mediating factors to nurse job satisfaction indirectly affects nurse performance" is accepted.

Based on the results of the test, the t-statistic is 4.936. Because the t-statistic value is greater than the 2.00 t-table, so it has a significant value. In Inner Model 2, the effect of the implementation of lean hospital on performance is mediated by the nurse's job satisfaction factor, so it can be concluded that the second hypothesis states "The implementation of lean hospital with mediating factors to nurse job satisfaction indirectly affects nurse performance" is accepted.

The result of testing the third hypothesis; "Nurse's performance has an effect on job satisfaction" obtains a value of 8,440 (p value 0,000 <0,05). The result of the positive coefficient value can be concluded that the correlation between both is positive, it means that the better the implementation of lean hospital, the better the job satisfaction of nurses.

Inner model is a test of the structural model carried out by determining R-Square as a test of the goodness of fit model. The R-Square value shows the amount of effect or contribution to the dependent variable. And here is the R-Square value of inner model 2.

**Table 4.** R Square Inner model 2

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics ( O/STERR )	P Values
Lean Hospital Implementation-> Nurses Job Satisfaction	0.429	0.423	0.074	5.799	0.000
Lean Hospital Implementation-> Nurses Job Performance	0.434	0.437	0.088	4.936	0.000
Nurses Job Satisfaction-> Nurses Job Performance	0.588	0.586	0.070	8.440	0.000

The results above show that the R-square value for the variable nurse satisfaction is 0.748. This means that nurse satisfaction is explained by the variable implementation of lean hospital and performance of 74.8%. The R-square value for nurse performance variables is 0.188, which means that



“Effect of the Lean Hospital Implementation on Nurse Satisfaction and Performance in PKU Muhammadiyah Delanggu Hospital”

the nurse's performance is explained by the variable nurse satisfaction of 18.8%.

It can be concluded from both inner models above that the second inner model is better than the first inner model. We can see that the first inner model there are negative coefficient results. The results of the coefficient value are negative, meaning that the higher the lean hospital is implemented with the mediation model of job satisfaction, the less the nurse's performance will be. While in the second inner model all the coefficients are positive, including the effect of implementing lean hospital on nurse performance. So what is applied is the second inner model whose interpretation is the implementation of lean hospital directly affect the satisfaction and performance of nurses, while the nurse's performance affect nurse satisfaction.

In the implementation, it can be interpreted that the effective implementation of lean hospital is aimed at improving the performance of nurses, but if implemented directly with the target (without mediating factors) it turns out to give negative or no effect. So to get a positive influence between the implementation of lean hospital to the performance of nurses it is recommended to have a goal of nurse satisfaction first. The results of this study support the research conducted by Rodríguez et al. with the finding that the autonomy of work with perceived lean healthcare concepts and self-evaluation has a positive impact on job satisfaction.[7] This result is also in accordance with the research conducted by Pamungkas and Franksiska which states that Kaizen culture influences employee performance and rewards moderate or strengthen that effect.[8]

The results of this study support the research conducted by Drotz and Poksinska which states that lean implementation cannot be considered sustainable because the working conditions of employees and managers deteriorate under the application of lean.[5] This is due to many things, one of which is conveyed that, to build job satisfaction, job demands must be balanced against work resources. This hypothesis is also supported by the research of Sim, Curatola, and Banerjee with the results that with the implementation of lean systems employees get more support from the management team so as to increase employee satisfaction. [9]

The priority scale for each variable on the indicator can be seen in the measurement coefficient of the outer model, sequentially from the largest value towards the smallest value. Which can show the order of tendencies of the nurse's interest in the indicators in the tested variable.

The authors in this study found that the priority scale for each variable in implementing lean hospital at PKU Muhammadiyah Delanggu was as follow:

**Table 5.** Priority scale

Lean Hospital Implementation		Nurses Job Satisfaction		Nurses Job Performance	
Indicator	Coefficient	Indicator	Coefficient	Indicator	Coefficient
Long-term thinking	4,406	Satisfaction with supervisor	20,199	Assessment	4,618
Eliminate Waste	17,568	Satisfaction with co-worker	10,321	Nursing Diagnoses	21,792
People and Patners	54,211	Satisfaction with salary	20,628	Planning	42,294
Continuous Improvement	36,631	Satisfaction with promotion	8,585	Implementation	223,16
		Satisfaction with job	23,523	Evaluation	86,924

In the variable implementation of lean hospital, "people and partners" have the highest priority scale compared to the other three indicators. From this result, the management should pay attention to the matters related to people and partners. The priority scale results are in line with the research of Inamizu et al. which has the result that members will be more optimal in working in teamwork under a lean management system, even in this study there are steps to change lean systems into over-lean in a teamwork system in a company.[10] Whereas after the break-down of each question, it is known that the biggest value on the dominant indicator of people and partners is from the question "Supervisor respects partner networks". One example of its application in PKU Muhammadiyah Delanggu Hospital is the selection of cleaning service partners. The management team selects a small and non-bonafide cleaning service company, which is then given input and assists the company in improving service. This provides an extra advantage from partners, namely high loyalty from the partners themselves. The results are in accordance with the research conducted by Suwondo which states that building partnerships between parts and personal influences positively and significantly towards the successful implementation of 5S work culture (One of the lean management principles). [11]

In the variable job satisfaction, the highest priority scale is satisfaction with work. Then followed by satisfaction with salary, satisfaction with superiors, satisfaction with fellow nurses and finally satisfaction with promotion. From the questions we asked in the questionnaire that led to job satisfaction, it was known that nurse dominant indicators tended to feel satisfied when they knew that they had helped heal patients. It seems that one of Lean's philosophies which is respect for people applied by the management team at the PKU Muhamadiyah Delanggu Hospital to nurses has been reflected in the attitude of nurses to the patients he cared for. Which of these philosophies is very relevant in realizing lean management philosophy, namely respecting people as outlined in the work of Graban that two important factors in lean management are elimination of waste and respect of people.[12]

The first priority scale in the performance variable is the "implementation" indicator whose coefficient value is

very dominant compared to other indicators, in accordance with the concept and method of nursing in Nursalam which states the importance of the five nursing concepts along with the implementation flow diagram, among others, assessment, diagnosis, planning, implementation, and evaluation. [13]

#### IV. CONCLUSION

From the results of this study conclusions can be drawn as below: The implementation of lean hospital affects nurse job satisfaction. The implementation of lean hospital does not directly affect the performance of nurses, but indirectly affects the factors mediating nurse job satisfaction. Nurse job satisfaction affect nurse performance. Nurse's job performance effect nurse's job satisfaction. There are additional conclusions from the analysis of priority scales, and they are: The first priority scale is variable implementation of lean hospital on people and partners indicators. The first priority scale of the nurse's job satisfaction variable is the indicator of satisfaction with work. The first priority scale is the nurse performance variable is on the implementation.

The results of this study have limitations that need to be considered for subsequent research. These limitations are as follows: The results of this study can be applied properly and efficiently at PKU Muhammadiyah Delanggu Hospital and need to be reviewed again if applied in other hospitals. The research subject is only limited to nurses, it is necessary to re-research using respondents from all RS employees and broader respondents.

Based on the results of this study, we can provide some input that can be used as material for consideration to evaluate the application of lean hospital to job satisfaction and the performance of employees of the PKU Muhammadiyah Delanggu hospital. For PKU Muhammadiyah Delanggu hospitals: There needs to be a periodic evaluation of the application of lean hospital to the PKU Muhammadiyah Delanggu Hospital which is directly related to the nurse's performance reference. There needs to be a standard measurement of the performance of nurses specially formulated in PKU Muhammadiyah Delanggu Hospital and adapted to national policies and the principle of lean hospital. It is necessary to implement a program that evaluates the performance of nurses by referring to increasing job satisfaction in accordance with the principles of lean hospital.

For further research: Based on the problems of patient safety in this hospital, it is necessary to conduct qualitative research with in-depth interviews and focus group discussions (Focus Group Discussion) by including safety factors in nurse performance on the application of lean hospital. The need for more effective lean hospital principles is emphasized by creating slogans that are easily accepted and remembered in hospitals to improve nurse

performance. The slogan was adopted from (Grabau 2016) but has been adapted to Indonesian, namely 5 S: Sort, Save, Cool, Simultaneously, Self-Management.

#### V. REFERENCES

1. Abdelhadi, Abdelhakim, and Mwafak Shakoor. 2014. "Studying the Efficiency of Inpatient and Outpatient Pharmacies Using Lean Manufacturing." *Leadership in Health Services* 27 (3): 255–67. <https://doi.org/10.1108/LHS-04-2013-0019>.
2. Gaspersz, Vincent; 2011. Sistem Manajemen Kinerja Terintegrasi Balanced Scorecard dengan Malcolm Baldrige dan Lean Six Sigma Supply chain Management: Contoh Implementasi pada Organisasi Bisnis dan Pemerintah. Vinchristo Publication. [http://digilib.bkkbn.go.id/index.php?p=show\\_detail&id=17626&keywords=](http://digilib.bkkbn.go.id/index.php?p=show_detail&id=17626&keywords=).
3. Ahmad, Habib, Khursheed Ahmad, and Idrees Ali Shah. 2010. "Relationship between Job Satisfaction, Job Performance Attitude towards Work and Organizational Commitment" 18 (2): 11.
4. Dickson, Eric W., Sabi Singh, Dickson S. Cheung, Christopher C. Wyatt, and Andrew S. Nugent. 2009. "Application of Lean Manufacturing Techniques in the Emergency Department." *Journal of Emergency Medicine* 37 (2): 177–82. <https://doi.org/10.1016/j.jemermed.2007.11.108>.
5. Drotz, Erik, and Bozena Poksinska. 2014. "Lean in Healthcare from Employees' Perspectives." Edited by Terry Sloan, Anneke Fitzgerald, Kathryn J. *Journal of Health Organization and Management* 28 (2): 177–95. <https://doi.org/10.1108/JHOM-03-2013-0066>.
6. Nelson, Noelle. 2006. "A Little Appreciation Can Go a Long Way toward Employee Job Satisfaction." *Employment Relations Today* 33 (1): 19–26. <https://doi.org/10.1002/ert.20094>.
7. Rodríguez, Denise, Hendrik Van Landeghem, Virginia Lasio, and Dirk Buyens. 2017. "Determinants of Job Satisfaction in a Lean Environment." *International Journal of Lean Six Sigma* 8 (2). <https://doi.org/10.1108/IJLSS-01-2016-0002>.
8. Pamungkas, Erix Irvan, and Rosaly Franksiska. 2018. "Analisis Pengaruh Budaya Kaizen Terhadap Kinerja Karyawan Dengan Reward Sebagai Variabel Moderasi Dalam Rangka Penguatan Daya Saing Bisnis." *Jurnal Manajemen Daya Saing* 20 (1). <https://doi.org/10.23917/dayasaing.v20i1.6037>.
9. Sim, Khim L, Anthony P Curatola, and Avijit Banerjee. 2015. "Lean Production Systems and Worker Satisfaction: A Field Study," 22.

“Effect of the Lean Hospital Implementation on Nurse Satisfaction and Performance in PKU Muhammadiyah Delanggu Hospital”

10. Inamizu, Nobuyuki, Mitsuhiro Fukuzawa, Takahiro Fujimoto, Junjiro Shintaku, and Nobutaka Suzuki. 2014. “Group Leaders and Teamwork in the Over-Lean Production System.” *Journal of Organizational Change Management* 27 (2): 188–205. <https://doi.org/10.1108/JOCM-08-2012-0122>.
11. Suwondo, Chandra. 2012. “Penerapan Budaya Kerja Unggulan 5s (Seiri, Seiton, Seiso, Seiketsu, Dan Shitsuke) Di Indonesia” 1 (1): 19.
12. Graban, Mark. 2016. *Lean Hospitals: Improving Quality, Patient Safety, and Employee Engagement, Third Edition*. CRC Press.
13. Nursalam. 2008. *Konsep & Metode Keperawatan (ed. 2)*. Penerbit Salemba.