

Development of Waste Identification Instrument Adopted from Lean Management System Handbook in Outpatient Unit of dr. Sayidiman Hospital, Magetan

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Abstract

Health care system always achieved a challenge to provide high quality of health care and unlimited resources. Important aspect that needed to be developed in health care system in National Health Insurance era in order to be able to provide the best care for the patient with efficient resource was the development of procedure for improving patients flow and service timeliness. Most of previous studies had been correlated with the implementation of management lean and waste identification, but none of instrument of waste identification was tested its validity and reliability as one of the efficiency steps in lean hospital. Based on it, it required to develop the instrument of waste identification and conducted validity and reliability test of its instrument. This research aimed to develop the waste identification instrument adopted from Lean Management System Handbook in the outpatient unit of Dr. Sayidiman Hospital, Magetan, Indonesia. The conducted tests were content validity test and construct validity test for conducting the instrument of validity test, which used correlation test of Pearson Product Moment, and the reliability test used Cronbach's Alpha method. The total of participants was 33 who consisted of 28 nurses from 17 polyclinic and 5 doctors. The content validity test, among the 100 items of adopted questions, there were 25 items of irrelevant questions which were used in hospital service, thus, they were removed by the researchers. The result of expert's review among 75 items that the researchers proposed, 5 items of the questions were removed due to irrelevant questions and 4 items of questions were revised for grammatical rules and each items were combined, from two items became one item of question because those questions had similar meaning. Thus, from the results of expert's reviews, it was obtained 68 items and they were used for first stage test by involving 26 participants. After constructing the validity, the result of the first stage test showed that 12 items of questions showed invalid result and 56 items showed valid result because the score was > 0.4044 (r table value). Based on 56 items of questions in test result of first stage, it was conducted the test result of second stage by involving 33 participants. The result of validity test showed that 17 items of 56 items in the instrument of waste identification were invalid because they had Pearson Correlation value in < 0.3440 . The result of reliability test by using Cronbach's Alpha, based on 39 items questions, which were valid, showed that the instrument was valid and had score of 0.878 (> 0.6). The instrument of waste identification could be used to identify waste in outpatient installation due to its validity and reliability. Further research was required in order to know the effectiveness of the waste identification checklist.

Keywords: validity, reliability, instrument, waste identification, lean hospital

I. INTRODUCTION

Health care system always achieved the challenge to provide high quality of health care and unlimited resources. Important aspect that needed to be developed in health care system in National Health Insurance (*in Indonesian: Jaminan Kesehatan Nasional*) era in order to provide the best service for the patient with an efficient resource was the development of procedure to improve patients flow and service timeliness. Outpatient unit in hospital generally had patient's visit greater rather than other installations in a day. The patient flow in outpatient, particularly in referral hospital, needed collaboration with many units, such as administration unit, medical records, laboratory, radiology, pharmacy, inpatient installation, and emergency unit.

Therefore, the staff of outpatient tended to feel frustration with the process of service and the fullness of queue room. Doctors also complained of their patient's waiting time due to besides consultation and examination by doctor, for the process of diagnose, they also needed to wait for the result of laboratory or radiology division in quite long time. Hence, the patient was late for next medical procedure. This wasted time while waiting for either the process of registration or the call for examination by the doctor caused the patients would feel disappointed and could influence patients' loyalty. The problem that continuously disturbed the service process against patients in terminology of lean was known as waste. It was also considered as the activity which didn't give an additional value for the patients.

The research of waste was regarded as a new and limited research in health field, particularly in Indonesia. It was because in its development, society still focused to use lean for production operations rather than service

operations. It was important to improve the service performance, especially in the hospital service. Thus, it was needed the development of the instrument of waste identification in Indonesian hospitals. Dr. Sayidiman Hospital was a referral hospital in Magetan, East Java, Indonesia. During the last three years, the number of patient's visits in the outpatient installation had decreased. In 2013-2014, the total of 91.671 became 88.883. Then, in 2015, the total became 83.988 (medical record visit data).

Based on the background above, waste identification required in the outpatient installation service in dr. Sayidiman Hospital, Magetan. However, the previous researches had not used the standard of the instrument of waste identification yet, thus, it was needed the development of the instrument of waste identification in the outpatient installation service in hospital. In this research, it was developed the instrument of waste identification which was adopted from Lean Management System Handbook.

II. METHODS

The development of waste identification instrument adopted from Lean Management System Handbook in outpatient unit of dr. Sayidiman Hospital, Magetan utilized participatory action research method by using qualitative and quantitative approach. The qualitative analysis was conducted in order to valuing the content validity which included logic validity and appearance validity by applying online discussion technique with two academicians and a manager of hospital. Qualitative approach was used in order to test the construct validity that was by using correlation test of Pearson Product Moment; meanwhile, the reliability was by using Cronbach's Alpha test.

This research was conducted within three stages: preparation, implementation, and finishing. The stage of preparation encompassed the arrangement of proposal, the permit of the research, the development of questionnaire, interview guidance, workshop guidance, and other instruments. The process of implementation referred to stage of action research cycle, which were: 1) Diagnosing Action (arranging draft instrument which referred to lean management system handbook); 2) Planning Action (content validity test through expert judgment); 3) Taking Action (implementation of first trial test on 26 participants in outpatient installation, implementation of workshop that involved both nurses and doctors, implementation of second trial test on 28 nurses and 5 doctors); 4) Evaluating Action (construct validity test by using the correlation test of Pearson Product Moment and reliability test by using Cronbach's Alpha). The finishing stage included the arrangement of summary, analysis and explanation, and consultation and conference.

III. RESULTS

Generally, the description of the informant of this research was provided in table 1. Most of the participants of this research were 40-50 years old, female, and having educated in Diploma III of Nursing.

Table 1. Description of Participants in this Research

	Participant	Total
Age	< 40 years old	8
	40 – 50 years old	20
	> 50 years old	5
Sex	Male	5
	Female	28
Education	D III	23
	S1	7
	S2	3

The instrument of waste identification was obtained from the result of literature searching. Then, it was translated into Indonesian language and the substance of the instrument was adapted from the characteristic of hospital service. Among the 100 items in Lean Management, it was only taken 68 items and other 25 items were removed due to their irrelevant items with hospital services.

In the process of content validity test (expert judgment), the experts were asked to give a suggestion that related to the organized instrument by utilizing online method discussion through email and social media. In this case, the 68 items which were arranged were reduced to be 65 items by improving the grammatical parts so that it would be easier to be understood by the participants.

The first stage test was conducted on February 24, 2017 by involving 21 nurses and 5 doctors. The questionnaires which were returned and filled correctly were 24 sets. Workshop was joined by human resources staffs who were involved in the outpatient unit of the dr. Sayidiman Hospital, Magetan on March 11, 2017 by inviting one of the experts who had reviewed the instrument that had been made. The material of the workshop included the socialization about lean hospital, waste in hospital generally, and special waste in outpatient unit, tips for being

success for implementing lean management, particularly for waste identification in each units, and finding out the problem root. Thus, the waste could be reduced or removed. The workshop was attended by 55 participants who consisted of the officers in outpatient unit, the representation from the management of hospital, and nursing committee. The second stage of trial was conducted on 13rd March 2017. The instrument was divided by 28 nurses and 5 doctors. The validity and reliability instrument test were presented in Table 2.

Table 2. Validity Test in The Instrument of Waste Identification (N=33; df = N-2 = 31, r table = 0.3440)

Type of Waste	Item	r count	r table	Decision	Explanation
Waste of Defect	1	0.602	0.3440	Valid	Usable
	2	0.635	0.3440	Valid	Usable
	3	0.500	0.3440	Valid	Usable
	4	0.754	0.3440	Valid	Usable
	5	TA	0.3440	Couldn't be analyzed	Changed/omitted
	6	0.003	0.3440	Invalid	Changed/omitted
	7	0.659	0.3440	Valid	Usable
	8	TA	0.3440	Couldn't be analyzed	Changed/omitted
	9	0.310	0.3440	Invalid	Repaired
	10	0.661	0.3440	Valid	Usable
	11	-0.041	0.3440	Invalid	Changed/omitted
	12	0.493	0.3440	Valid	Usable
	13	0.552	0.3440	Valid	Usable
	14	TA	0.3440	Couldn't be analyzed	Changed/omitted
	15	0.801	0.3440	Valid	Usable
	16	0.313	0.3440	Invalid	Changed/omitted
	17	0.347	0.3440	Valid	Usable
	18	0.127	0.3440	Invalid	Changed/omitted
	19	0.432	0.3440	Valid	Usable
	20	0.712	0.3440	Valid	Usable
	21	0.747	0.3440	Valid	Usable
Waste of Overproduction	22	0.333	0.3440	Invalid	Repaired
	23	0.291	0.3440	Invalid	Changed/omitted
	24	0.595	0.3440	Invalid	Usable
	25	0.788	0.3440	Valid	Usable
	26	0.595	0.3440	Valid	Usable
Waste of waiting time	2	0.453	0.3440	Valid	Usable
	28	0.314	0.3440	Invalid	Repaired
	29	0.748	0.3440	Valid	Usable
	30	0.748	0.3440	Valid	Usable
	31	0.558	0.3440	Valid	Usable
Waste of non-utilized staff	32	0.538	0.3440	Valid	Usable
	33	0.768	0.3440	Valid	Usable
	34	0.576	0.3440	Valid	Usable
	35	0.590	0.3440	Valid	Usable
	36	0.555	0.3440	Valid	Usable
	37	0.300	0.3440	Invalid	Repaired
Waste of transportation	38	0.665	0.3440	Valid	Usable
	39	0.807	0.3440	Valid	Usable
	40	0.334	0.3440	Invalid	Repaired
	41	0.137	0.3440	Invalid	Changed/omitted
Waste of inventory	42	0.807	0.3440	Valid	Usable
	43	0.807	0.3440	Valid	Usable
	44	TA	0.3440	Couldn't be analyzed	Changed/omitted
	45	0.487	0.3440	Valid	Usable
Waste of motion	46	0.000	0.3440	Invalid	Changed/omitted
	47	0.385	0.3440	Valid	Usable
	48	0.417	0.3440	Valid	Usable
	49	0.616	0.3440	Valid	Usable
	50	0.545	0.3440	Valid	Usable
	51	0.752	0.3440	Valid	Usable

Type of Waste	Item	r count	r table	Decision	Explanation
Waste of excess processing	52	0.439	0.3440	Valid	Usable
	53	-0.235	0.3440	Invalid	Changed/omitted
	54	0.889	0.3440	Valid	Usable
	55	0.711	0.3440	Valid	Usable
	56	0.895	0.3440	Valid	Usable

Reliability test was used in order to test the consistency of measurement tools; whether the result was consistent or not (if not, the measurement would be re-conducted). Unreliable questionnaire instrument was inconsistent for the measurement, so that the measurement result was unbelievable. Reliability test that was used in this research was using cronbch's alpha method.

IV. DISCUSSION

The instrument of waste identification consisted of 100 items of closed questions with two choices of answer, "Yes" and "No". The researcher took 74 items of relevant questions for being adopted, translated, and arranged according to the condition of outpatient service in hospital in order to be proposed to the chosen experts for conducting review. According to the researcher, those steps were good because they had been appropriate with the procedure in arranging the instrument. Moreover, this was in accordance with Salimi and Azimpour's explanation (2013) who stated that a good instrument procedure had to endure several steps; these were: 1) construct exploration 2) item organization, 3) instrument evaluation in qualitative and quantitative way, and 4) final revision.

The first step was construct evaluation that was conducted through adopting items about waste identification based on Charron, et al. (2015) in his book (the lean management system handbook), which was established as an instrument that had been tasted as the instrument of waste identification. The exploration procedure above was also appropriate with the procedures in developing the instrument based on de Vellis, 2016, which in determining things that would be measured consisted of the goal of the measurement, theory that helped the clarity, and certainty in helping the developed clarity of the instrument that was developed.

The second step was arranging the item that also had been conducted appropriately with good principle according to either Salimi & Azimpour (2013) or De Vellis (2016) which was in this stage, it had to be conducted a selection of the material that reflected the goal of making instrument and determining the total of the item.

The standard procedure for planning action stage in arranging the instrument was the test of the content validity that consisted of logic validity and appearance validity (Azwar,2012; Retnawati,2016). In the process in arranging the instrument of waste identification in procedure of outpatient service unit in hospital, this procedure had been done well. Referring to Aiken (1985) and Azwar (2012) who explained that content validity test had to involve the expert for analyzing against arranged items. The process of the development of this instrument also had involved 3 experts who consisted of 2 experts in lean hospital from academician and 1 practitioner in managing the hospital. However, Kartowagiran (2009) also stated that the content validity level of an instrument was more depended on individual subjective assessment of the expert. This was strengthened by a fact that the estimation of content validity did not involve any statistical calculation instead of only using rational analysis.

The instrument trial was used in order to look at construct validity test in twice because there were some questionnaires which were not filled by the participants in first trial and there were also some participants who filled the questionnaire with two choices of answers (all of the answers were chosen). Thus, the researcher had difficulty for analyzing to test the validity of the instrument. According to Fraenkel & Wallen (2010), they stated that validity test could be repeated if the result of validity test was not appropriate with what the researcher had expected. Based on Dharma (2011), he stated that validity test was needed in order to make sure whether the instrument could be used or not, which meant that the instrument was able to measure what should be measured. Besides, Fraenkel and Wallen (2010) also stated that validity test was conducted for looking at the congruence and accuracy of a tool for assessing something.

The assessment of validity and reliability of the instrument of waste identification was by *Pearson Product Moment* analysis and *Cronbach Alpha* method. The *Pearson Product Moment* analysis was for validity test and the *Cronbach Alpha* method was for reliability test of instrument. These were in accordance with Retnawati's statement (2016) which the process of reliability calculation was known as quantitative estimation: 1) external consistence, 2) internal consistence, 3) composite reliability that consisted of *Alpha Cronbach*, KR-20 and KR-21. This was also in accordance with Priyatno's statement (2016). He stated that in SPSS, the validity test tool that was mostly used was *Pearson* correlation method between each item score and total item score, meanwhile, the reliability test that was mostly used for the research was using *Cronbach's Alpha* method, which was testing the consistency of measuring tool whether the result was still consistent or not if the measurement was repeated.

The result of either validity test or reliability of instrument on this research was valid instrument and reliable result. Thus, the instrument of waste identification could be stated as good instrument. This was in accordance with Kartowagiran's statement (2009) that the prime requirement of good instrument was valid and reliable. By good instrument, the result of the measurement would be good too. As the impact, the policy that was based on the data of measurement result would be also correct.

V. CONCLUSION AND SUGGESTION

This research had result the instrument that could be used after through the process of review by experts, validity test, and reliability test. The instrument that was resulted consisted of eight categories of waste in hospital and there were 39 items of questions which were: *waste of defect* (13 items of questions), *waste of overproduction* (2 items of questions), *waste of waiting time* (4 items of questions), *waste of non-utilized staf* (5 items of questions), *waste of transportation* (2 items of questions), *waste of inventory* (3 items of questions), *waste of motion* (5 items of questions), and *waste of excess processing* (4 items of questions). The instrument of waste identification that was resulted had qualified either validity criteria or reliability criteria, including: content validity, construct validity, and reliability of instrument.

This instrument was suggested to be able to be used in order to measure/ identify the waste in outpatient installation of Regional Public Hospital dr. Sayidiman Magetan particularly and other hospitals generally. Besides, it needed to be developed again so that it could not only be used in outpatient unit, but also in all hospital units in Indonesia.

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