sustainability

MDPI

Article

A Study on the Status of Safety and Health for Golf Course Caddies and Improvement of Protective Measures in South Korea

Ja-Young Lee [1,2] and Chankyu Kang [2,*]

[1] Korea Disaster Prevention and Management Agency, Ansan 15457, Korea
[2] School of Social Safety System Engineering, Research Center for Safety and Health, Hankyong National University, Anseong 17579, Korea
* Correspondence: safetyfirst@hknu.ac.kr; Tel.: +82-31-670-5287

Abstract: Due to the rapid expansion of the leisure industry, there were about 32,000 golf caddies in South Korea in 2020, an increase of 18.5% compared to 2016. Consequently, they face an increasing industrial accident rate, which is presumed to be the result of exposure to various harmful factors. Through a survey and oral interview of 221 caddies across more than 20 golf courses, health protective measures, protective measures for caddies, preparation for golf cart operation, physical burden, compliance with golf cart safety during games, and golf course responses to emotional labor were investigated in this study to identify safety and health problems of caddies and suggest prevention measures. Preliminary interviews were conducted to confirm golf courses' safety and health status and participants' characteristics. Golf caddies' health and safety were confirmed using frequency analysis, independent sample *t*-test, one-way analysis of variance (ANOVA), Pearson correlation analysis, and multiple regression analysis. The results showed that caddies' workplaces were relatively vulnerable to safety and health issues and caddies were exposed to various harmful risk factors. In addition, it was confirmed that golf caddy protective measures, golf cart safety compliance, physical burden, and health protection affect golf courses' response level to caddies' emotional labor.

Keywords: golf caddies; health and safety; risk factors; workplace accidents; protective measures

Citation: Lee, J.-Y.; Kang, C. A Study on the Status of Safety and Health for Golf Course Caddies and Improvement of Protective Measures in South Korea. *Sustainability* **2022**, *14*, 10479. https://doi.org/10.3390/su141710479

Academic Editors: Filippo Marciano, Paola Cocca and Elena Stefana

Received: 15 July 2022
Accepted: 19 August 2022
Published: 23 August 2022

1. Introduction

The golf industry is one of the largest sports-related travel markets and is experiencing tremendous growth worldwide [1]. It is estimated that the domestic golf population in South Korea is approximately 5.15 million, an increase of 448,000 compared to a year ago [2]. However, the number of golf course caddies, who are essential for advising golfers about the game, cannot meet the increasing demand. The number of caddies in 2020 was 31,840, which is a 24.1% increase from 2015, but it is insufficient compared to the 41.7 million golf course users as of 2020.

In the past, caddies' traditional role was limited to simple tasks, such as carrying a golfer's bag, cleaning clubs, and maintaining a course of play [3]. The significant increase in the golf population has caused many to view caddying as a job that anyone can do, rather than requiring professional skills, and the working conditions of the golf courses that employ them have become poor, despite their growing influence on improving golfers' performance [4]. Recently, caddies have also been recognized for their professionalism, as research has shown that their professionalism affects golfers' performance [5]. However, according to industrial accident statistics, caddies' industrial accident rates have been increasing since 2015 [6]. According to a survey of leisure news in South Korea in 2017, 77.1% of caddies in South Korea have experienced an industrial accident, and 50% of them were hit by a batted ball [7]. Caddies in South Korea are self-employed (individual entrepreneurs) but are subordinate to golf courses and receive work orders from them.

According to the industrial accident compensation insurance act, they are classified as a special type of worker and are defined as persons who need protection from occupational accidents because the labor standards act does not cover them, even though they provide labor similar to workers, regardless of the contract form. In addition, they provide the labor necessary for the operation of the golf course at all times and earn their salaries. For these reasons, 36 industrial accidents occurred in South Korea between 2014 and June 2019. By accident type, it was reported that the most accidents occurred in the order of hitting (47.2%), unbalanced movement (13.9%), bumping (8.3%), and falling (5.6%) [7].

Several studies have shown that caddies are exposed to harmful risk factors, such as musculoskeletal pain and other physical problems [8,9]. However, emotional labor, such as sexual harassment at work and accidents involving golf carts, has recently been presented as a social problem [10,11]. Safety and health issues related to emotional labor occur not only in South Korea but also in other countries [12]. According to the consumer injury surveillance system (CISS), approximately 91% of accidents caused by golf carts from 2018 to 2021 occurred while driving, and 27 of 44 accidents were caused by the carts falling on slopes [13]. In addition to insufficient safety measures for golf carts, many golf courses have insufficient installation of safety facilities, such as non-skid pavements, caution warning signs on the road, and poor road conditions. Because of these social problems, the Korean government expanded the Industrial Accident Insurance Act to include golf caddies in 2008 to strengthen national responsibility [14]. However, understanding the health and safety status of golf courses is insufficient, as are legal and institutional protective measures. While many studies have been conducted on golfers' injuries, there have been very few studies on caddies' safety and health issues, and most have been limited to musculoskeletal disorders, despite various harmful risks [1,15–18].

This study aimed to understand the health and safety status of caddies working at golf courses and to analyze various harmful factors. As the COVID-19 pandemic continues to have an impact, the number of golf course users in Korea is increasing significantly, which increases the risk of safety accidents. Most of the current studies are centered on golf course users, but interest in the safety and health of caddies is very low. For this purpose, in-depth oral interviews and surveys were conducted with the participants, and statistical analyses were conducted to identify the relationships. The safety and health-related variables used in this study were derived based on media news (from 2011 to 2021) and government research reports related to caddies' accidents that occurred in South Korea. Through these analyses, we attempted to identify the appropriateness of safety and health measures for golf courses and derive directions for their improvement for golf course caddies.

2. Materials and Methods

2.1. Participants

A total of 221 caddies working in over 20 golf courses in South Korea were selected to participate in the study. The selected golf caddies were randomly selected among many caddies who provide labor at domestic golf courses. However, reliability was secured by setting inclusion and exclusion criteria for the survey participants [19]. For example, low numeracy, short experience, poor understanding, and surveys completed too quickly were excluded from the analysis of survey results to maintain high-quality responses. The caddies that participated in the study conducted the study with his/her consent through e-mail and notice on the golf course.

2.2. Survey

A survey was constructed based on the guidelines of the Korea Occupational Safety and Health Agency (KOSHA), existing research results, and preliminary in-depth studies to derive the current status and problems of the participants' safety and health [20,21]. The questionnaire was designed to capture the characteristics of the caddies who participated in the study, health protection, protective measures for golf caddies, preparation for golf cart operation, physical burden, compliance with golf cart safety during games, and golf course

response to caddies' emotional labor. The survey consisted of over 60 questions rated on a 5-point Likert scale (Table 1). To analyze the characteristics of the participants for the items presented in Table 1, the reliability of statistical analysis was verified using gender, age group, total length of employment of golf course caddies, length of employment at the current workplace, average working hours, and the number of caddies employed at the golf course in the workplace [1].

Table 1. Composition of research survey.

Classification	Detailed Questionnaire
Health protection	Regular health checkups, follow-up guidance by health managers, and recognition of emergency procedures
Protective measures for golf caddies	Safety education, verbal abuse from customers, sexual harassment protective measures, workplace harassment prevention
Preparation for golf cart operation	Risk awareness of cart operation, safety education, cart checklist before work
Physical burden	Heavy work, education on the prevention of musculoskeletal disorders, a correlation between work and musculoskeletal disorders, risk of musculoskeletal disorders
Compliance with golf cart safety during the game	Hazard factors that may occur during operation and observance when driving a cart
Golf course's response to emotional labor	Assault, verbal abuse, and sexual harassment by customers, golf course response to protect caddies, development of customer response manual

2.3. Data Analysis

The survey data were analyzed using SPSS Statistics 25.0 (IBM Inc., New York, NY, USA). The main statistics used for the analysis were as follows: (i) frequency analysis was performed to identify study the participants' characteristics. (ii) Mean and standard deviation were used for the statistical analysis of the health protective measures. (iii) Cronbach's alpha, which represents the internal consistency, above 0.7 was judged suitable for analysis. (iv) T-test and one-way analysis of variance (ANOVA) were performed to examine the six categories, as shown in Table 1. The differences in the recognition level according to the participants' characteristics were analyzed using gender, age, the total length of employment as caddies, length of employment at the current workplace, average working hours, and the number of caddies employed as parameters. (v) Pearson's correlation analysis was performed to examine the correlation between safety and health-related golf course response levels, and multiple regression analysis was performed to examine the factors that significantly affect golf course response during emotional labor. This study was verified at significance levels of $p < 0.05$, $p < 0.01$, and $p < 0.001$.

3. Results

3.1. Participants' Characteristics

The caddies that participated in the study consisted of 29 males (13.1%) and 192 females (86.9%), which was considered a suitable number to reflect the characteristics of golf courses in South Korea. Regarding age, those in their 30 s and 40 s accounted for the majority, with 97 (43.9%) and 53 (24.0%) participants, respectively. A total of 107 participants (48.4%) worked as caddies for more than 10 years, while those with less than 5 years' experience were the majority, at 114 (51.6%). This is presumably attributable to the working environment and salaries. Participants' average working day was eight hours (less than two rounds per day), which accounted for approximately 58.8% of the study participants. The average number of caddies employed at a given golf course was 50–100, accounting for 70.6% (n = 156). A preliminary survey was conducted, targeting 221 caddies working at over 20 golf courses. Surveys and interviews were conducted on the

perception of occupational accidents, which were used to identify golf courses' health and safety status. In particular, 78 out of 221 golf caddies experienced industrial accidents; this study tried to identify safety and health problems in domestic golf courses by intensively analyzing them.

3.2. Safety and Health Status

The safety and health of golf caddies in South Korea were identified through preliminary research by the study participants. Regarding the safety of the golf courses' working environment, 38.5% of participants answered that the safety level at their workplace was low. A total of 35.5% (n = 78) responded that they had been treated or hospitalized for work-related accidents and diseases at golf courses; caddies had a high rate of work-related diseases. An in-depth study that allowed multiple responses was conducted on 78 caddies. Among them, bruises and sprains accounted for the most injuries at 47.5% (n = 67), followed by fractures at 19.1% (n = 27), indicating that the frequency of accidents was high. In addition, heat stroke accounted for 15.6% (n = 22). Detailed information is shown in Figure 1.

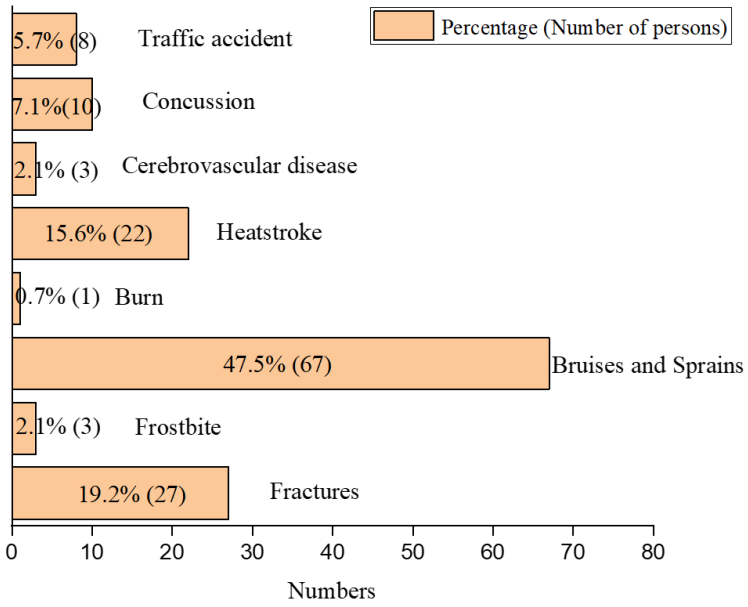

Figure 1. Caddy injuries by type.

Injuries from industrial accidents were distributed across almost all parts of the body, but the most frequent were foot or ankle injuries (21.1% (n = 48)), followed by leg injuries (19.7% (n = 45)). Injuries to the lower body were relatively more frequent than those to the upper body. About 16.7% (n = 38) of the participants had injuries in the shoulder, arm, and hand. Detailed information regarding injured areas of the body is presented in Figure 2.

As a result of analyzing how various accidents occurred, the frequency of hitting the ball (i.e., swinging the club) was the highest at 41.1% (n = 60), followed by carts being overturned by obstacles during the game at 28.8% (n = 42). It was also reported that 11.6% (n = 17) of participants developed a musculoskeletal disorder resulting from handling heavy objects, as shown in Figure 3. Caddies also experienced traffic accidents and assaults by customers while driving a cart. Based on these results, it was confirmed that caddies are exposed to various harmful risk factors. There was no mention of sexual harassment by customers. However, some participants confirmed this in the survey.

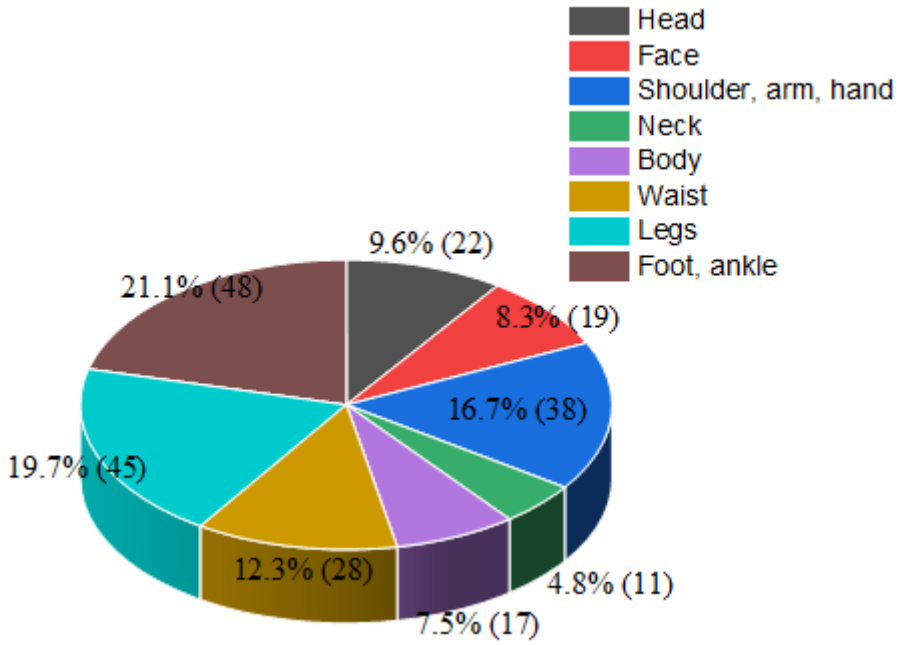

Figure 2. Body parts where injuries occurred.

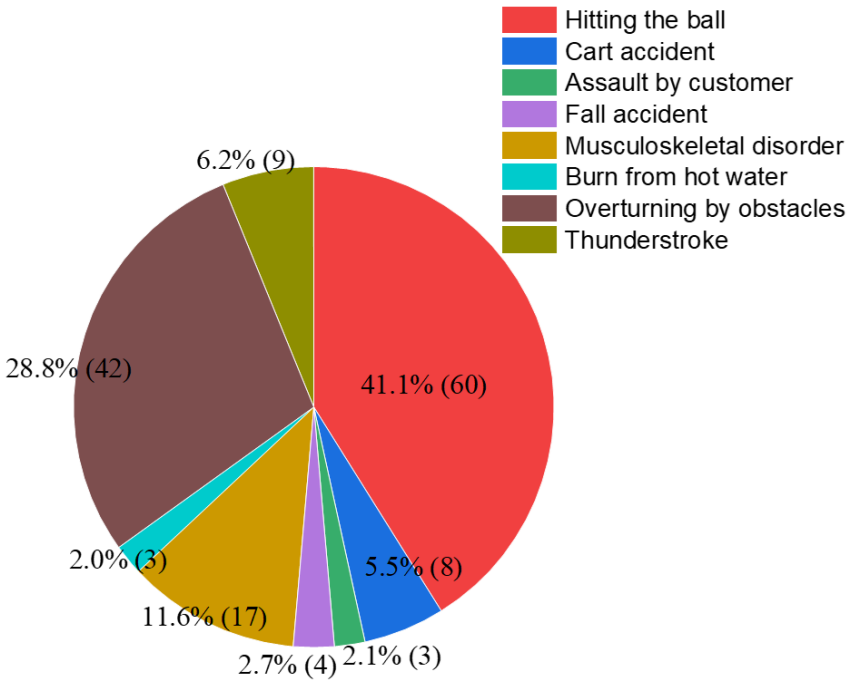

Figure 3. Workplace risk factors for caddies.

Caddies usually (72.6% (n = 82)) use their own medical insurance for treatment in cases of injury; by comparison, the rate of receiving workers' compensation insurance through the golf course was as low as 4.4% (n = 5). It was also confirmed that some of them received compensation for treatment costs from customers (4.4%, n = 5). These results indicate that golf courses do not actively intervene in industrial accidents; therefore, caddies should take full responsibility for their safety and health. Detailed information is shown in Figure 4.

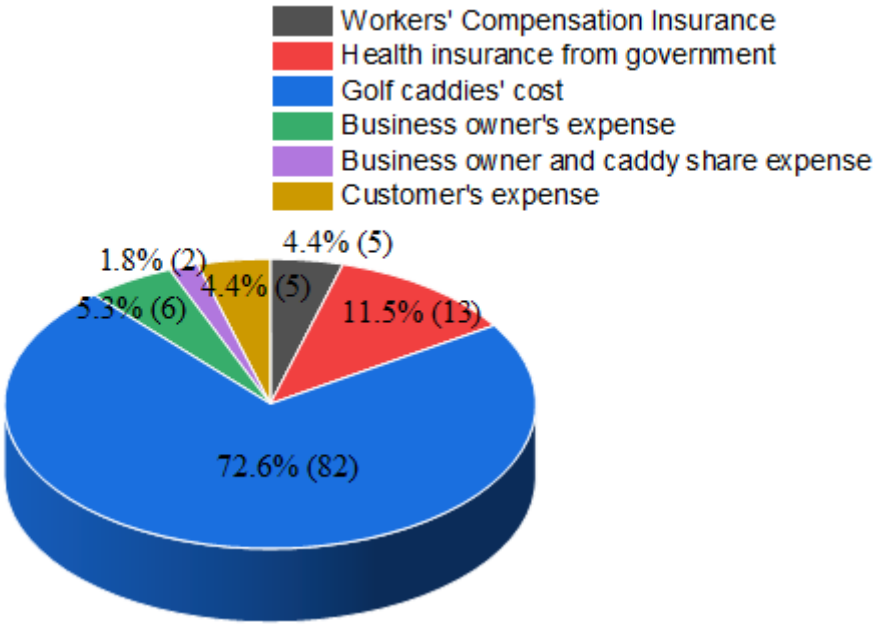

Figure 4. Analysis of treatment expenses.

3.3. Health Protection and Protective Measuresfor Caddies

Arithmetic statistics were calculated and a reliability analysis was performed to examine proficiency in health protective measures; the results are presented in Table 2. The health protections for caddies identified in this study consisted of 12 items, and higher scores were interpreted as having a better understanding of health protective measures. The caddies were found to be the most aware of the need for regular health checkups. In addition, they were familiar with cardiopulmonary resuscitation (CPR) concerning cardiac arrest accidents that may occur during the game. However, the level of proficiency in first aid measures for injuries caused by animals was low. The Cronbach's value calculated for the reliability analysis was 0.803. Therefore, the correlation between items was found to be good [22]. Independent sample t-tests and one-way ANOVA were performed to confirm the difference in the degree of protective measures for caddies according to their characteristics, including gender, age, the total length of employment as a caddy, length of employment at the current workplace, average working hours, and the number of caddies employed. The t-test and ANOVA showed significant findings regarding age and number of caddies employed ($p < 0.005$), but there were no statistically significant differences in other factors. A lower p-value indicates that the result was not obtained by chance. When looking at age, in which a p-value of less than 0.048 was found, those in their 50 s had the highest score of 3.25 (S.D. = 0.73), and those in their 30 s had the lowest score of 2.71 (S.D. = 0.86), showing a meaningful finding. In addition, when the number of caddies employed at the golf course was less than 30, the average was the lowest at 3.48 (S.D. = 0.53), showing a meaningful finding. As a result of the survey, many respondents said that safety and health measures were necessary for golf courses that employed fewer than 30 people.

To prevent occupational accidents, caddies answered that regular safety and health education was the most necessary measure, with an average of 3.22 (S.D. = 0.96). In contrast, the opinion that protective measures are necessary against abusive language or assault by customers showed a lower average of 2.96 (S.D. = 1.13 points). The Cronbach's value calculated for the reliability analysis was 0.802; therefore, the degree of internal agreement between each item was good. These results indicate that caddies are aware of the need for regular safety and health education, and that protective measures in the workplace should be improved (Table 2). The results of the t-test and one-way ANOVA showed a meaningful finding only in the age group analysis, especially in the 50 s age group ($p < 0.001$).

Table 2. Survey analysis of health protection and protective measures.

Classification	Detail Information	Mean	Standard Deviation (S.D.)	Cronbach's Alpha
Health protection	Necessity of regular health checkups	3.89	0.91	0.803
	Necessity of consultation with a health manager after health checkups	3.39	1.05	
	Familiarity with emergency procedures	3.53	0.91	
	Familiarity with the location of the first aid kit	3.46	1.10	
	Whether or not to take measures, such as suspending the game during extreme cold and extreme heat	2.82	1.22	
	Education on using a defibrillator and performing CPR	3.71	1.17	
	First aid measures in case of injuries caused by animals	2.55	1.10	
	Tips for first aid in case of an accident caused by hitting the ball	3.54	1.03	
	Actions and safety rules in case of a lightning strike	3.36	1.13	
Protective measures	Necessity of regular safety and health education	3.22	0.96	0.802
	Implementing protective measures in case of customer verbal abuse or assault	2.96	1.13	
	Implementing protective measures in case of sexual harassment	3.05	1.12	
	Implementing protective measures in case of workplace harassment	3.04	1.11	

3.4. Preparation for Golf Cart Operation and Safety Compliance

It was confirmed that caddies complied with the basic safety requirements for driving golf carts. Cronbach's value calculated for the reliability analysis was 0.886. For the item that referred to checking whether the golf cart was charged before use, the average score was 4.57 (S.D. = 0.58), and risk during the cart operation was thought to be the lowest, with an average of 3.44 (S.D. = 1.03). These results indicate that the pre-safety measures for cart operation on golf courses are relatively good. Recently reported golf cart-related accidents occurred because of uneven roads, overturning due to movement on severe slopes, and non-installation of seat belts, which indicate the need to install safety equipment and for safe driving education [23]. For the safety of the caddy, external factors, such as safety education, road conditions and safety facilities of golf courses, must be properly managed (Table 3). There were no statistically reliable data on the degree of preparation for cart operation according to the characteristics of the participants.

On the 5-point Likert scale, the highest mean was 4.73 (S.D. = 0.50), confirming that caddies put their bags on a designated golf cart and fixed them correctly so that they did not fall off while driving. However, it was confirmed that seat belts for the driver and passengers were not properly installed in the golf carts. The absence of such a safety device cannot mitigate the impact of an accident and may lead to casualties. Therefore, supplementation is necessary. Table 3 describes items of golf car safety. The Cronbach's value was 0.610, which indicates acceptable internal consistency. The t-test and one-way ANOVA on the difference in the degree of compliance with golf cart safety according to the participants' characteristics revealed no significant difference.

Table 3. Survey analysis of golf cart preparation and safety compliance.

Classification	Detail Information	Mean	Standard Deviation (S.D.)	Cronbach's Alpha
Golf cart preparation	Dangers when driving a golf cart	3.44	1.03	0.886
	Training experience on how to operate and the hazards before driving a cart	4.05	0.72	
	Golf cart preparation before use (1) Charge the cart before driving	4.57	0.58	
	(2) Tire damage, wear, and air pressure before cart operation	3.76	0.92	
	(3) Check for abnormalities in the brake system, reverse lever, and steering system	3.86	0.89	
	(4) Check for abnormalities in the indicator, battery, automatic operation remote control, automatic stop switch, and a warning sound when reversing	3.89	0.96	
	(5) Noise check	4.0	0.82	
Golf cart safety	Fixing the golf bag on the golf cart	4.73	0.50	0.610
	Safety education for instruction during automatic operation	4.22	0.77	
	Golf cart driven by designated caddies	4.64	0.70	
	Whether seat belts are installed	2.14	1.17	
	Use the safety handle while driving, observe the specified speed, and drive safely in turns or corners	4.58	0.62	
	Keep an eye on the front while driving, and install caution and safety devices when driving at night	2.87	1.35	
	Golf cart safety compliance	3.91	0.45	

3.5. Physical Burden and Emotional Labor

Caddies perform warm-up exercises to prevent injuries to players and themselves and to enable players to play their best. However, the average experience of receiving safety education in handling heavy objects and repetitive tasks to prevent musculoskeletal disorders was found to be the lowest, with an average of 2.15 (S.D. = 1.04). These are thought to be the factors that exacerbate the physical burden received by caddies. The need for the prevention of musculoskeletal disease, an occupational disease related to golf caddies, has been claimed in several studies [1,2,9], but safety education on this is not performed properly in South Korea. It was found that the repetitive task of picking up a golf ball during the game was physically burdensome (Table 4). The results confirmed that the symptoms of musculoskeletal disorders were recognized as being caused by caddies' work; therefore, it is necessary to develop improved treatment plans. An independent sample t-test and one-way ANOVA were conducted to examine the difference in perceived body burden according to the participants' characteristics, and significant differences were found by gender ($p < 0.018$) and age ($p < 0.027$). Analysis of the degree of perceived physical burden revealed that the physical burden was greater in women in their 30 s and 50 s.

The research results on physical burden have been confirmed in previous studies, but problems with emotional labor were confirmed through the survey. Nearby colleagues' response to a problem that occurred during the customer service process was the highest, with an average of 3.22 (S.D. = 0.97). However, given that it is a 5-point Likert scale, it means that it is not easy for colleagues to actively intervene in customer service issues. In addition, it was found that there was significant difficulty in maintaining normal work due to customer verbal abuse and sexual harassment. This tendency was found in par-

ticipants with poor work skills, that is, those who worked for a short period. Cronbach's value calculated for the reliability analysis was 0.830, which was relatively high. Detailed information is shown in Table 4. Independent sample t-tests and one-way ANOVA were conducted to determine the difference in the degree of golf course responses to emotional labor according to participants' characteristics, and significant differences were found by age ($p < 0.001$). In particular, it was found that golf courses' response level to the emotional labor of caddies in their 20 s was good, but the response level deteriorated as the age group increased.

Table 4. Survey analysis of physical burden and emotional labor.

Classification	Detail Information	Mean	Standard Deviation (S.D.)	Cronbach's Alpha
Physical burden	Risk of musculoskeletal disorders due to transporting, moving, or handling the player's clubs and other equipment	3.85	1.03	0.728
	Safety education for heavy objects and repetitive tasks	2.15	1.04	
	Players and golf caddies' warm-up	4.40	0.68	
	Repetitive action to pick up the player's ball	4.32	0.87	
	Repetitive action for golf ball cleaning	3.96	1.07	
	Repairing damage to the putting green	3.62	1.11	
	Removal of movable obstructions, such as loose impediments	2.92	1.05	
	Whether musculoskeletal disease symptoms and work are related	4.09	0.94	
Emotional labor	Assault, verbal abuse, and sexual harassment from customers	2.86	1.29	0.830
	Appropriate protective measures on the golf course in case of problems during the game	3.03	1.17	
	Help from superiors and colleagues in case of customer service problems	3.21	1.02	
	Golf course systems and procedures in case of problems in customer service	2.84	1.07	
	Difficulty maintaining normal work due to customer verbal abuse, sexual harassment, etc.	2.81	1.08	
	Prepared behavioral guidelines, manuals, and guides for customer service	3.07	1.09	

3.6. Correlation between Major Factors

Pearson's correlation analysis was performed to determine the linear relationship between the two variables; the results are presented in Table 5. In general, a fair relationship is evident when the coefficient value is above 0.4, and a strong relationship exists between the two variables when it is above 0.7 [24]. There was a statistically significant positive correlation between health protection and protective measures for caddies (r = 0.468), and between protective measures for caddies and response to emotional labor (r = 0.652), preparation for gold-cart operation and compliance with golf cart safety during the game (r = 0.484).

Table 5. Analysis of Pearson correlation.

Classification	1	2	3	4	5	6
Health protection	1					
Protective measures for caddies	0.468	1				
Preparation for golf cart operation	0.377	0.180	1			
Physical burden	−0.029	−0.084	0.252	1		
Compliance with golf cart safety during game	0.301	0.142	0.484	0.129	1	
Golf course's response to emotional labor	0.347	0.652	0.103	−0.174	0.202	1

A detailed analysis was performed on golf courses' response to emotional labor, which showed a high correlation through the Pearson correlation analysis. With the golf course's response to emotional labor as the dependent variable, health protection, protective measures for caddies, physical burden, and compliance with golf cart safety during the game were analyzed as independent variables. Table 6 shows the results of the multiple regression analysis to determine the causes that affect the safety and health of golf course caddies. The model's modified coefficient of determination was $R^2 = 0.449$, and the model was found to be suitable ($F = 45.422$, $p < 0.001$). The coefficient of determination generally has a value of $0 < R^2 < 1$, and in general, if the R value is 0.4 or more, the regression equation is moderate, and if it is 0.7 or more, it is judged that the regression equation is well explained [25]. The Durbin–Watson statistic was 2.019, which was close to 2; therefore, there was no problem in the assumption of independence. In addition, the reliability of the analysis results was verified by confirming that there was no multicollinearity problem, as the variance inflation factor was in the range of 1.029 to 1.380, which is less than 10 [26]. The factors that influenced the golf course's response to emotional labor were protective measures, physical burden, compliance with golf cart safety during games, and health protection in the following order. Among the independent variables, protective measures for caddies were found to have the greatest influence on the golf course's response to emotional labor. Multiple regression coefficient analysis showed that health protection and protective measures for caddies had a positive effect, whereas physical burden had a negative effect. Enhanced protective measures for golf caddies, compliance with golf cart safety during games, and lower physical burden are interpreted as increased awareness of the golf course's rationality in responding to emotional labor.

Table 6. Analysis of multiple regression for response to emotional labor.

Dependent Variable	Independent Variable	Unstandardized Regression Coefficient		Std Beta	t Ratio	Prob (*p*)
		B	S.D.	β	2.799	0.006
Golf course's response to emotional labor	Health protection	0.021	0.072	0.017	0.291	0.071
	Protective measures for golf caddies	0.534	0.049	0.615	10.801	0.001
	Physical burden	−0.198	0.073	−0.138	−2.716	0.007
	Compliance with golf cart safety during game	0.211	0.088	0.128	2.399	0.017

4. Discussion

Despite the growing interest in golf around the world, studies on occupational safety and health problems for caddies remain insufficient. Although various harmful risk factors are known to occur on golf courses, only a few studies on caddies, such as investigating musculoskeletal disorders, are being conducted [27]. The first step to understanding the seriousness of safety and health is to increase relevant research on vulnerable groups, especially those without socioeconomic protection [28,29].

A golf caddy is a special type of worker who has an unstable income structure due to inconsistent working hours and who receives work orders from the golf course but is vulnerable to safety and health issues. Although efforts are needed to prevent industrial accidents by identifying caddies' exposure levels and the current status of harmful risk factors, no official investigation has been conducted at the government level. The government's lack of concern is presumed to be due to the narrow range of data on the population because industrial accidents occurred but were not approved by the government's industrial accident compensation insurance or because golf caddies handled accidents. Recently, caddies in South Korea have had an increased risk of exposure to various industrial accidents, often caused by insufficient rest, due to a tight game schedule [30]. Nevertheless, investigation of the health and safety status of golf course caddies and development of policies to correct problems have not been prioritized.

Caddies are more likely to work in places with fewer employment options and limited income security [28]. However, many do not prefer structured employment because they have the advantage of being free to set their own schedule and choose who to work with [31]. Socioeconomic, health, and occupational factors were central in determining the direction of influence in this relationship. Similar cases have been reported in India and South Africa [1,31]. They claimed that caddies did not want formal employment and preferred the current informal structure, which accommodated minor changes. South Korea has defined these jobs as specially employed workers and has protected them by including them in industrial accident compensation insurance since 2021. However, a survey of perceptions, requirements, and objectives should be conducted and considered when changing policies or procedures.

Although it was confirmed through the survey that the need for safety and health of caddies has greatly improved, the role of the workplace or the government does not meet the caddies' needs. According to OSHA, workers who work long hours increase the level of physical stress and can cause bad eating habits, lack of physical activity and diseases, so workers' protection measures are needed [32]. Most of the caddies who participated in the survey worked 8 h per day, but rest time was not guaranteed due to the increase in the golf population. It means that increased fatigue poses safety and health concerns. As musculoskeletal diseases increase, the need for regular health check-ups for caddies and countermeasures in cases of emergency should be prepared in advance [33]. In addition to regular safety education for caddies, legal standards should be prepared to enforce protective measures against verbal abuse and sexual harassment against golf course users. In Europe, there is a policy on violence and harassment and the rules should also be applied to golf courses so that caddies can avoid violence and sexual harassment by customers [34]. There is also the potential for increased accident rates due to the lack of safety regulations and increased power performance of golf carts. Because rollover or struck accidents often occur on golf carts that are frequently used on golf courses, it is necessary to make improvements to hazard areas with severe inclinations in the workplace and to prevent the operation of golf carts that are not equipped with safety equipment, such as seat belts [35]. Many efforts have been made to understand musculoskeletal disorders that occur in the workplace [36–38], and a study was recently conducted to prevent musculoskeletal disorders, which can be called occupational diseases of caddies [1]. In order to reduce the physical stress of caddies in the workplace, regulations for handling heavy objects and repetitive work should be prepared, and the physical burden should be reduced through warm-up exercises. This should ensure that appropriate preventive measures are

implemented. Recently, OSHA has suggested that work-related stress among workers can have a serious negative impact on their mental health, and several measures have been proposed for this purpose [39]. However, it is necessary to develop detailed guidelines for the mental health of caddies. OSHA's various work guidelines make a great contribution to reducing the physical and mental stress of workers that can occur in the workplace, but the absence of direct regulations on caddies is a significant challenge for occupational safety and health. Therefore, prevention measures are needed to prevent industrial accidents for caddies on the golf course.

5. Conclusions

This study investigated health protection, protective measures for caddies, preparation for golf cart operation, physical burden, compliance with golf cart safety during games, and golf course responses to emotional labor of caddies, who are classified as a special type of worker in South Korea. Although this study aimed to prevent industrial accidents by analyzing golf course caddies from various aspects, it has some limitations. Although efforts were made to secure reliability based on references for the selection of participants, there may be problems that may cause some recall bias and interviewer bias. In addition, the fact that the participants who attended and agreed to participate on the day of data collection were not randomly selected means that they may not be representative of all caddies, making it difficult to generalize the health and safety risk factors analyzed. To compensate for these problems, a large-scale study on the various harmful factors that caddies face is required based on the generated information. Through this study, the safety and health status of the golf course where caddies are working was identified and the following conclusions were drawn through the risk factors that could cause industrial accidents.

(i) The study participants demanded higher safety protective measures for caddies working in small golf courses with fewer than 30 employees.
(ii) Most caddies were aware of the need for regular health checkups. It is necessary to provide follow-up guidance from health managers, based on the expansion of caddies having health checkups and the results of health checkup diagnosis.
(iii) According to the analysis of perceived physical burden, females perceived there to be a higher burden than males, and with regard to age, those in their thirties were more aware of physical burdens than those in their twenties. Therefore, there is a need for attention and protective measures to prevent musculoskeletal disorders in female caddies in their 30 s and 50 s. Caddies should be able to devote sufficient time to warm-up exercises to prevent injuries to players and themselves.
(iv) The experience of receiving safety education for the prevention of musculoskeletal disorders in handling heavy objects and repetitive tasks was very low. Caddies have a very high risk of developing musculoskeletal disorders due to unnatural postures, such as squatting or bending the back due to green maintenance, grass marks, ball picking, pin insertion, and repetitive postures, such as wiping balls, clubs, and cleaning carts. Musculoskeletal disease prevention education that can enable maintenance of the correct working posture should be conducted periodically.
(v) Most golf carts that operate on courses do not have safety belts. To prevent accidents, it is necessary to prepare standards for installing safety facilities, such as seatbelts, and strengthen safety device management.
(vi) To increase golf courses' response to emotional labor, health protection, protective measures for caddies, compliance with golf cart safety during the game, and lower physical burden should be encouraged. Additionally, the government should identify golf courses' health and safety status and establish appropriate preventive measures.

Author Contributions: Conceptualization, J.-Y.L. and C.K.; methodology, J.-Y.L.; software, J.-Y.L.; validation, C.K.; formal analysis, J.-Y.L. and C.K.; investigation, J.-Y.L.; data curation, C.K.; writing—original draft preparation, C.K.; writing—review and editing, C.K.; visualization, C.K.; supervision, C.K. All authors have read and agreed to the published version of the manuscript.

Funding: This study received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: This study was conducted with the informed consent of the participants, and data were obtained.

Data Availability Statement: Not applicable.

Acknowledgments: We sincerely thank the golf caddies that participated in this study.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Garnett, J.; Made, F.; Tlotleng, N.; Wilson, K.; Naicker, N. Work related musculoskeletal pain in gold caddies-Johannesburg, South Africa. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3617. [CrossRef] [PubMed]
2. Seo, C. *Leisure Industry Yearbook 2022*, 1st ed.; Korea Leisure Research Institute: Seoul, Korea, 2022; pp. 154–195.
3. Bruce, D. Turn Up, Keep Up & Shut Up: The Role of a Caddie in Male Professional Gold in Australia. Master's Thesis, The University of Queensland, Brisbane, Australia, 1999.
4. Coate, D.; Toomey, M. Do professional golf tour caddies improve player scoring? *J. Sports Econ.* **2014**, *15*, 303–312. [CrossRef]
5. Donald, W.; Winter, S. More than carrying a bag? The role of the caddies in facilitating a golfer's psychological performance. *Sport Exerc. Perform. Psycho.* **2022**, *11*, 124–137. [CrossRef]
6. Leisure News. Available online: http://www.golftimes.co.kr/ (accessed on 23 June 2022).
7. Ministry of Employment and Labor. Available online: https://www.mole.go.kr/user/download/ (accessed on 13 August 2022).
8. Jun, H.; Lee, J.E.; Kim, J. A specific case of a female golf caddy in South Korea. *Work* **2013**, *45*, 183–189.
9. Kim, E.; Nakata, M. Work-related musculoskeletal disorders in Korea and Japan: A comparative description. *Ann. Occup. Environ. Med.* **2014**, *26*, 17. [CrossRef] [PubMed]
10. Growing Number of Sexual Crimes by South Korea's "Power Elite". Available online: https://english.hani.co.kr/arti/english_edition/e_national/664325.html (accessed on 22 June 2022).
11. Golf Cart Accident and Moped Crash Injuries Can Be deadly in South Carolina. Available online: https://www.matthewsandmegna.com/golf-cart-moped-accidents-south-carolina-lawyer (accessed on 12 June 2022).
12. How Vulnerable Are "Cart Girls" to Sexual Harassment? Here's One Woman's Take After Three Years on the Job. Available online: https://golf.com/news/how-vulnerable-are-cart-girls-to-sexual-harassment-heres-one-womans-take-after-three-years-on-the-job/ (accessed on 18 June 2022).
13. CISS. Available online: https://www.kca.go.kr/kca/sub.do?menukey=5012 (accessed on 18 June 2022).
14. Kim, I.; Rhie, J.; Yoon, J.; Kim, J.; Won, J. Current situation and issue of industrial accident compensation insurance. *Korean Med. Sci.* **2012**, *27*, S47–S54. [CrossRef] [PubMed]
15. Wadsworth, L.T. When golf hurts: Musculoskeletal problems common to golfers. *Curr. Sports Med. Rep.* **2007**, *6*, 362–365. [CrossRef]
16. Zouzias, I.C.; Hendra, J.; Stodelle, J.; Limpisvasti, O. Golf injuries: Epidemilogy, Pathophysiology, and treatment. *J. Am. Acad. Orthop. Surg.* **2018**, *26*, 116–123. [CrossRef]
17. McHardy, A.; Pollard, H.; Luo, K. One-year follow up study on golf injuries in Australian amateur golfers. *Am. J. Sports Med.* **2003**, *35*, 1354–1360. [CrossRef]
18. Darrow, M. How Carrying Golf Bags Adds to Neck and Back Pain. Available online: https://stemcellinstitute2.com/carrying-a-golf-bag-adds-to-neck-and-back-pain/ (accessed on 8 June 2022).
19. Engel, L.; Bansback, N.; Bryan, S.; Doyle-Waters, M.M.; Whitehurst, D.G.T. Exclusion criteria in national health state valuation studies: A systematic review. *Med. Decis. Making.* **2016**, *36*, 798–810. [CrossRef]
20. Jung, M.; Kim, H. Relations between the emotional labor and depression symptoms of female workers in cosmetics sales. *J. Oil Appli. Sci.* **2018**, *35*, 1–11.
21. Korea Occupational Safety and Health Agency (KOSHA), KOSHA Guide H-106-2012 Job Stress Assessment Guidelines. Available online: http://www.kosha.or.kr (accessed on 20 June 2022).
22. Taber, K.S. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res. Sci. Educ.* **2018**, *48*, 1273–1296. [CrossRef]
23. Golf Cart Accidents & Golf Cart Safety. Available online: http://www.golfcartsafety.com/ (accessed on 23 June 2022).
24. Li, C.; Wang, X.; Wei, C.; Hao, M.; Qiao, Z.; He, Y. Analysis of the correlation between occupational accidents and economic factors in China. *Int. J. Environ. Res. Public Health* **2021**, *18*, 10781. [CrossRef]
25. Dancey, C.; Reidy, J. *Statistics Without Maths for Psychology*, 5th ed.; Prentice Hall: Hoboken, NJ, USA, 2011; p. 175.

26. Liao, D.; Valliant, R. Variance inflation factors in the analysis of complex survey data. *Surv. Methodol.* **2012**, *38*, 53–62.
27. Murray, C.J.; Vos, T.; Lozano, R.; Naghavi, M.; Flaxman, A.D.; Michaud, C.; Ezzati, M.; Shibuya, K.; Salomon, J.A.; Abdalla, S.; et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet* **2013**, *380*, 2197–2223. [CrossRef]
28. Paver, R.; Rothman, S.; van den Broeck, A.; de Witte, H. Labour market interventions to assist the unemployed in two townships in South Africa. *SA J. Ind. Psychol.* **2019**, *45*, a1596. [CrossRef]
29. Rischewski, D.; Kuper, H.; Atijosan, O.; Simms, V.; Jofret-Bonet, M.; Foster, A.; Lavy, C. Poverty and musculoskeletal impairment in Rwanda. Trans. *R. Soc. Trop. Med. Hyg.* **2008**, *102*, 608–617. [CrossRef]
30. National Assembly Research Service. Available online: https://www.nars.go.kr/report/view.do?cmsCode=CM0018&brdSeq=2087 (accessed on 29 June 2022).
31. Inglis, P. The "Caddie Question": Why the Golf Caddies of Bangalore Reject Formal Employment. *J. Contemp. Ethnogr.* **2018**, *47*, 579–608. [CrossRef]
32. Occupational Safety and Health Administration. Long Work Hours, Extended or Irregular Shifts, and Worker Fatigue. Available online: https://www.osha.gov/worker-fatigue (accessed on 17 August 2022).
33. Brumitt, J.; Cuddeford, T. Current concepts of muscle and tendon adaptation to strength and conditioning. *Int. J. Sports Phys. Ther.* **2015**, *10*, 748–759.
34. Giaccone, M.; Nunzio, D.D.; Fromm, A.; Vargas, O. *Violence and Harassment in European Workplaces: Extent, Impacts and Policies*; Eurofound: Dublin, Ireland, 2015; pp. 1–89.
35. Golf Cart Safety Fact Sheet. Available online: https://www.tdi.texas.gov/pubs/videoresource/fsgolfcart.pdf (accessed on 14 August 2022).
36. Carrillo-Castrillo, J.; Pérez-Mira, V.; Pardo-Ferreira, M.D.C.; Rubio-Romero, J.C. Analysis of required investigations of work-related musculoskeletal disorders in Spain. *Int. J. Environ. Res. Public Health* **2019**, *16*, 1682. [CrossRef]
37. Comper, M.L.C.; Dennerlein, J.T.; Evangelista, G.D.S.; Rodridues da Silva, P.; Radula, R.S. Effective of job rotation for preventing work-related musculoskeletal diseases: A cluster randomized controlled trial. *Occup. Environ. Med.* **2017**, *74*, 545–552. [CrossRef] [PubMed]
38. Moar, J.M.; Alvarez-Campana, J.M.; Míguez, J.L.; González, L.M.; Ramos, D.G. Comparative study of the relevance of musculoskeletal disorders between the Spanish and the European working population. *Work* **2015**, *51*, 645–656. [CrossRef] [PubMed]
39. Occupational Safety and Health Administration. Available online: https://www.osha.gov/quicktakes/05202021 (accessed on 18 August 2022).