Original Article

# The Relationships Between Control Measures and Absenteeism in the Context of Internal Control

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## A R T I C L E   I N F O

## A B S T R A C T

*Background:* The study tries to show the effect of Occupational Health and Safety (OHS) legislation implemented via plan-do-check-act methodology on accident and sickness absenteeism.
*Methods:* The data for the study gathered via a questionnaire from a large-sized organization operates in production and maintenance of passenger coaches in February–March 2019 in Turkey. The data analyzed via structural equation model analysis.
*Results:* The results showed that there are statistically meaningful relationships between OHS protective measures, training and informing of employees, and employee participation and accident and sickness absenteeism. In addition, a meaningful relationship between internal control and accident and sickness absenteeism was determined. Statistically meaningful relationships between emergency measures, and health surveillance and internal control, and accident and sickness absenteeism could not be determined.
*Conclusion:* It is concluded that the actions implemented by organizations to reduce absenteeism should be as per OHS legislation.

## 1. Introduction

Absenteeism is one of the key factors of the job performance and high absenteeism rate that cause high costs and reduced productivity is a source of concern for most of the organizations [1–3]. According to statistics gathered from the Bureau of Labor Statistics, there is a loss of 2.8 million workdays every year due to employee absenteeism [4]. Because of that organizations try to minimize absenteeism by constant monitoring of employees and preventive actions. Employee absenteeism covers not only the state of being out of office because of health problems but also injured employees, other employees helping the injured employees, and production slowdowns or halts because of equipment and machine damage [5].

Taking measures has become a key factor in the literature to ensure health and safety in the workplaces. Today, taking measures before occupational accidents and diseases occur is seen as a more humane, ethical, and economical approach rather than solving the problem after an accident or a disease. Unless organizations take measures to prevent occupational accidents and diseases, there would be various direct and indirect negative effects on both employees and organizations [6].

The first Occupational Health and Safety (OHS) Law in Turkey (law no. 6331) that was prepared in accordance with the law of harmonization code of the European Union (EU) enacted in 2012. The law no. 6331 is created consistent with EU OHS legislation to take measures for dangers and risks in the workplace as a proactive approach. Taking preventive measures, evaluating the risks, training and informing of employees (TI) , and health surveillance (HS) are the main principles of both EU OHS legislation and the law no. 6331 [7,8].

The plan-do-check-act (PDCA) cycle is a methodology that aims continuous improvement and can be implemented in various areas including quality and productivity exercises. PDCA methodology can, also, be the basis for OHS management systems [9]. Obligations of the law no. 6331 that aims to provide and improve OHS in the workplace can be adapted to the PDCA methodology (see Fig. 1). By the law no. 6331, responsibility of preventive (i.e. periodical controls of lifting equipment and electric wiring and organizational and managerial measures such as environmental evaluations, HS, and employee participation [EP]), protective (collective protective measures [PMs] such as ventilation, lightening, air conditioning systems, and machine protectors, etc and personal protective gear), and mitigating measures (actions related with being prepared for

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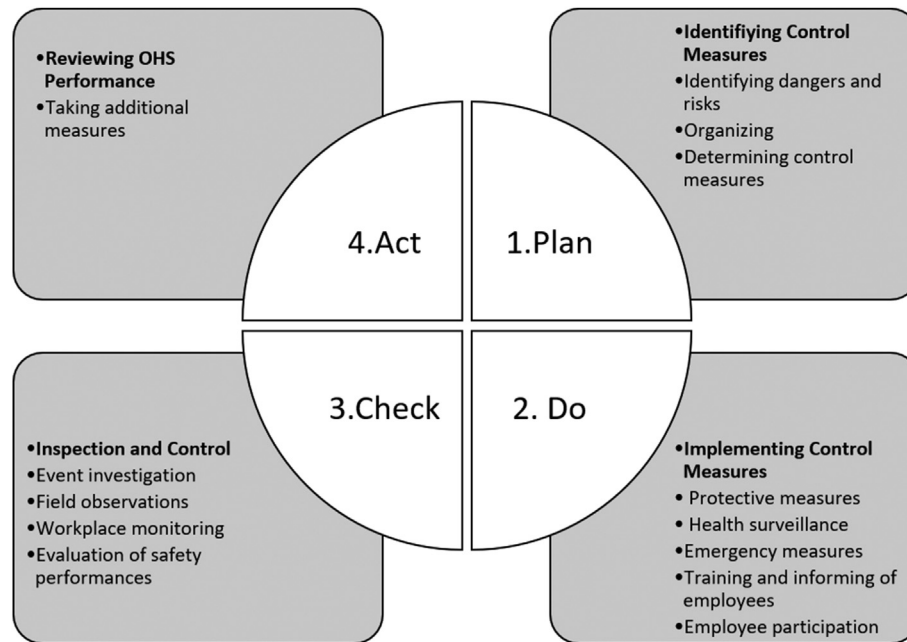*E-mail address:* hburgazoglu@sakarya.edu.tr (H. Burgazoglu).

**Fig. 1.** Adaptation of obligations of the Occupational Health and Safety law no.6331 to PDCA methodology. OHS, Occupational Health and Safety; PDCA, plan-do-check-act.

emergency situations), called as OHS control measures (CMs) in the literature, for occupational accidents and diseases is given to employers [7]. Training of employees is an obligation that includes all three types of CMs [10]. The law gives not only responsibility of providing OHS in the workplace but also enjoins control actions such as field observations to improve OHS and taking additional measures by investigating accidents with or without personal injuries to prevent similar accidents [7].

Various studies show that taking measures to provide OHS in the workplaces has positive effects for both employees and organizations. In this regard, Mossink [11] states that prevention of occupational accidents and sickness has indirect contributions such as a decrease in sick leaves and infirmity. On the other hand, Özmutaf [12] claims that poor working conditions and environment lead to negative consequences such as an increase in absenteeism and complaints and a decrease in performance and efficiency. In addition, according to Bergström et al [13], failure to consider work environment may increase sick leaves. In their study, Widerszal-Bazyl and Warszewska-Makuch [14] have measured workplace safety by the variables of number of accidents, number of employees, and accident and sickness absenteeism and found out that employees' participation to OHS practices positively affects workplace safety. Gervais et al [15] state that preventive and encouraging OHS practices have a positive effect on absenteeism, intention to leave of employment, employee turnover rate, and efficiency. According to report of Hesapro [16], taking measures to implement OHS leads to decrease in a number of occupational accidents and diseases, improvement in the quality of life, and a healthy lifestyle. Ilesanmi et al [17] showed that training is necessary for proper use of personal protective garments and it decreases the number of occupational accidents and infirmities. Masso [18] states that OHS management activities would be beneficial for keeping the employees, managing absenteeism, and improving the general performance of the organization. Bayram [19] claims that preventive OHS implementations would provide a decrease in absent time and sick leaves. Jinnett et al [20] concluded that one of the benefits of ensuring safety in workplaces is decreased absenteeism.

The findings of the study conducted by Fernando et al [21] showed that 38% of the employees who have physical and psychological health issues have absenteeism problems. Dos Santos and Mendes [22] claim that employing manual therapists in workplaces as a preventive safety approach will contribute to reducing absenteeism due to musculoskeletal disorders.

It is conspicuous that there are very few empirical studies in the literature that examine the relationship between preventive OHS legislation and absenteeism. In this regard, Bertera's [23] study that shows comprehensive occupational health development programs decrease absenteeism is one of the studies that shows such a relationship. On the other hand, there are studies that show a relationship between absenteeism and accidents, infirmity, and occupational diseases (e.g., Allen [24]; Goodman and Garber [25]); and absenteeism and poor health conditions (i.e. Ose [26]; Goetzel et al [27]).

## 2. Materials and methods

### 2.1. Hypotheses

The main purpose of this study is to empirically test whether the decree of the law no. 6331 that can be adopted to the PDCA methodology contributes to the continuous improvement of OHS in workplaces. The aim would be achieved by examining the relationship between decrease in accident and sickness absenteeism (AB) and implementations of obligations of the law no. 6331 adopted to the PDCA methodology. A research model was created to empirically test the relationships between the variables. Employees of Turkish Wagon Industry Incorporation (TUVASAS), operates in production and maintenance of passenger coaches, that subject to the law no. 6331 were determined as target population to test the research model.

The hypotheses shown below were determined based on the literature and research model shown in Fig. 2.

**H₁.** There is a statistically meaningful direct relationship between OHS PMs and Internal Control (IC).

**Obligations of the OHS Law no. 6331**

**Control Measures**
- OHS Protective measures
- Emergency Measures
- Health Surveillance
- Training and informing of Employees
- Employee Participation

→ Internal Control →

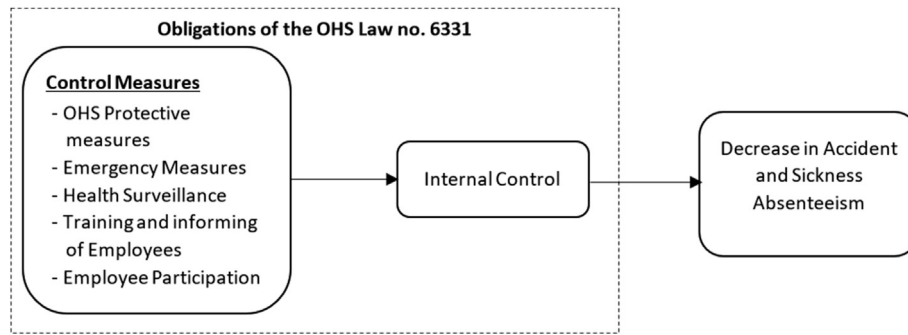Decrease in Accident and Sickness Absenteeism

Fig. 2. Research Model. OHS, Occupational Health and Safety.

**H₂.** There is a statistically meaningful direct relationship between emergency measures (EMs) and IC.

**H₃.** There is a statistically meaningful direct relationship between HS and IC.

**H₄.** There is a statistically meaningful direct relationship between TI and IC.

**H₅.** There is a statistically meaningful direct relationship between EP and IC.

**H₆.** There is a statistically meaningful positive direct relationship between IC and AB.

**H₇.** There is a statistically meaningful relationship between OHS PMs and AB via IC.

**H₈.** There is a statistically meaningful relationship between EMs and AB via IC.

**H₉.** There is a statistically meaningful relationship between HS and AB via IC.

**H₁₀.** There is a statistically meaningful relationship between TI and AB via IC.

**H₁₁.** There is a statistically meaningful relationship between EP and AB via IC.

## 2.2. Sample of the research and data gathering

The research was conducted on employees of TUVASAS which is a large-sized enterprise that operates in the production and

**Table 1**
Scales and variables of the research

| **Control measures (CMs)** | | |
|---|---|---|
| PM | PM_1 | Measurements for noise, dust, vibration, and lightening are conducted regularly in our workplace. |
| | PM_2 | Controls of lifting crane, lever jack, etc are conducted regularly in our workplace. |
| | PM_3 | Heating and ventilating systems are adequate in our workplace. |
| | PM_4 | The number and quality of PPE are adequate in our workplace. |
| EM | EM_1 | Emergency escape routes and gathering places are designated in our workplace. |
| | EM_2 | All the employees are informed about emergency situations beforehand in our workplace. |
| | EM_3 | Fire and emergency evacuation drills are conducted regularly in our workplace. |
| HS | HS_1 | First-aid and medical equipment are effective in our workplace. |
| | HS_2 | All the employees are subjected to health surveillance regularly in our workplace. |
| | HS_3 | All the employees are subjected to entry examination in our workplace. |
| TI | TI_1 | All the employees are trained and informed about the dangers and risks in the workplace. |
| | TI_2 | All the employees are informed about instructions and codes related to occupational safety. |
| EP | EP_1 | Employees' opinions and suggestions about OHS are noted in our workplace. |
| | EP_2 | OHS boards/committees related to with occupational safety are formed. |
| **Internal Control (IC)** | | |
| | IC_1 | Accidents involving personal injuries or material/equipment damage are investigated in our workplace. |
| | IC_2 | OHS precautions are monitored regularly in our workplace. |
| | IC_3 | Dangers and risks in the workplace are evaluated periodically and occupational health and safety would be improved accordingly. |
| **Decrease in Accident and Sickness Absenteeism (AB)** | | |
| | AB_1 | There has been a decrease in absent time resulted from accidents and diseases in our workplace. |
| | AB_2 | There has been a decrease in absent time resulted from machine and equipment failure in our workplace. |
| | AB_3 | There has been a decrease in sickness leave in our workplace. |
| | AB_4 | Unpaid and hourly leaves are higher in workplaces with inadequate working conditions. |

AB, decrease in accident and sickness absenteeism; EM, emergency measure; EP, employee participation; HS, health surveillance; IC, internal control; PM, protective measure; OHS, Occupational Health and Safety; TI, training and informing of employees.

maintenance of passenger coaches in Sakarya (Turkey). The data were gathered by a questionnaire. The approval of the Sakarya University Ethics Committee (date and number of approved documents: 27/06/2019-E.8465) that the research and questionnaire is in compliance with the ethical rules was obtained, and necessary permissions were acquired from the authorities of the institution where the research will be conducted. At the time the study was conducted, there were 682 employees working at TUVASAS, and without any sampling procedure, the questionnaire was sent out to all (682) employees. With a response level of 70.2%, 479 of them have answered the questionnaire.

### 2.3. Scales

There are three main scales constructed by the authors themselves in this study: CMs, IC, and AB. The items of CMs and IC were adopted from the OHS law no. 6331. The CMs scale (14 items) has five dimensions: PMs (4 items), EMs (3 items), HS (3 items), Training and Informing of the Employees (TI, 2 items), and EP (2 items). The IC scale has 3 items, and the AB scale has 4 items adapted from the Increase in Employee Safety Productivity scale [5]. In Table 1, scales used in the research and their items were stated. Participants were asked to indicate their perceptions about the items via the 5-item Likert Scale: 1 = Strongly Disagree … 5 = Strongly Agree.

### 2.4. Analyses and findings

The scales used in the study were analyzed for unidimensionality, internal consistency, compound reliability, convergent validity, and discriminant validity. Then, explanatory factor analysis (EFA) was conducted to find new meaningful latent variables from CMs via SPSS (v. 23). After that, the hypotheses about the relationships between new latent variables, IC, and AB variables were analyzed with confirmatory factor analysis via SmartPLS (v. 3) [28].

### 2.5. Demographic findings

While 476 of the participants (99.4%) are male, only 3 of them (0.6%) are female and 184 of them (38.41%) are in the age between 40 and 49 and 115 of them (24%) are between 30 and 39. While 444 of them (92.7%) are workers, 35 of them (7.3%) are foremen. Four hundred and sixty-five of them (97.1%) are working directly in production, and 14 of them (2.9%) are working in supportive services. Lastly, 245 of them (51.1%) are working in this organization more than twenty years, and 135 of them (28.2%) are working in this organization less than five years.

### 2.6. Explanatory phase findings

In this part, only the 14 items of CMs were analyzed to find new latent variables that can represent the scale. The varimax rotation method was used for EFA, and it was examined that whether the CM scale can be represented via five latent variables or not. Based on results of EFA and the scree test, five latent variables that can represent 72.452% of the total variance were detected. The first factor called PMs, with an eigenvalue of 4.642 and the total variance of 33.155%, included four items. The second factor called EMs, with an eigenvalue of 2.111 and a total variance of 15.082%, included three items. The third factor called HS, with an eigenvalue of 1.292 and a total variance of 9.226%, included three items. The fourth factor called TI, with an eigenvalue of 1.103 and a total variance of 7.878%, included two items. The fifth factor called EP, with an eigenvalue of 0.996 and a total variance of 7.111%, included two items. The communalities of each variable ranged from 0.566 to

**Table 2**
The validity of the scales and path quality of the model

| Dimensions | EM | EP | AB | TI | IC | PM | HS |
|---|---|---|---|---|---|---|---|
| PM_1 | | | | | | 0,820 | |
| PM_2 | | | | | | 0,772 | |
| PM_3 | | | | | | 0,742 | |
| PM_4 | | | | | | 0,689 | |
| EM_1 | 0,792 | | | | | | |
| EM_2 | 0,896 | | | | | | |
| EM_3 | 0,819 | | | | | | |
| HS_1 | | | | | | | 0,791 |
| HS_2 | | | | | | | 0,874 |
| HS_3 | | | | | | | 0,760 |
| TI_1 | | | | 0,928 | | | |
| TI_2 | | | | 0,927 | | | |
| EP_1 | | 0,860 | | | | | |
| EP_2 | | 0,897 | | | | | |
| IC_1 | | | | | 0,838 | | |
| IC_2 | | | | | 0,852 | | |
| IC_3 | | | | | 0,896 | | |
| AB_1 | | | 0,903 | | | | |
| AB_2 | | | 0,861 | | | | |
| AB_3 | | | 0,793 | | | | |
| (*)AB_4 | | | 0,594 | | | | |
| Cronbach's α ≥ 0.650 | 0,787 | 0,706 | 0,836 | 0,838 | 0,827 | 0,751 | 0,738 |
| CR ≥ 0.800 | 0,875 | 0,871 | 0,902 | 0,925 | 0,897 | 0,843 | 0,851 |
| AVE≥0.500 | 0,700 | 0,772 | 0,754 | 0,861 | 0,743 | 0,573 | 0,656 |
| √AVE | 0,837 | 0,879 | 0,868 | 0,928 | 0,862 | 0,757 | 0,810 |
| EM | 1,000 | | | | | | |
| EP | 0,415 | 1,000 | | | | | |
| AB | 0,458 | 0,516 | 1,000 | | | | |
| TI | 0,473 | 0,523 | 0,466 | 1,000 | | | |
| IC | 0,467 | 0,655 | 0,622 | 0,544 | 1,000 | | |
| PM | 0,611 | 0,344 | 0,458 | 0,418 | 0,518 | 1,000 | |
| HS | 0,428 | 0,497 | 0,409 | 0,418 | 0,454 | 0,356 | 1,000 |

**Note:** (*) Item deleted due to low factor loading.
AB, decrease in accident and sickness absenteeism; AVE, average variance extracted; CR, composite reliability; EM, emergency measure; EP, employee participation; HS, health surveillance; IC, internal control; PM, protective measure; TI, training and informing of employees.

0.877. The results of the Kaiser-Meyer-Olkin (KMO) (0.873) and Bartlett Sphericity ($\chi^2 = 2563.910$, $p < 0.000$) tests show that the data from the sample are suitable for factor analysis.

### 2.7. Confirmatory phase findings

#### 2.7.1. Findings of the research model

For the evaluation of the research model, convergent and discriminant validity of the model was tested. For convergent validity some criteria must be met: all the indicator loadings>0.703; their composite reliability > 0.8 or Cronbach's α > 0.65; the average variance extracted (AVE) for each scale>0.5 [29,30]. After initial analysis, it is found out that index loadings of all of the variables are between 0.742 and 0.928 except AB_4 (index loading: 0.594) and PM_4 (index loading: 0.689). Because index loading of AB_4 is too low, it was taken out of the model. On the other hand, because index loading of PM_4 is close to the threshold value and it is an important item, it was kept in the model. Without AB_4 factor, the Cronbach's α values of the scales were from 0.706 to 0.838, the AVE values were from 0.573 to 0.861, and the composite reliability values were between 0.843 to 0.925 (see Table 2). All the necessary conditions for convergent validity are met for the research model.

**Table 3**
Evaluation of path quality of the model

| Scales | Cross-validated communality | Cross-validated redundancy |
|--------|----------------------------|----------------------------|
| EM | 0,386 | |
| EP | 0,292 | |
| AB | 0,469 | 0,274 |
| TI | 0,456 | |
| IC | 0,450 | 0,384 |
| PM | 0,302 | |
| HS | 0,318 | |

AB, decrease in accident and sickness absenteeism; EM, emergency measure; EP, employee participation; HS, health surveillance; IC, internal control; PM, protective measure; TI, training and informing of employees.

Fornell and Larker [29] criteria test was conducted to test the discriminant validity of the scales, and the results are shown in Table 2. As it shown in Table 2, square roots of AVE values of all latent variables are higher than their correlation values with other variables; therefore, discriminant validity is confirmed.

### 2.7.2. Structural equation model (SEM) findings

Before the SEM analysis, the relationships between the demographic variables and the scales were examined via ANOVA. The results showed that there is no significant relationship between the demographic variables and the scales. Therefore, demographic variables were not included in the SEM analysis as control variables.

In PLS-SEM via blindfolding procedure, two types of $Q^2$ parameters can be found out: cross-validated communality and cross-validated redundancy [31]. As it can be seen in Table 3, both of the $Q^2$ parameters are positive. Therefore, the predictive validity of the model is confirmed.

Secondly, the explanatory power of the model was tested. $R^2$ used for endogenous structures is calculated to determine the explanatory power of the model. Acceptable $R^2$ levels: 0.75 (strong), 0.50 (medium), and 0.25 (weak) [32,33]. According to

Fig. 3, $R^2$ level of IC is 0.553 (medium) and $R^2$ level of AB is 0.387 (medium). Therefore, endogenous structures of the model are a medium level and acceptable.

Thirdly, the goodness of fit level of the model was examined. Smart PLS uses the standardized square root of mean error value introduced by Henseler et al [34] to evaluate the goodness of fit. Values under 0.08 are considered as an acceptable goodness of fit value by Hu and Bentler [35]. The standardized square root of mean error value of the model is determined as 0.068; therefore, the model has a good goodness of fit.

Lastly, hypotheses were tested. The β value can be used to determine validity of the hypotheses. A bootstrapping procedure with a 500 subsample was used to examine the hypotheses of the research. Direct and indirect effects were found out as shown in Fig. 3. As it can be seen in Fig. 3, while seven hypotheses ($H_1$, $H_4$, $H_5$, $H_6$, $H_8$, $H_9$, $H_{10}$) were strongly confirmed four of them ($H_2$, $H_3$, $H_7$, $H_{11}$) were rejected. Therefore, based on test results, it was found out that PMs, TI, and EPs have a statistically meaningful effect on both IC and AB. On the other hand, it was also shown that EMs and HS have no statistically meaningful effect on IC and AB.

## 3. Discussions

In this study, the relationships between components of CMs, IC, and AB were investigated. Eleven hypotheses were tested, and while seven of them were accepted, four of them were rejected.

Statistically meaningful relationships between PMs, one of the components of CMs and IC, and AB were found out. The findings are coherent with other studies [12,17,36] in the literature. Özmutaf [12] and Leineweber et al [36] have shown that absenteeism levels are higher in workplaces with inadequate working conditions and environment. Ilesanmi et al [17] have found out that the right and proper use of personal protective garments would decrease occupational accidents and injuries. Based on these results, it is concluded that PMs have an effect on occupational accidents and sickness absenteeism which is an indicator for an improvement in
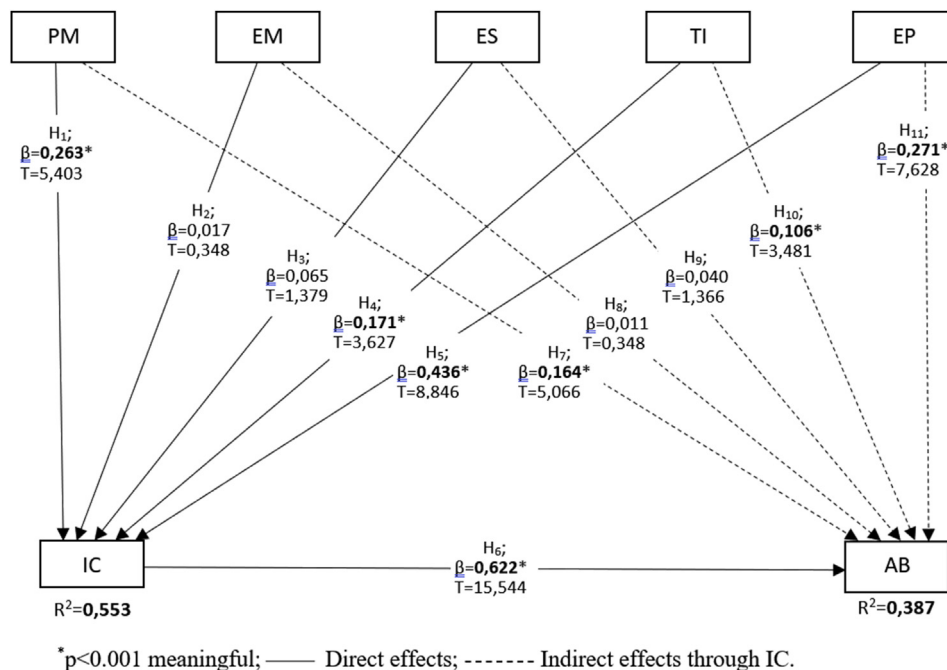


**Fig. 3.** *p<0.001 meaningful; —Direct effects; – – – – – –Indirect effects through IC. AB, decrease in accident and sickness absenteeism; EM, emergency measure; EP, employee participation; HS, health surveillance; IC, internal control; PM, protective measure; TI, training and informing of employees.

OHS via IC implemented according to the PDCA cycle. Managers should implement effective PMs in the context of OHS to AB that create economical advantage for the organizations.

There are, also, statistically meaningful relationships between TI, one of the CMs and IC, and AB. The findings are consistent with studies of Lin and Mills [37], Probst [38], Teo et al [39], and McCaughey et al [40] that state that OHS training reduces occupational accident rates. Based on results, it can be concluded that TI is a legal obligation that would affect accident and sickness absenteeism in accordance with the PDCA cycle via IC. To be able to gain economic benefit, managers should implement preventive measures in the context of OHS training at least at the level that meets legal obligations.

A statistically meaningful relationship was found out between EP, which is one of the components of the CMs and IC, and AB. The result is coherent with other studies [14,41–46] in the literature. In the report published by the European Foundation for the Improvement of Living and Working Conditions [41], it was stated that in the context of absenteeism to improve employees' health conditions, employees' active participation is necessary, and in addition, OHS committees and unions should be involved in the process. In their studies, Carrivick et al [42] have shown that with the help of the participative ergonomics risk evaluation approach, 35% of improvement for missing time because of handling injuries can be achieved. In their study of Neal and Griffin [43] showed that EP affects the success of OHS. Wurzelbacher [44] has shown that there is a meaningful relationship between decrease in occupational accidents and occupational safety participation. Widerszal-Bazyl and Warszewska-Makuch [14] proved that employees' participation affects accident and sickness absenteeism rates positively. The International Labor Office [45] has reported that forming OHS committees and participation of unions to OHS activities would have a positive effect on decrease in the number of injuries and accident absenteeism. Mullen et al [46] stated that there are strong indications that show a relationship between decrease in occupational accidents and injuries and safety participation. Based on this finding, it was concluded that employees' participation in OHS activities as a legal obligation has an effect on accident and sickness absenteeism in accordance with the PDCA cycle via IC. Therefore, for managers it is suggested that for the success of OHS, they should create ways to increase active participation of employees such as developing tools that encourage employees to offer their suggestions and opinions, forming OHS committees that would help employees' participation to decision-making processes.

Statistically meaningful relationships between EMs and IC, and AB could not be determined. The finding shows that EMs, one of the mitigating measures, have no significant contribution to providing and improving OHS; but managers should not forget that the organization must be ready for emergency situations such as fire, earthquake, sabotage, etc that threats the safety of the organization as a whole.

In addition, statistically meaningful relationships between HS and IC, and AB could not be determined. The number of studies examines the relationship between HS and accident and sickness absenteeism is scarce in the literature. As far as we can see the only study about the subject is the study of Wild et al [47]. Our findings contradict with the study of Wild et al [47]. In our study, it was predicted that HS would help to improve accident and sickness absenteeism, but such a relationship could not be determined. Because HS would increase the probability of early detection, additional measures can be implemented for the sick employee and other employees. Therefore, the process would improve health and safety conditions, and therefore, absenteeism would decrease. The reason for the absence of relationships between HS and IC, and AB could be ineffective surveillance activities of the organization that in the study was conducted. Further studies are necessary for the subject.

There is also a direct relationship between IC and AB. These findings are coherent with other studies [15,48–51] in the literature. Gervais et al [15] state that preventive and promotive activities for providing and improving OHS in workplaces have a positive effect on employees' absenteeism and productivity. In their studies, Loebbaka [48] and Palacic [51] showed that the organizations with OHSAS 18001 certificates designed based on the PDCA cycle have improved their safety performances. In the studies, it was shown that with improvement training designed as per PDCA cycle, the hand hygiene conformity rate had improved from 31% to 69% and infection rate called as ventilator-associated pneumonia had decreased from level 16 to level 7 [49,50]. In this regard, it was concluded that OHS control activities have a direct effect on accident and sickness absenteeism. These findings show that OHS can be further improved with the help of OHS control activities in the workplaces. Therefore, it was suggested for the managers to implement IC activities effectively.

The results should be interpreted considering some limitations. Firstly, the study was conducted in Turkey wherein OHS law went into effect in 2012 to reduce the occupational accident rate which is higher than that in other emerging countries. Moreover, it can be seen that safety awareness in the workplace is increasing because of legislative amendments according to EU legislation. The results reflect employees' perception in an organization that implements OHS legislation in Turkey. Because in other countries, legislations about OHS and safety awareness may differ, results may vary. The results can be interpreted as the quality of the first independent OHS law of Turkey is good enough and it helps to improve safety awareness. Lastly, the organization where the study conducted in is operating in the OHS management as per OHSAS 18001 standards for continuous improvement of OHS in the workplace. In an organization that only meets the obligations required by the law, the results may differ.

Considering the aforementioned limitations, it is recommended that similar researches are carried out for organizations that do not implement a management system such as OHSAS 18001 but implement OHS measures due to legal obligations only. In addition, similar researches can focus on developing country organizations and particularly Small or Medium Enterprise (SME-style) organizations with a high accident rate.

The study proves that OHS legislations that are designed based on the PDCA methodology can improve OHS in the workplace, and therefore, economic improvements can be achieved. There are several studies that show OHS management systems designed as per OHSAS 18001 based on the PDCA methodology would improve organizational performance [52,53] (i.e. Muñiz et al [52], Rzepecki [53]) and safety performance (i.e. Loebbaka [48], Palacic [51]). Similarly, it is empirically proved that in the organizations meeting the obligations of OHS law no. 6331 that are assumed to be designed as per the PDCA methodology an improvement in accident and sickness absenteeism can be achieved. Therefore, it is recommended that policy makers take into account the PDCA cycle for the OHS laws.

Because the relationships that were examined in the study had not to be studied before and similar empirical studies were conducted only in the OHS management system literature, the importance of the study can be seen. In this regard, we believe the study would make significant contributions to the literature.

## Conflicts of interest

All authors have no conflicts of interest to declare.

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