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THE STUDY OF CONSTRUCTION ON INDICATORS IN TAIWAN GREEN HOSPITALS

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Abstract

Taiwan is a country with limited resources. Excessive emissions of greenhouse gases, excessive energy consumption in urban buildings and excessive waste generation are the causes of environmental damage and imbalance in Taiwan. According to the UN report, Taiwan is a high-risk group for climate change. Over the past 100 years, the average temperature in Taiwan has risen by 1.3°C, about twice the global average. Therefore, Taiwan must pay more attention to the effective use of resources and energy conservation. The medical industry is the second largest energy user, consuming a lot of energy and money, at least twice as much as the average workplace. In response, the Taiwan government is actively guiding the hospital's goal of moving towards a green hospital. However, at present, Taiwan's hospitals are faced with a lot of complicated projects for evaluating green hospitals, and lack of indicators that truly belong to Taiwan's green hospitals. In this regard, the study proposed the indicators belonging to the Taiwan Green Hospital in four steps, and then obtained 220 respondents by questionnaire to confirm the reliability and validity of the green hospital indicators. This study proposes two major indicators of environmental management and environmental education, and extends eleven sub-indicators, which will be detailed in the text.

Keywords: green hospital, indicator, environment

Introduction

At present, the global greenhouse gas has reached 430ppm (normal concentration below 400ppm). Even if governments actively adopt measures to reduce greenhouse gases, the global temperature will still have a high probability of rising by 2 to 3 degrees Celsius in the future (Stern, 2000). According to the UN report, Taiwan is a high-risk group for climate change. Over the past 100 years, the average temperature in Taiwan has risen by 1.3°C, about twice the global average, higher than Japan and China. Gore (2007) believes that human behavior is the main cause of accelerating the rate of global warming. Exces-

sive emissions of greenhouse gases, excessive energy consumption in urban buildings, excessive waste generation, and deforestation, such as excessive consumption and environmental protection, are factors that accelerate warming. Therefore, if we can improve the original high energy consumption and high consumption lifestyle, it will be able to slow down or even reduce the risk caused by global warming.

The current status of the hospital: (1) to ensure that medical quality medical supplies are mostly abandoned; (2) medical equipment to perform operations immediately for safety, mostly energy-consuming standby and operating status; (3) the hospital operates 24 hours, so air conditioning And lighting also needs to operate 24 hours; (4) drug use and disposal increase year by year; (5) all-weather hot water supply causes the boiler to heat the fuel, whether it is gas or diesel. In summary, the existing hospital operation mode is neither energy-saving nor environmentally friendly, and the entire operation of the hospital must comply with the trend of energy saving and carbon saving.
If the hospital can save energy, it will have great benefits for saving carbon dioxide emissions and saving costs. In the water resources section, although Taiwan is an island country, it is also the 18th water shortage country in the world. This is a warning that must be taken seriously. Water conservation is also a goal that hospitals should pay attention to. Taiwan hospitals produce 90,000 metric tons of waste a year, of which 23,561 metric tons are harmful biomedical waste, and waste disposal costs are high. In this regard, if the hospital can be transformed into a green hospital, it will not only be beneficial to the hospital itself, but also be able to integrate with the community to reduce greenhouse gas emissions through the implementation of environmental protection and energy conservation. In addition to helping the public health, it can also Reduce pollutant discharge and reduce waste of social resources.

Since 1988, the World Health Organization has promoted the health promotion hospitals program, with the main goal of developing hospitals into healthier places, and green hospitals to creating a hospital that combines the concepts of ecology, energy conservation, environmental protection and health. This study collected green hospital literature and found that green hospitals can not only reduce hospital energy expenditure, but also meet international energy and energy conservation trends, and can effectively enhance the hospital image. However, green hospitals can only measure green hospitals by taking appropriate indicators from green buildings and green universities. Until 2010, the National Health and welfare department of the Executive Yuan of the Taiwan (2010) measured green hospitals with eight indicators, including energy efficiency, green buildings, alternative energy, transportation, food, waste, water, and environmental education. However, this study believes that green hospitals involve a wide range of aspects. Therefore, the assessment indicators should consider various indicators of the world that are beneficial for transformation into green hospitals.

This study proposes the green hospital indicators in Taiwan in four steps. In the first step, this study will consolidate and collate the indicators of the green and medical industries in countries

around the world. In the second step, the above indicators were compiled into a questionnaire scale, and 55 respondents from Taiwan who were familiar with hospital management were selected, and the opinions of the 55 respondents were extracted by factor analysis. In the third step, three teachers and experts from Taiwan who specialize in medical and green fields were invited to correct the extraction factors, and proposed indicators and measurement items suitable for the development of green hospitals in Taiwan hospitals. In the fourth step, this study interviewed 220 respondents from Taiwan's medical industry through questionnaires to confirm the appropriateness of the indicators.

Literature Review

In the literature of green hospitals, this study searches for electronic journals related to hospital administration and medical treatment, including Taiwan Master's Thesis Network, Huayi Online Library (CEPS), Actualités pharmaceutiques hospitalières, Advances in Hospitality and Tourism Research, American Heart Hospital. Journal, Annals of general hospital psychiatry, Annual report / the New Children's Hospital, Australian hospital statistics. There are only four related studies on the related words of green hospitals from the above electronic journal database (Sheng-Ta Shen, 2015, Zhang Zhihong, 2011, Wei-Chen Lin, Shu-Chin Tung & Po-Hao Chiu, 2013, Yang Jiaxuan, 2007).

In the process of promoting green hospitals in Taiwan, the National Health Bureau announced eight principles for identifying green hospitals in 2010. Other studies also cited foreign indicators (Zhang Zhihong, 2011) and Green Building Standards (Wei-Chen Lin et al., 2013) to examine green hospitals. . It can be seen that Taiwan is still a more general way of identifying green hospitals. As long as hospitals can adopt green building standards to plan building facilities, incorporate sustainability into business management activities, and value the friendly relationship between people and the environment, they will be regarded as Green hospital.

In recent years, Taiwan's research related to green buildings includes Yan Atao (2016), Zhang Congyi (2014), Zhao Zengwei (2014), Lin Jiahui (2014), Yang Zhihao (2013), Zhang Anzhen (2013) and Guo Yijun (2013) etc., its focus is on green building teaching benefits, indoor visual preference research, carbon footprint cost, smart or digital green building management system and architectural design, sustainable environmental assessment, green building materials research, evaluation index analysis, etc., although the focus of the above research is different from this study, its content can still be considered. Secondly, in terms of medical research, Taiwan's medical research focuses on epidemiological analysis, genetic research, drug treatment and other fields. Such analysis is not related to this study.

Third, regarding hospital administration, hospital administration focuses on hospital organization and management, patient medical satisfaction, medical cost and cost analysis, etc., most of them focus on administrative analysis, but ignore the discussion of green buildings in green hospitals.

Finally, there are only 4 master's thesis research in the Green Hospital. Lin

Weichen (2012) believes that the green environment can be constructed through the recognition of the green stamp and the use of the environment. With environmental knowledge and skills, the hospital can be promoted to become a healthy environment. It is recommended that the green stamp item be listed as an indicator for green hospitals. Huang Shenghua (2015) analyzes the willingness and consideration of silver-haired people by exploring factors such as green buildings, green restaurants, green hospitals, and green stores. Zhang Gongming (2014) has developed a place for human health and environmental friendliness by embedding green buildings, green restaurants, green hospitals and green shops in the health village. Yang Jialu (2007) explores the impact of hospital policies on green hospitals, which in turn affects their green behavior. In summary, Taiwan's literature on green hospitals is rare, and the reason may be that green hospitals integrate green building, medical research, and hospital administration.

At present, only three studies directly explore green hospitals. Sheng-Ta Shen (2015) uses the theory of planned behavior (TPB) as a theory to explore what factors will affect the willingness of 620 people to receive medical services in green hospitals. The results show that energy hospitals, green buildings, food, waste, water and other green hospital indicators will affect the attitude of the respondents to green hospitals; attitudes, subjective norms and perceived behavioral control can predict people's willingness to receive medical services in green hospitals.

Zhang Zhihong (2011) developed seven projects with reference to the guidelines for the implementation of green hospitals in hospitals provided by the Green Guide for Health Care in the United States and the Building Green Hospital Checklist in Canada. It is suitable for Taiwan's green hospital indicators, and interviewed 410 people and 36 medical staff on these seven indicators. The seven indicators are facility management, transportation, sustainable field management, chemical substance management, waste management, Food supply, environmentally friendly purchase.

Wei-Chen Lin, Shu-Chin Tung and Po-Hao Chiu (2013) used the nine indicators of green buildings to assess whether a hospital can be considered a green hospital. The results showed that the hospital staff believe that the hospital's promotion of green hospitals will bring the benefits of the top three: improving energy efficiency, reducing waste of resources (234 people / 84.2%), improving the image of the hospital (194 people / 69.8%) and Promote the health of patients and employees (157 people / 56.5%). The staff of the hospital highly endorsed the hospital to promote the green hospital. The staff also believed that the green hospital could improve the working environment of the hospital, strengthen the implementation and promotion of the concept of ecological, energy saving, environmental protection and health of the hospital environment for the staff of the hospital, and improve the health promotion policy for the staff of the hospital , planning, activities and awareness, and thus improve the hospital's healthy environment.

From the above-mentioned green hospital literature, we can understand that the world is still at the stage of es-

tablishing indicators for green hospitals. Many of the studies directly quote foreign green building indicators to measure Taiwan's medical institutions. The medical centers are completely different from general buildings. The characteristics and management methods are not appropriate if the hospital is directly inspected by the standards of green buildings. Therefore, it is necessary to take into account the global and Taiwan green and medical indicators to establish a comprehensive indicator of Taiwan's green hospitals.

Construction Of Green Hospital Index

This study uses a four-stage approach to establish indicators for assessing domestic green hospitals. In stage 1, this study sorts out global indicators for green and medical care; in stage 2, 55 respondents from Taiwan who are familiar with hospital management are invited to fill in the questionnaires and extract indicators based on their opinions. In stage 3, three experts from Taiwan are invited. Revised indicators and development measurement items. In stage 4, a questionnaire survey was conducted to collect 220 Taiwan medical staff's views on the indicators, and the indicators and measurement items belonging to the Taiwan Green Hospital were proposed.

(1) *The first stage*

This study reviewed the eight green hospital assessment indicators and green building indicators recommended by Taiwan's ministry of health and welfare department, as well as the USEDC's LEEDv4 indicator, CBRE's GBI indicator, USGBC's Green Guide for Health Care (GGHC) indicator, and CII's Clean & Green. Interior Building Materials indicators, consolidating and clarifying the commonality of indicators, and designing questionnaires.

(2) The second stage

This study extracted factors using principal component analysis. The KMO value is .91, which is suitable for factor analysis. In this study, six factors were extracted with the eigenvalue greater than 1 as the factor, and the cumulative explanatory variation was 65.42%. The green hospital indicator is named according to the content of the item (see Table 1 for details).

Table1. Summary Of Green Hospital Factor Analysis

Source of indicators	Item of green hospital	Efficiency of energy	Green building	Water management	Drug and waste management	Low carbon transportation	Green behavior
Taiwan health and welfare department	Efficiency of energy	.889	.288	.291	.012	.023	.201
	Green building	.231	.821	.302	.129	.102	.102
	Alternative energy	.802	.102	.129	.010	.101	.303
	Transportation	.032	-.293	.023	-.231	.792	.014

Source of indicators	Item of green hospital	Efficiency of energy	Green building	Water management	Drug and waste management	Low carbon transportation	Green behavior
ment	Low carbon food	.211	.230	-.123	-.293	.043	.692
	Waste treatment	.129	.022	.023	.882	.201	.032
	Water resource	.143	.203	.802	.093	.192	.204
	Environmental education	.212	.192	.239	.043	.230	.711
Health Care Without Harm	Green leadership	.421	.132	.110	-.231	.102	.782
	Chemical substance management	.182	.221	.230	.718	-.203	.112
	Waste treatment	.239	.292	-.231	.823	-.102	.042
	Energy reduction	.853	.103	-.129	.191	.302	-.241
	Water saving	.239	.310	.721	.191	.230	.321
	Transportation management	.029	.230	.120	.092	.802	.293
	Food control	.211	-.102	.103	-.212	.032	.662
	Drug control	.120	-.231	.191	.698	.220	.121
	Green building	.312	.812	.032	-.282	.102	-.248
	Purchasing management	-.210	.102	.042	-.032	.039	.801
USGBC	Site and transportation	.012	-.201	.102	.203	-.695	.193
	Sustainable site	-.212	.720	.201	.293	.203	.002
	Efficiency of energy	-.102	.192	.772	.111	.304	-.213
	Energy and atmosphere	.769	.201	.102	.043	.203	.032
	Material and resource	.331	.703	.201	.091	.102	.102
	Indoor environment quality	.212	.792	-.120	.192	.201	.019
	innovation	.102	-.212	-.102	.138	.401	.792
CBRE	Efficiency of energy	.812	.102	.212	.201	.592	-.383

Source of indicators	Item of green hospital	Efficiency of energy	Green building	Water management	Drug and waste management	Low carbon transportation	Green behavior
	Indoor environment quality	.263	.703	.310	.201	.201	.302
	Sustainable site planning and management	.312	.621	.102	.299	.403	.227
	Material and resource	.112	.794	.201	.292	.203	.263
	Efficiency of water resource	.732	.102	.882	.421	-.293	.301
	innovation	.092	.292	.032	-.123	.293	.623
USGBC	Integrated work	.092	-.231	.012	.032	.102	.703
	Transportation work	-.112	.102	.102	.204	.721	.239
	Efficiency of energy	.803	.321	-.211	.201	.202	.309
	Preservation of water resource	.412	.291	.732	.363	.192	-.294
	Chemical management	.231	.113	.231	.721	.301	.203
	Waste management	-.210	.092	-.123	.832	.202	.102
	Environment service	.192	.231	.203	.103	.102	.831
	Green purchasing	.371	.318	.032	.201	.093	.882
	Work innovation	.120	.302	.102	.218	.034	.693
CII	Illumination	.301	.788	.042	-.203	.121	.349
	Indoor air quality and monitor	.102	.742	.195	.102	.192	.632
	Green building maintain	-.092	.832	.321	.201	.095	.701
	Green building material	.329	.723	.193	.053	-.220	.583
	Garden and landscape	.112	.693	.121	.002	-.101	.662

Based on the above analysis results, this study extracted six indicators from the green hospital indicators: energy efficiency, green building, water resource management, drug and waste management, low carbon transportation, and green behavior (Table 2).

(3) *The third stage*

The study interviewed three experts in green and medical science in Taiwan to correct the green hospital indicators. After three rounds of amendments by the three experts, the study proposed two main indicators - M environmental management, E environmental education, and extended eleven sub- indicators (MA air quality management, MB water management, MC Waste Management, MD Green Building, ME Environmental Management Policy, MF Hazardous Substance Management, MG Energy Management, MH Greenhouse Gas Management, EA Course and Teaching, EB Event Advocacy and Promotion, EC Green Leadership), Based on these indicators, a scale that can be measured is designed (see Table 3 for details).

(4) the fourth stage

1. Item analysis

The air quality management critical ratio value between 8.235 and 11.532 (p<.001) and correlation coefficient between .792 and .833. The water resources management critical ratio value between 7.234 and 10.405 (p<.001) and correlation coefficient between .827 and .864. The waste management critical ratio value between 7.394 and 10.203 (p<.001) and correlation coefficient between .734 and .843. The green building critical ratio value between 8.299 and 9.203 (p<.001) and correlation coefficient between .739 and .799. The critical ratio value of the environmental management policy is between 7.394 and 11.394 (p<.001) and the correlation coefficient is between .823 and .845. The critical ratio value of the Hazardous Materials Management is between 9.394 and 10.123 (p<.001) and the correlation coefficient is between .814 and .853. The energy management critical ratio value between 7.283 and 8.964 (p<.001) and correlation coefficient between .812 and .883. The greenhouse gas management critical ratio value between 10.203 and 11.293 (p < .001) and correlation coefficient between .816 and .834.

The critical ratio of the course and teaching ranged from 9.294 to 11.294 (p<.001) with correlation coefficient between .835 and .882. The critical ratio of event advocacy and promotion ranged from 10.222 to 11.293 (p<.001) with correlation coefficient between .801 and .820. The green leadership has a critical ratio between 10.238 and 10.483 (p < .001) and correlation coefficient between .902 and .910.

Table 2. Green Hospital Indicators And Elements

Indicators of green hospital	Elements
Efficiency of energy	Efficiency of energy、alternative energy、energy reduction、energy and atmosphere
Green building	Green building、sustainable site、material and resource、indoor environment quality、sustainable site planning and management、illumination、indoor air quality and measuring、green building maintain、green building material、garden and landscape
Water resource management	Water resource、saving water、efficiency of water resource、protection of water resource
drug and waste management	Waste management、chemical management、drug control
low carbon transportation	Transportation tool、transportation management、site and transportation
green behavior	Low carbon food、environmental education、green leadership、food control、purchasing management、innovation、integrated work、environmental service、green purchasing、innovation

Table 3. Indicators Of Green Hospital And Measuring Items

indicator	Measuring items
air quality management	1. Good air quality near the hospital.
	2. There are few mobile sources of pollution in the hospital.
	3. The hospital has implemented smoke prevention and control.
	4. Hospital has controlled laboratory gas emissions.
	5. The hospital will manage and control the gases emitted by infectious wards.
	6. Good indoor air quality in the hospital.
Water management	1. As you observe, employees can save water.
	2. Hospital wastewater quality has reached emission standards.
	3. The hospital can make good use of recycled water.
	4. The drinking water quality in the hospital meets the human body drinking water standard.

	5. Hospital wastewater treatment meets standards.
Waste management	1. Employees are capable of reducing waste.
	2. Employees already have the habit of recycling resources.
	3. The hospital has proposed a waste classification implementation strategy.
	4. Hospital treatment of kitchen waste meets standards.
	5. The hospital has an implementation strategy for the treatment of general waste and non-hazardous waste.
Green building	1. Employees know the greening indicators in the hospital.
	2. Hospital base water retention meets green building standards.
Environmental Management Policy	1. The hospital has established an environmental planning plan.
	2. The hospital has a green procurement system.
	3. The hospital has an environmental audit system.
	4. The hospital can plan hospital environmental greenification and ecology.
Hazardous Substance Management	1. The hospital's chemical substance management method meets the standards.
	2. The hospital has implemented an implementation strategy for hazardous business and biological waste disposal.
Energy Management	1. Hospital equipped with indoor environmental energy saving system
	2. The administrative process has been electronically
	3. The hospital has proposed a traffic strategy to reduce carbon emissions.
	4. Both the hospital and the staff are able to save electricity.
	5. Hospital EUI value (power consumption per floor area) meets green building standards
Greenhouse Gas Management	1. The hospital has calculation and statistics of per capita greenhouse gas emissions in the hospital.
	2. The hospital has proposed a greenhouse gas reduction plan.
Course and Teaching	1. You believe that environmental awareness has been integrated into the hospital's management and management methods.
	2. There are environmental related courses / lectures / lectures in the hospital.
	3. There are books related to environmental education in the hospital (including electronic resources).
Event Advocacy and Promotion	1. The hospital often organizes environmental protection and education promotion activities or competitions.
	2. The hospital can combine community resources and civil environmental protection groups to help hospitals promote green living concepts.

	3. The hospital often has "offices for environmental protection and greening activities".
	4. Hospital staff often serve as environmental education volunteers.
	5. Products with environmental protection stamps can often be seen in the hospital.
	6. Good results in the classification of waste in the hospital.
Green leadership	1. The hospital has a strong willingness to promote green hospitals.
	2. Hospital directors are highly willing to support green behavior.

Table 4. Summary Of Item Analysis- Environmental Management

indicator	item	Critical ratio	Correlation coefficient
air quality management	1. Good air quality near the hospital.	9.430***	.823***
	2. There are few mobile sources of pollution in the hospital.	10.694***	.792***
	3. The hospital has implemented smoke prevention and control.	11.532***	.833***
	4. Hospital has controlled laboratory gas emissions.	8.845***	.811***
	5. The hospital will manage and control the gases emitted by infectious wards.	8.235***	.799***
	6. Good indoor air quality in the hospital.	9.383***	.813***
Cronbach alpha coefficient = .811			
Water management	1. As you observe, employees can save water.	7.932***	.833***
	2. Hospital wastewater quality has reached emission standards.	8.203***	.845***
	3. The hospital can make good use of recycled water.	10.405***	.853***
	4. The drinking water quality in the hospital meets the human body drinking water standard.	9.232***	.864***
	5. Hospital wastewater treatment meets standards.	7.234***	.827***
Cronbach alpha coefficient = .842			
Waste management	1. Employees are capable of reducing waste.	10.203***	.843***
	2. Employees already have the habit of recycling resources.	9.239***	.745***

indicator	item	Critical ratio	Correlation coefficient
	3. The hospital has proposed a waste classification implementation strategy.	10.683***	.734***
	4. Hospital treatment of kitchen waste meets standards.	7.394***	.804***
	5. The hospital has an implementation strategy for the treatment of general waste and non-hazardous waste.	8.294***	.799***
Cronbach alpha coefficient = .792			
Green building	1. Employees know the greening indicators in the hospital.	8.299***	.739***
	2. Hospital base water retention meets green building standards.	9.203***	.799***
Cronbach alpha coefficient = .756			
Environmental Management Policy	1. The hospital has established an environmental planning plan.	7.394***	.845***
	2. The hospital has a green procurement system.	9.394***	.833***
	3. The hospital has an environmental audit system.	10.394***	.826***
	4. The hospital can plan hospital environmental greenification and ecology.	11.394***	.823***
Cronbach alpha coefficient = .835			
Hazardous Substance Management	1. The hospital's chemical substance management method meets the standards.	9.394***	.853***
	2. The hospital has implemented an implementation strategy for hazardous business and biological waste disposal.	10.123***	.814***
Cronbach alpha coefficient = .858			
Energy management	1. Hospital equipped with indoor environmental energy saving system.	7.283***	.834***
	2. The administrative process has been electronically.	8.293***	.812***
	3. The hospital has proposed a traffic strategy to reduce carbon emissions.	7.684***	.883***

indicator	item	Critical ratio	Correlation coefficient
	4. Both the hospital and the staff are able to save electricity.	8.964***	.834***
	5. Hospital EUI value (power consumption per floor area) meets green building standards.	7.395***	.814***
Cronbach alpha coefficient = .822			
Green gas management	1. The hospital has calculation and statistics of per capita greenhouse gas emissions in the hospital.	10.203***	.834***
	2. The hospital has proposed a greenhouse gas reduction plan.	11.293***	.816***
Cronbach alpha coefficient = .821			

***: $p< 0.001$

Table 5. Summary Of Item Analysis-Environmental Education

indicator	item	Critical ratio	Correlation coefficient
Course and teaching	1. You believe that environmental awareness has been integrated into the hospital's management and management methods.	10.282***	.882***
	2. There are environmental related courses / lectures / lectures in the hospital.	11.294***	.845***
	3. There are books related to environmental education in the hospital (including electronic resources).	9.294***	.835***
Cronbach alpha coefficient = .848			
Event advocacy and promotion	1. The hospital often organizes environmental protection and education promotion activities or competitions.	10.222***	.801***
	2. The hospital can combine community resources and civil environmental protection groups to help hospitals promote green living concepts.	11.293***	.820***

indicator	item	Critical ratio	Correlation coefficient
	3. The hospital often has "offices for environmental protection and greening activities".	9.342***	.814***
	4. Hospital staff often serve as environmental education volunteers.	10.286***	.834***
	5. Products with environmental protection stamps can often be seen in the hospital.	10.483***	.818***
	6. Good results in the classification of waste in the hospital.	9.696***	.832***
Cronbach alpha coefficient = .821			
Green leadership	1. The hospital has a strong willingness to promote green hospitals.	10.238***	.902***
	2. Hospital directors are highly willing to support green behavior.	10.483***	.910***
Cronbach alpha coefficient = .904			

***: $p < .001$

Table 6. Summary Of Factor Analysis-Environmental Management

indicator	item	loading
air quality management	1. Good air quality near the hospital.	.773
	2. There are few mobile sources of pollution in the hospital.	.723
	3. The hospital has implemented smoke prevention and control.	.843
	4. Hospital has controlled laboratory gas emissions.	.823
	5. The hospital will manage and control the gases emitted by infectious wards.	.882
	6. Good indoor air quality in the hospital.	.812
Water management	1. As you observe, employees can save water.	.679
	2. Hospital wastewater quality has reached emission standards.	.702
	3. The hospital can make good use of recycled water.	.803
	4. The drinking water quality in the hospital meets the human body drinking water standard.	.773
	5. Hospital wastewater treatment meets standards.	.723
Waste man-	1. Employees are capable of reducing waste.	.832
	2. Employees already have the habit of recycling resources.	.811

indicator	item	loading
agement	3. The hospital has proposed a waste classification implementation strategy.	.792
	4. Hospital treatment of kitchen waste meets standards.	.788
	5. The hospital has an implementation strategy for the treatment of general waste and non-hazardous waste.	.823
Green building	1. Employees know the greening indicators in the hospital.	.632
	2. Hospital base water retention meets green building standards.	.672
Environmental Management Policy	1. The hospital has established an environmental planning plan.	.729
	2. The hospital has a green procurement system.	.741
	3. The hospital has an environmental audit system.	.732
	4. The hospital can plan hospital environmental greenification and ecology.	.772
Hazardous Substance Management	1. The hospital's chemical substance management method meets the standards.	.821
	2. The hospital has implemented an implementation strategy for hazardous business and biological waste disposal.	.833
Energy Management	1. Hospital equipped with indoor environmental energy saving system	.753
	2. The administrative process has been electronically	.821
	3. The hospital has proposed a traffic strategy to reduce carbon emissions.	.793
	4. Both the hospital and the staff are able to save electricity.	.811
	5. Hospital EUI value (power consumption per floor area) meets green building standards	.762
Greenhouse Gas Management	1. The hospital has calculation and statistics of per capita greenhouse gas emissions in the hospital.	.639
	2. The hospital has proposed a greenhouse gas reduction plan.	.699

Table 7. Summary Of Factor Analysis-Environmental Education

indicator	item	loading
Course and Teaching	1. You believe that environmental awareness has been integrated into the hospital's management and management methods.	.821
	2. There are environmental related courses / lectures / lectures in the hospital.	.833
	3. There are books related to environmental education in the hospital (including electronic resources).	.852

indicator	item	loading
Event Advocacy and Promotion	1. The hospital often organizes environmental protection and education promotion activities or competitions.	.723
	2. The hospital can combine community resources and civil environmental protection groups to help hospitals promote green living concepts.	.783
	3. The hospital often has "offices for environmental protection and greening activities".	.832
	4. Hospital staff often serve as environmental education volunteers.	.811
	5. Products with environmental protection stamps can often be seen in the hospital.	.836
	6. Good results in the classification of waste in the hospital.	.820
Green leadership	1. The hospital has a strong willingness to promote green hospitals.	.883
	2. Hospital directors are highly willing to support green behavior.	.835

2. factor analysis

The air quality management factor loading is between .723 and 882, the water management factor loading is between .679 and .803, the waste management factor loading is between .792 and .832, and the green building factor loading is between .632 and .672, the environmental management policy factor loading is between .729 and .772, the hazardous substance management factor loading is between .821 and .833, and the energy management factor loading is between .753 and .821. The greenhouse gas management factor loading is between .639 and .699.

The course and teaching factors load between .821 and .852, the Event Advocacy and Promotion factors loading between .723 and .836, and the green leadership factor loading between .835 and .883.

Conclusion

As environmental damage has become more and more serious, countries around the world have begun to pay attention to green hospitals, and they are all committed to the development of energy-saving and carbon-reduction technologies. Taiwan has also begun to promote green hospital projects. However, countries around the world have different views on the definition of green hospitals, and Taiwan defines them as “ecological, energy-saving, carbon- reducing, and healthy buildings”, which include biodiversity indicators, greening indicators, daily energy-saving indicators, and carbon dioxide. Reduction indicators, waste reduction indicators, indoor

environmental indicators, water resources indicators, sewage waste improvement indicators. The design of the green hospital can achieve environmental symbiosis, and effectively maintain the balance of the ecological environment, as well as reduce the pollution and impact on the environment, and achieve the ideal of sustainable development.

The connection between the environment and the hospital cannot be ignored. As a provider of medical services, the hospital mainly enhances the health and well-being of the people. However, the hospital belongs to the high-energy-consuming industry and produces related biomedical harmful substances and a large amount of carbon dioxide emissions. Under the trend of increasing environmental awareness, the goal of a green hospital towards a friendly environment, energy saving and carbon saving has become an urgent issue for hospitals. Green hospitals meet the goals of friendly environment, energy conservation and carbon reduction in building layout, building materials and equipment. Green hospitals play an extremely important role in environmental protection awareness.

The green hospital indicators proposed in this study have not only included the indicators of measuring the green building and medical industry in the world, but also the corrections of domestic hospital management experts and the opinions of 220 medical personnel. Finally, the Taiwan Green Hospital indicators was proposed. Two major indicators - environmental management, environmental education, and extended eleven sub-indicators, can provide a reference for hospitals to introduce green hospitals.

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