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Evaluating Quality of Work Life as Base of Working Condition Improvement Based on Participatory Ergonomic: Case Study on Workers in Small Industry of Gamelan XYZ at Bali, Indonesia

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Abstract

Small Industry of XYZ Gamelan in Bali Province is a heritage industry. Currently, the existence of small industry of Gamelan has become serious cause of attention for the local government; this makes the gamelan industry one of the interesting tourist objects in Bali. The demand of quality of life improvement of worker is a will of all workers, but nevertheless, some cultures, local tradition, and the value of community life are becoming constraint to changing the local character. The objective of this research is to evaluate four domain qualities of life as base of initial information of working condition improvement based on user need (participatory ergonomic). The sampling technique used is non-probability sampling with accidental sampling design, that is, choosing sample based on immediacy of subject to population. A questionnaire was given to subjects based on inclusion criteria randomly. Data collection was done by parameter of quality of life questionnaire developed by WHO, that is, WHOQOL-100, which contains 26 questions in total. It was a self-report questionnaire, where subjects are requested to respond as conditions in 4 latest weeks. Data was analyzed quantitatively and qualitatively. Result showed that the quality of life of workers in small industry on XYZ Gamelan at Bali Province on physical health domain has a score of 54, meaning good; psychological score of 44, meaning less social; relationship domain had a score of 75, meaning good; and environment domain 44, meaning less good. Since physical health and environmental domain had lowest scores, thus improvement that considering human as the main indicator is a must. Improvement could be conducted by redesigning work facility, work load adjustment, and worker performance, and evaluating worker and company productivity.

Keywords: quality of life, participatory ergonomic, physic, psychologic, social relationship, environment

1. Introduction

Health is not only free from disease or illness, but also physical, mental, and social health. Small Industry of XYZ Gamelan Craftsmen in Bali Province has existed for a long time so that besides its famous as a metal producer, it is also famous as one of tourist destinations which can attract visitors, especially tourists coming from abroad. The demands for environmental improvement become serious concerns of various parties including the workers or employees quality improvement. The demands of improving quality of life of employees are not apart from the wishes of all employees, yet various cultures, local traditions, and values of life of the society become constraints and local characteristics which are not easily changed. The basic theory states that the Quality of Work Life (QWL) is a working condition resulting from the interaction between individual and his work which makes the worker be more productive, the worker feels a role in organizational development, gains responsibility and feels a sense of belonging to the job [1]. In general, the workers quality is already good, but it still has not been supported by research which simultaneously is able to measure the quality of life of the worker to be taken as the basis to improve the working condition. Although it does not seem that there are principle problems, but simply because the quality criteria are quite a lot, empirical study is needed to become scientific reference for the improvement of working life.

Quality of life is a multidimensional building that is subjective, which includes functional ability and physical and psychological health of humans [2]. QWL concept has a positive and significant influence on performance improvement, fostering the desire of employees to remain in the company's organization, because workers are regarded as "human capital" rather than as contracted and salaried workers only. The principle of ergonomic application is fitting the task to the man, that is, every work must be balanced with human capabilities and limitations so that the results achieved increase [3].

The purpose of this study is to conduct evaluation of the four domains of the quality of life of the employees for further used as initial information for user desired-based (ergonomic participatory). The ergonomic participatory is carried out to obtain a holistic description of the four domains and 26 instruments listed in the WHOQOL instrument.

The result of this evaluation becomes the input to improve working conditions, especially gamelan craftsmen in XYZ Bali Province.

The role of all employees to participate in openness and provide comprehensive assessments has an impact on the measurement of the improved work condition design. The concept of exploring problems with ergonomic participatory models can identify problems and simultaneously guide alternative outcomes of improvement designs produced by the workers themselves, the evaluation stage involves all employees involved in each field and then proceed by jointly designed improvements as well. The success of a program is a part of mutual success, but on the contrary, the failure of the program provides an evaluation feedback which can be implemented by all parties.

According to WHO in 1991, an organizational project of the ¹¹ quality of world life or The World Health Organization Quality of Life (WHOQOL) has been conducted, which has formulated ¹⁹ four domains of quality of life, that is [2]: (1) Physical health includes disease, sleep and rest anxiety, energy and fatigue, ⁴ mobility, activities of daily living, dependence on medication and treatments, work capacity, (2) Psychological includes positive feelings, thinking, learning, memory and concentrations, self-esteem, bodily image and appearance, negative feelings, individual beliefs, (3) Social relation includes ² personal relationships, social support, sexual activity, (4) The environment includes freedom, physical safety and security, home environment, financial resources, health and social care, opportunities for acquiring new information and skills, participation in and opportunities for recreation, environmental activity, transportation. The purpose of this formula is to develop an assessment instrument of quality of life that can be used nationally and cross-culturally. The WHOQOL instrument has been developed collaboratively in a number of world centers and tested of its validity and reliability. This study uses WHOQOL questionnaire to assess the level of quality of life of XYZ gamelan craftsmen in Bali Province. With the approach of participatory method, the instrument assessment is more objective, the process of exploring the solution is also more practical and simple and able to be implemented by the workers themselves.

2. Methods

2.1. Subject of research

The subject of the research was the workers exist in small industry of xyz gamelan craftsmen in Bali Province. The randomly-chosen subject of the research had fulfilled

the inclusion and exclusion criteria, so that they could be determined as the sample of this research which consisted of 14 craftsmen groups.

2.2. Population

The target population of this study was all workers in the small industry of gamelan craftsmen in Klungkung Regency with a total number of workers as many as 59 craftsmen groups or 223 people. Affordable populations were workers in the gamelan industry who had a place for smelting metal in form of "perapen". Affordable population was determined by the gamelan craftsmen place which was used as the subject of the research and workers' characteristics.

2.3. Research design

The design of this research was in form of non-probability sampling with accidental sampling design, that was a sampling based on the subject proximity in reaching the population. The questionnaire was distributed to the subjects based on the inclusion criteria as random sampling. The data were collected by using a measurement tool of the questionnaire of the quality of life developed by WHO namely WHOQOL-100 which consisted of 26 questions. The questionnaire was in the form of self-report, the subjects were asked to give responds in accordance with the conditions of the last four weeks. The data were analyzed qualitatively and quantitatively.

2.4. Inclusion criteria

To gain unbiased data in the research, inclusion criteria were needed. The inclusion criteria in this research were as follows:

1. The workers age were 20 to 40 years with male gender
2. Physically healthy
3. IMT was 18,5 to 25,0 (normal)
4. Had working experience in at least seven years.
5. Willing to be involved as a sample until completion and proven by filling the *informed consent*.

3. Results

Participatory is a part of form to explore and find ideas and notion directly from users who work every day to complete the product. Workers were being given enough space and time to discuss in finding out the problems being faced by them in every day. Indeed, the habits that are carried out each day construct judgments be often biased, because of a high enough discomfort if the workers are ¹⁵ in a relatively long period of time, it will make them be accustomed and assume that the environmental conditions have been parts of the working impact so that temporary conclusions are that there are no problems or constraints in working. Likewise with the work attitude that is not ergonomic, if it is carried out for a long time, the workers have adapted and feel accustomed, then it makes ergonomic problems be a habit and workers routine which are not a handling priority for changes in working conditions.

Habits which have been going on for quite a long time and become a part of a work attitude that has been considered normal, this condition be the cause of the slow improvement of ergonomic-based working conditions, the use of a more comfortable body and naturally adjusting the anatomical movement of the human body become slow to be applied, so that ergonomic participatory research is really appropriate to be conducted. The advantages of the ergonomic participatory concept is that the workers feel of having and able to explore problems and find alternative solutions to existed problems in their own working conditions.

The scores of quality of life in XYZ gamelan craftsmen in Bali Province were resulted from the value of each different domain. The value of domain 1 is on the workers' Physical condition, the value of domain 2 is on Psychological burden, the value of domain 3 is on social relations and the value of domain 4 is on environmental conditions which can be seen in Figure 1.

Based on Figure 1, it can be interpreted that the instruments of Domain 1 point 1-7 and Domain 3 show a higher level graphic as compared to the score of the quality of life of the two other domains. So, it can be concluded temporarily that domain of workers physical factor and of workers social factor are higher than the two other domains which are Psychological and Environment. In order for the data to be analyzed further, the assessment results are needed to be transformed into the scale of 20 and the scale of 100.

Based on Figures 2 and 3, it can be seen that the obtained values from transformation scores (4-20) and transformation scores (0-100) have differences, appeared

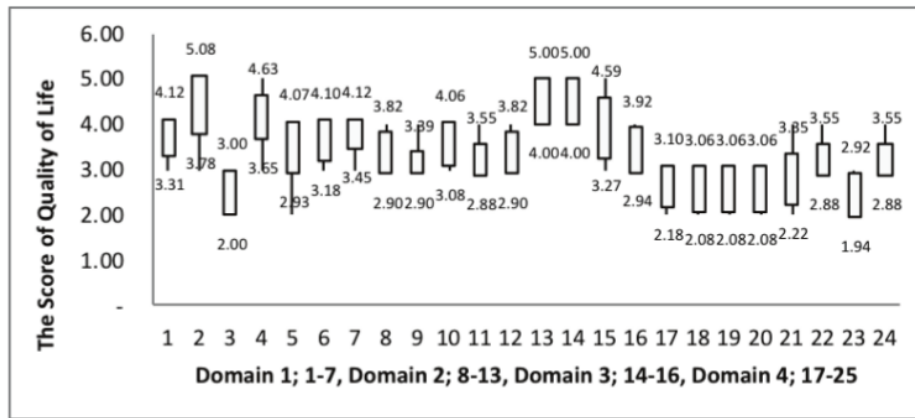


Figure 1: Data spreading of respondents rating (n = 75).

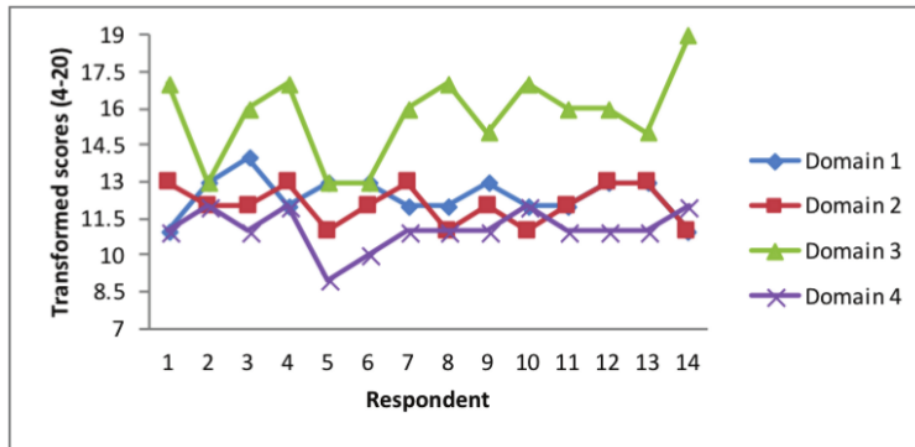


Figure 2: Data transformed score (4-20).

on transformation scores (4-20) Physical domains are 13, psychological and environmental domains are 11, social domain are 16. In transformation score (0-100), Physical domain are 56, psychological and environmental domains are 44, social domain are 75. However, the difference of the value of these two transformations can give the same quantitative results.

4. Discussion

Based on Table 1, it can be concluded that the Physical Domain and Social Domain of the workers in small industry of xyz gamelan craftsmen in Bali Province are included to good category, it means that the workers have been able to overcome a few factors

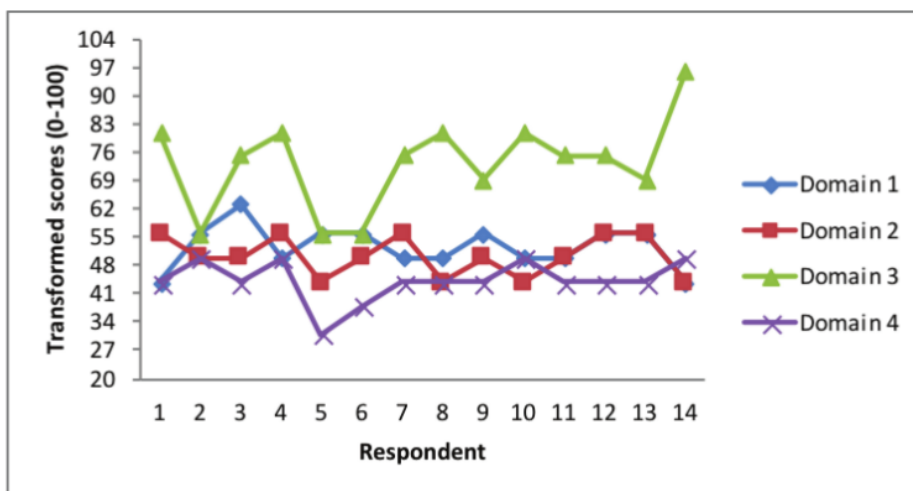


Figure 3: Data transformed score (0-100).

TABLE 1: The value of transformed scores (4-20) and (0-100).

Domain		General Score		Transformed score (4-20)	Transformed score (0-100)	Description
Domain 1	Physical	302	21.57	13	56	Good
Domain 2	Psychological	232	16.57	11	44	Poor
Domain 3	Social	166	11.86	16	75	Good
Domain 4	Link.	303	21.64	11	44	Poor

which affect physical condition, such as disease, sleep and rest anxiety, energy and fatigue, mobility, activities of daily living, dependence on medication or treatments, work capacity. As there has been many approaches implemented in this small industry of gamelan crafts, it is possible that there has been acclimation to the demands of tasks which have become routine activities in each day. Instantaneous measurement is possible indication of excessive workload, but because it has been adapted to the surrounding environment so that the physical condition has stabilized. The demands of task are influenced by the characteristics of the task, environment, and organization where the work is carried out in a healthy, safe, convenient, efficient, effective and productive working condition, which ultimately leads to the improvement of the quality of working performance and physical stability performance [4, 5]. Improvement of productivity will be achieved if all components in the work system are ergonomically designed [6, 7]. If a not ergonomic working conditions are neglected for a long time, it will cause problems for health, comfort, and work safety [8].

While, of the social factors, the workers have also been able and gained synergy in implementing ¹⁴ personal relationships, social support, and arrangement of sexual activity in the household. The condition of a value which exists in society can be hereditary (heritage), and be a value that develops and attaches to a group and becomes a culture [9]. Ergonomics is applied by considering culture [10].

Based on Table 1, it can also be concluded that on the Domain of Psychology and Domain Environment on the workers in small industry of xyz gamelan craftsmen in Bali Province are included in a poor category, this gives information that these two domains become a more serious ⁵ attention to be implemented to improve the quality of work life. The instruments which ⁵ are included in physical domain are positive feelings, thinking, learning, memory and concentration, self-esteem, bodily image and appearance, ⁵ negative feelings, individual ³ beliefs. Whereas the environment domain includes freedom in thinking and acting, ³ physical safety and security, friendly environment, guarantee of financial resources, health and social care, opportunities for acquiring new information and skills, participation in and opportunities for recreation, environmental activities, transportation availability and ease of access.

¹ The ergonomic participatory approach can record all existing activities in the industry, thus indirectly improving the social domain, while the physical domain is in the high category as there may be an improvement on the aspects of work organization and physiological conditions of workers. The participatory is implemented by involving all parties, giving positive impact to the workers, workers who are active in determining the priority scale of the problem and its solution, the idea or notion of the workers which are delivered so that the working atmosphere is dynamic and reduce the boredom of work. Boredom is a condition with low stimulus, a condition in which the environmental characteristics received by workers seem monotonous [3, 11].

In other words, participatory means that ¹ everyone should be involved from the beginning to the end of the program starting from identification and determining priority issues to be solved and consideration of appropriate technology to be implemented when necessary. ¹ Participatory approach in ergonomic interventions can improve the outcomes quality of a new product development, this participatory approach starts with direct inquiring to users of some of the used product alternatives [12-16].

Workers are being given time and opportunity to give input, conduct design evaluations, jointly monitor the process undertaken, so that what the workers desire can be accommodated or applied to the new design. It must also involve all disciplines together, and contribute thoughts or suggestions pertaining to the new ways of working or products design, even to the making of SOP. Problems are explored and found

by all involved parties, then given space to contribute alternatives of problem solving. At the end of the activities, it is necessary to jointly evaluate to continue the problem solving on the other priorities. Implementation of a holistic approach is undertaken at the time of defining, analyzing and resolving issues which actively involve workers and other stakeholders in a team [11].

Prior to the application of ergonomic participatory, process or adaptation period often takes place, so that the conditions of changes inflicted by human activities can be easily adjusted. Participatory is the workers' involvement from the beginning to the evaluation, the workers present physically to provide the alternative proposal (the body), jointly provide suggestions by conducting process and supervision (the mean), and jointly participate to try and give input improvement of a helping tool.

Ergonomic problems need to be viewed, identified and resolved holistically. Holistic means the problem is viewed thoroughly and comprehensively between one system and its relation to processes in the other systems. Implementation of a holistic approach should be undertaken at the time of defining, analyzing and solving problems by incorporating appropriate technologies which actively involve workers and other stakeholders in a team. Work process is also influenced by environmental conditions, such as climate, humidity, wind speed, intensity of light and noise. Internal factors include age, gender, height, weight, work experience and work status. External factors of working relationships, leadership patterns. A holistic approach will impact on future system improvements in the future [17].

The quality of life of workers will continuously improve along with the system improvement, without eliminating the consideration of ability, permissibility and limitations of a human being. The system is an integral influence of several direct and indirect sub-systems, such as wages system, due to economically assessable waste, environmental health systems, in which all this time companies have to invest on the cost of replacing waste disposed to the air and workers insurance systems.

In this study, the results of the quality of life measurements can be taken as the consideration in redesigning work facilities, adjusting workload and employee work performance, evaluating employee and company productivity. In addition to physical, psychological, social and environmental factors, other in-line research on ⁶quality of life has been reported that quality of life can be influenced by lifestyle, work characteristics and workplace conditions particularly in workers in the food and textile industries [18], socio-demographic factors, job characteristics, individual characteristics and lifestyle [19]. Coverage in the quality of life assessment requires a more holistic instrument in order to respond to the various needs of respondents.

5. Conclusions

The results showed that the quality of life of the employees in the small industry of XYZ gamelan craftsmen in Bali Province were in the domain of physical health (score 54) which meant Good, the psychological domain (score 44) which meant poor, social relations domain (score 75) which meant good, and environmental domains (score 44) which meant poor. Since the physical health and environmental domains had the lowest scores, the improvements to take humans as the main benchmark becomes mandatory. Improvements can be carried out through redesigning work facilities, adjusting workload and employees work performance, evaluation of employees and company productivity.

12 Conflict of Interest

The authors declare that they have no competing interest in this research.

Ethical Approval

The sample involved in this research has been filled and approved with informed consent.

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