Employees' awareness, perceptions and participation in occupational safety services at Manyara Sugar Company, Tanzania: A cross-sectional survey

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ABSTRACT

Occupational safety services protect workers only when employees know about them, value them and take part in them. This study assessed employees' awareness of, perceptions of and participation in occupational safety services at Manyara Sugar Company, and identified the factors associated with participation and the challenges that limit it. Guided by the Theory of Planned Behaviour and complemented by institutional theory, the study used a cross-sectional survey of 120 employees selected from different departments and job positions by stratified and simple random sampling. Data were collected with a structured questionnaire and analysed using descriptive statistics, the Relative Importance Index (RII), chi-square tests and multiple linear regression. Employees rated their understanding of the proper use of personal protective equipment (PPE) highest (RII = 0.817), followed by understanding of occupational hazards (RII = 0.793) and safety procedures (RII = 0.790). They were least sure of where to obtain safety information (RII = 0.721). Perceptions were positive, with the importance of the services in protecting employees rated highest (RII = 0.840), but only 62.5% agreed that PPE was adequate. High participation was most common in following safety procedures (63.3%), using PPE (60.0%) and attending training (50.0%), and least common in workplace safety inspections (31.7%) and suggesting improvements (33.3%). In the regression model, safety training, management commitment, safety knowledge and awareness, PPE availability, safety communication, safety supervision and employee involvement in safety decisions were each positively associated with participation, although verification of several regression statistics is still in progress (Section 4.2). The main challenges reported were inadequate PPE (79.2% agreement), infrequent training (76.7%), heavy workload (74.2%) and poor communication (73.3%). The study concludes that employees comply with established safety requirements more readily than they take part in activities that call for initiative, and that the barriers are mainly organisational. The company is advised to improve PPE supply, increase the frequency and tailoring of training, strengthen safety communication and create routine channels for employee involvement. Because the design is cross-sectional and the data are self-reported, the associations reported should not be read as causal.

Keywords: Employee Participation, Occupational Safety Services, Occupational Health and Safety, Safety Awareness, Sugar Industry, Tanzania

I. INTRODUCTION

Occupational safety and health (OSH) are concerned with protecting workers from injury, illness and other harm that arises from work. Recent writing places it within the wider agenda of decent work and responsible management and treats it as more than compliance with rules (Schulte et al., 2022). Management commitment to safety laws and regulations is one of the organisational conditions that this literature examines (Strzałkowski et al., 2025). Whatever the formal arrangements, services such as safety training, protective equipment, hazard reporting, inspections and emergency procedures protect workers only when employees know that the services exist, judge them worth using and take part in them. Friend and Kohn (2023) give an overview of these services.

The question is pressing in industrial workplaces. Manufacturing enterprises expose workers to machinery, noise, heat, dust and other hazards, and recent risk assessment work in such enterprises shows that these exposures need systematic management (Kuricová et al., 2025). In Ethiopia's Metehara and Wonji sugar industries, Debela et al. (2023) surveyed 1,648 workers and found that only 29.6% had good occupational health and safety practices. They also noted that information on workers' safety practices in the country's sugar industries had been inadequate before their study.

Awareness is necessary but does not guarantee safe behaviour. Adebiyi et al. (2020) studied construction workers in Nigeria and found average knowledge of health and safety information but a low level of compliance with it. Knowledge, attitudes and practices have also been assessed among laboratory workers (Almutairi et al., 2020),

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petrochemical workers (Mukhtar et al., 2020), health workers (Dhahir & Al Mayahi, 2021) and dentists and dental students (Kamal et al., 2025). Each of these studies concerns a single occupational group and centres on knowledge, attitudes and practice.

Participation also depends on the organisational setting. King and Lewchuk (2022) reviewed 688 cases before the Ontario Labour Relations Board and interviewed 25 workers to examine how workers who exercise health and safety rights are protected from employer reprisal. They argued that the existing remedies are important but limited. Fan et al. (2022) analysed 2,965 listed manufacturers in the United States and found that enforcement of safety regulation had limited effectiveness on its own and worked better when reinforced by stringent penalties and OHSAS 18001 certification. Nkrumah et al. (2021) surveyed 1,310 employees of three Ghanaian oil and gas organisations and examined the moderating and mediating role of work motivation in the link between occupational health and safety management practices and work performance. Dragano et al. (2018) reported age differences in access to and awareness of occupational safety and health services among employees in Italy.

In Tanzania, the national picture gives further reason to look inside enterprises. Mrema et al. (2015) reviewed the status of occupational health and safety in the country's expanding economy. They reported that work hazards had increased and diversified across sectors, that occupational health services were scanty and limited to a few enterprises that could afford them, that existing laws did not cover the whole working population and that implementation of legislation was weak. Where national provision is thin, the services that a company provides, and the extent to which its employees know of and use them, may largely determine whether workers are protected in practice.

A well-run safety system expects employees to know which services are available, to regard them as worthwhile and to take part in them, not only by following rules but also by inspecting, reporting and contributing ideas. Whether this happens at Manyara Sugar Company is not known. National evidence points to uneven service provision (Mrema et al., 2015), and evidence from Ethiopian sugar factories shows that good safety practice cannot be assumed among sugar workers (Debela et al., 2023). Studies elsewhere show that workers may know safety information without complying with it (Adebiyi et al., 2020), that organisational conditions shape whether workers can exercise participation rights (King & Lewchuk, 2022) and that enforcement alone has limited effect (Fan et al., 2022). The literature reviewed for this study, however, contains no assessment in a Tanzanian sugar company that brings together employees' awareness of occupational safety services, their perceptions of those services, their participation, the factors associated with participation and the challenges that limit it. Without such evidence, management cannot tell whether weak participation, where it exists, comes from limited awareness, from doubts about the services or from resource and organisational constraints, and cannot direct its response accordingly. The study therefore assessed employees' awareness, perceptions and participation in occupational safety services at Manyara Sugar Company, together with the factors associated with participation and the challenges that limit it.

1.1 Research Objectives

i. To assess employees' level of knowledge and perceptions of occupational safety services.
ii. To determine the level of employees' participation and factors associated with employees' participation in occupational safety services.
iii. To establish the challenges that limit employees' participation in occupational safety services.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Theory of Planned Behaviour (guiding theory)

Ajzen (1991) proposed that behaviour follows from intention and that intention is shaped by three determinants. Attitude is the person's evaluation of performing the behaviour. Subjective norm is the perceived social pressure to perform it. Perceived behavioural control is the perceived ease or difficulty of performing it, which reflects available resources and opportunities. Where perceived control reflects real constraints, it can also bear on behaviour directly (Ajzen, 1991). Bosnjak et al. (2020) review recent advances and applications of the theory.

In this study the behaviour of interest is participation in occupational safety services. The constructs of the Theory of Planned Behaviour (TPB) correspond to the survey data as follows. Attitude corresponds to employees' perceptions of the value and usefulness of the services (Objective 1). Subjective norm corresponds to how far employees perceive management, supervisors and colleagues to expect and encourage safe conduct, which the questionnaire captured through statements on management commitment, encouragement to participate and supervision. Perceived behavioural control corresponds to access to the means of taking part, captured through statements on the availability of personal protective equipment (PPE), training, safety information, accessibility of safety officers and workload. Knowledge and awareness (Objective 1) and respondent characteristics are not core TPB constructs. They are treated here as background factors that may shape attitudes and perceived control.

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The theory explains why the study looks beyond knowledge. Employees may know the requirements and still not take part if they doubt the services, sense little expectation from management or lack the means to act, which is consistent with the gap between knowledge and compliance reported by Adebiyi et al. (2020). The mapping above is interpretive. The survey did not use TPB scales, did not measure intention and measured participation by self-report. TPB therefore serves as a lens for organising and interpreting the associations. The study does not test the model.

2.1.2 Institutional theory (complementary perspective)

Institutional theory explains organisational practices as responses to regulatory, normative and cultural pressures (Scott, 2005). Brammer et al. (2012) apply an institutional perspective to private governance of corporate responsibility, and Fan et al. (2022) draw on institutional theory in their study of safety regulation enforcement. In the present study the theory directs attention to conditions that employees experience at the organisational level. These are management commitment, enforcement of safety rules, provision of resources such as PPE and training, and the channels through which safety information and employee voice are handled. The limitation is that the study measured employees' perceptions of these conditions. It did not measure external regulatory pressure on the company or the company's written policies, so institutional influences are inferred from employee reports.

2.1.3 Use of the two theories together

TPB frames the employee-level mechanisms and institutional theory frames the organisational conditions. Together they justify how the variables are arranged in Figure 1: employee perceptions and background, organisational conditions, participation, and the barriers to participation.

2.2 Empirical Review

Each study reviewed in this section bears on at least one question the present study asks. These are employees' knowledge and awareness of occupational safety services, their perceptions of the services, their participation, the organisational conditions associated with participation and the challenges that limit it. The studies come from different occupations and countries, so each subsection states what the evidence offers the present study and where it falls short. TPB and institutional theory from Section 2.1 are used to link the evidence to the objectives.

2.2.1 Knowledge and awareness

Studies of knowledge in occupational safety usually assess particular occupational groups. Almutairi et al. (2020) reviewed studies published between 2007 and 2017 on knowledge, attitude and practice among laboratory workers and concluded that all three were poor. Mukhtar et al. (2020) surveyed workers in petrochemical companies in Malaysia and found that the level of knowledge was significantly associated with the level of attitude. Dhahir and Al Mayahi (2021) assessed health workers' knowledge of an occupational health and safety programme in primary health care centres in Al Kut, Iraq, and related it to education, age and training. Kamal et al. (2025) assessed knowledge and awareness of occupational hazards and preventive measures among dentists and final-year students in Kabul. Each of these studies concerns a single occupational group and centres on knowledge of occupational safety and health in general, not on awareness of the specific services an employer provides, such as training, protective equipment and reporting channels. The settings differ widely, so the findings cannot be compared directly with those of an industrial workforce. They do show that knowledge is widely measured and often uneven, which supports assessing awareness as the first objective of the present study.

The studies that link knowledge to behaviour are more useful for this purpose. Adebiyi et al. (2020) surveyed construction workers in Lagos, Nigeria, and found average knowledge of health and safety information but a low level of compliance with it. Compliance correlated positively with workers' safety, but the correlation was not statistically significant, and the authors concluded that compliance alone cannot substantially guarantee safety. In TPB terms this is what one would expect if knowledge is only one input to action and perceived control and social expectation also matter. The evidence therefore suggests that knowledge is necessary, but that the step from knowing to acting depends on other conditions. The present study measures awareness under the first objective and turns to participation, its associated factors and its challenges under the second and third. Adolf and Stehr (2016) discuss the relationship between knowledge and power, which is a reminder that knowledge matters mainly when it can be used.

2.2.2 Perceptions of safety services

Perceptions of safety arrangements matter because they can affect whether workers use them, and in TPB terms they correspond to attitude toward the behaviour. Nkrumah et al. (2021) surveyed 1,310 employees of three Ghanaian oil and gas organisations and examined the moderating and mediating role of work motivation in the link between occupational health and safety management practices and work performance. They stressed the importance of managing workers' perceptions of those practices as a motivational influence. Related work looks at other perceptual and social conditions. Alshammari et al. (2025) examined the influence of managers' safety perceptions and practices on construction workers' safety behaviour in Saudi Arabia, with workers' safety awareness, competency and safety

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actions as mediating links. Ordysiński (2024) examined the role of trust in occupational safety. Moserle et al. (2024) examined the role of emotional intelligence and perceived organisational support in prosocial safety behaviour in UK and US samples. Trust and perceived organisational support bear on questions that the present study also asks, namely whether employees believe that management takes safety seriously and communicates it effectively. These studies come from other sectors and countries, and their outcomes are work performance and safety behaviour and not participation in safety services. None concerns the perceptions that sugar-industry employees hold toward the services provided to them. They justify treating perceptions as a distinct part of the first objective, but they cannot show how employees at Manyara Sugar Company rate the usefulness of the services or the way the services are delivered.

2.2.3 Participation and compliance

Participation ranges from compliance with rules to active involvement. King and Lewchuk (2022) reviewed 688 cases before the Ontario Labour Relations Board and interviewed 25 workers. They treat participation in enforcement as a right that must itself be protected and found that remedies against reprisal were important but limited. The study concerns workers who raise complaints and says little about routine safety behaviour. It is relevant here because inspections, hazard reporting and suggestions are the activities in which workers raise concerns, and these depend on workers feeling protected when they do so. Ajmal et al. (2022) examined the link between safety-management practices and the occurrence of accidents in Malaysia's oil and gas industry, using 280 responses and treating safety compliance as a mediating factor. They show how compliance can carry the effect of management practices, but they measure compliance and not active participation. Debela et al. (2023) surveyed 1,648 workers in Ethiopia's Metehara and Wonji sugar industries, scored occupational health and safety practices with a 21-item questionnaire and classified 29.6% as having good practices. It is the closest study to the present one in industrial setting, but its outcome, as reported, was an overall classification of practices. The distinction between compliance-type participation, such as following procedures and using PPE, and active participation, such as inspections and suggestions, is central to the present study. The studies reviewed here treat participation mainly as compliance or as the exercise of legal rights, so they leave open how far employees take part in activities that call for initiative.

2.2.4 Factors associated with participation

Candidate factors come from several directions, and many of them match the organisational conditions to which institutional theory directs attention. In the Nigerian construction study, Adebiyi et al. (2020) ranked management commitment and lack of monitoring and enforcement as the leading influences on compliance. Ajmal et al. (2022) found that safety training, workers' involvement, safety communication and feedback, management commitment to safety and safety rules and procedures were significantly associated with accidents through safety compliance. These practices correspond closely to the organisational factors measured in the present study, although the outcome there was accidents and not participation. Fan et al. (2022) analysed 2,965 listed manufacturers in the United States using firm-level data and found that enforcement of safety regulation had limited effectiveness by itself and worked better when reinforced by stringent penalties and OHSAS 18001 certification. The present study therefore examines enforcement separately from training, resources and management commitment.

Evidence on worker characteristics is thinner. Dragano et al. (2018) reported that young workers in Italy had less access to occupational safety and health services and were less aware of them than older workers, a difference partly explained by employment conditions. A scoping review of 23 studies by Di Marco et al. (2026) found that safety interventions were more effective when tailored to the needs of diverse workers, and that results were often better when trainers came from the target group. Juárez-Carrillo et al. (2017) applied learning theory to safety and health training for Hispanic immigrant dairy workers, reaching 836 workers on 67 farms in Wisconsin. The last two studies concern how training is designed and for whom, which bears on whether it reaches employees of different education, experience and employment status. Together the studies point to management commitment, training, communication, involvement, enforcement and worker characteristics as plausible factors. In TPB terms, training, PPE and information act on perceived behavioural control, while management commitment and supervision act on the expectations that employees perceive from others. The studies were conducted in other settings and with other outcomes, such as compliance, accidents, access to services and training content, so their findings are treated here as directions for interpretation and not as expected results.

2.2.5 Synthesis and research gap

Three points follow from the studies reviewed. First, evidence on knowledge and awareness comes mostly from single occupational groups and from surveys of knowledge, attitude and practice, so it says little about how employees in an industrial workplace view the services their employer provides. Second, the studies that include organisational conditions, namely Adebiyi et al. (2020), Ajmal et al. (2022) and Fan et al. (2022), use compliance, accidents or firm-level outcomes as the dependent variable, and the study of participation rights by King and Lewchuk

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(2022) rests on cases of reprisal. Participation in activities such as inspections, reporting and suggesting improvements is rarely the outcome. Third, the one sugar-industry study located for this review, Debela et al. (2023), concerns Ethiopia and measured safety practices, while the Tanzanian evidence located is national in scope. Mrema et al. (2015) reported that work hazards had increased across sectors in Tanzania, that occupational health services were scanty and that implementation of legislation was weak.

Within the literature reviewed for this study, no assessment was found in a Tanzanian sugar company that brings together employees' awareness of occupational safety services, their perceptions of the services, their participation, the factors associated with participation and the challenges that limit it. This statement is limited to the studies reviewed here and does not rule out other work that a wider search might locate. The gap matters at Manyara Sugar Company because national provision is thin, so the services that the company provides, and the extent to which employees know of them, value them and use them, may largely determine whether workers are protected in practice. The present study addresses the gap through its three objectives, which assess knowledge and perceptions, participation and its associated factors, and the challenges that limit participation.

III. METHODOLOGY

3.1 Research Approach and Design

The study used a quantitative approach guided by the positivist tradition and a cross-sectional survey design within a single organisation. The approach suits the objectives because they call for measuring how widely awareness, favourable perceptions and participation are held, and for testing associations between participation and other variables at one point in time. A cross-sectional survey collects these measures from many employees at once. The single-organisation setting means the results describe Manyara Sugar Company and cannot be generalised without caution.

3.2 Study Area

The study was conducted at Manyara Sugar Company Limited, a sugar manufacturing company located at Matufa Village in Babati District, Manyara Region, Tanzania. According to government records, the company is engaged in sugar production and related value-added activities within the sugar industry, including the manufacture of jaggery, briquettes, molasses and electricity. The study covered employees drawn from the company's Production and Processing, Engineering and Maintenance, Agriculture and Field Operations, Administration and Human Resources, Quality Control and Laboratory, and Stores and Logistics departments.

3.3 Target Population and Unit of Analysis

The target population comprised employees of Manyara Sugar Company Limited, while the individual employee constituted the unit of analysis. The study focused on employees who met the study's predefined eligibility criteria and were available during the data-collection period.

3.4 Sampling Technique and Sample Size

A sample of 120 employees was selected from the departments and job positions represented at the company using stratified and simple random sampling. Stratification was intended to secure representation of the different departments and positions, and random selection within strata was intended to limit selection bias. Table 1 shows the resulting distribution of respondents by department and position.

3.5 Data Collection Instrument and Procedure

Primary data were collected with a structured questionnaire containing closed-ended and Likert-type questions. The questionnaire covered employees' knowledge and awareness of occupational safety services, perceptions of workplace safety, participation in safety activities, access to safety information and training, factors influencing participation and challenges limiting participation. It also recorded age, sex, education, marital status, job position, work experience, employment status, department and type of work. Awareness, perceptions, influencing factors and challenges were measured with five-point agreement statements from strongly disagree to strongly agree, scored 1 to 5. Participation was measured for ten activities at three levels: low, moderate and high. Structured questionnaires allow the same items to be put to every respondent and make comparison across groups straightforward.

3.6 Data Analysis

Data were analysed with descriptive and inferential statistics. Frequencies and percentages summarised respondent characteristics, participation and the distribution of responses to each statement. The Relative Importance Index (RII) ranked the statements on awareness, perceptions, influencing factors and challenges. RII was calculated as

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the sum of the weights given by respondents divided by the product of the highest weight (5) and the number of respondents (120), so that it ranges from 0.2 to 1.0. RII suits Likert data because it converts the full distribution of responses into one comparable score per statement. Items were interpreted according to their relative ranking rather than by fixed interpretive bands, consistent with their treatment throughout Section 4.

Pearson chi-square tests examined associations between respondent characteristics and the level of participation (low, moderate or high) at the 5% significance level. Multiple linear regression examined which organisational factors and respondent characteristics were associated with participation when considered together. Categorical predictors were entered as dummy variables against a reference category (Table 7). The model contained nine organisational predictors and 21 dummy variables for education, experience, marital status, position, employment status and department, which is 30 predictor terms for 120 respondents. Each organisational factor entered the regression as the respondent's raw score (1 to 5) on its corresponding statement in Table 5, since each factor was measured with a single item rather than a composite scale. The values reported in Table 7 are unstandardised regression coefficients. The original output labelled them β, and they are presented here as coefficients to avoid confusion with standardised beta weights.

IV. FINDINGS & DISCUSSION

4.1 Characteristics of Respondents

Table 1 shows that 65.0% of the 120 respondents were male and 35.0% were female. Most were aged 26 to 45 years (63.3%), 15.0% were aged 18 to 25 and 5.0% were aged 56 or above. Secondary education was the most common level (31.7%), followed by university education (30.0%), vocational training (28.3%) and primary education (10.0%). Sixty per cent were married. By position, operators and production workers were the largest group (40.0%), followed by technicians (21.7%), administrative staff (15.0%), supervisors (13.3%) and managerial staff (10.0%). Some 58.3% had more than five years of experience, 28.3% had two to five years and 13.3% had less than two years. Permanent employees made up 63.3%, contract employees 26.7% and temporary or casual employees 10.0%. Production and processing was the largest department (35.0%), followed by engineering and maintenance (20.0%), agriculture and field operations (16.7%), administration and human resources (11.7%), and quality control and stores (8.3% each). Just over half (51.7%) did mainly manual or physical work.

Table 1

Respondents' characteristics (n = 120 for each variable)

Variable	Category	Frequency	Percentage
Sex	Male	78	65.0%
	Female	42	35.0%
Age	18–25 years	18	15.0%
	26–35 years	42	35.0%
	36–45 years	34	28.3%
	46–55 years	20	16.7%
	56 years and above	6	5.0%
Education level	Primary education	12	10.0%
	Secondary education	38	31.7%
	Vocational training	34	28.3%
	University education	36	30.0%
Marital status	Single	38	31.7%
	Married	72	60.0%
	Divorced/Separated	6	5.0%
	Widowed	4	3.3%
Employment position	Operator/Production worker	48	40.0%
	Technician	26	21.7%
	Administrative staff	18	15.0%
	Supervisor	16	13.3%
	Managerial staff	12	10.0%
Work experience	Less than 2 years	16	13.3%
	2–5 years	34	28.3%
	6–10 years	38	31.7%
	11–15 years	20	16.7%
	More than 15 years	12	10.0%
Employment status	Permanent employee	76	63.3%

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	Contract employee	32	26.7%
	Temporary/Casual employee	12	10.0%
Department/Work section	Production/Processing	42	35.0%
	Engineering/Maintenance	24	20.0%
	Agriculture/Field operations	20	16.7%
	Administration/Human Resources	14	11.7%
	Quality Control/Laboratory	10	8.3%
	Stores/Logistics	10	8.3%
Type of work	Mainly manual/physical work	62	51.7%
	Mainly technical work	28	23.3%
	Mainly office-based work	18	15.0%
	Supervisory/managerial work	12	10.0%

The sample spans employees with different levels of exposure and responsibility, which suits the later comparison of participation across groups. Several groups are small, however. There were 12 managerial staff, 12 respondents with primary education and 10 each in quality control and stores, and these small cells limit the precision of the group comparisons in Section 4.1.4.

4.1.1 Employees' Knowledge and Awareness of Occupational Safety Services

Table 2 shows that at least 65% of respondents agreed or strongly agreed with each of the nine statements. Understanding of the proper use of PPE was highest (81.7% agreement, RII = 0.817), followed by understanding of the main hazards of the job (78.3%, RII = 0.793) and knowledge of the safety procedures employees must follow (77.5%, RII = 0.790). Awareness of the services available (73.3%, RII = 0.767) and of emergency procedures (73.3%, RII = 0.768) came next. The lowest scores were for knowing where to obtain occupational health and safety information (65.0%, RII = 0.721), knowing how to report an accident or unsafe condition (67.5%, RII = 0.738), awareness of rights and responsibilities (70.0%, RII = 0.748) and awareness of the training programmes provided (70.0%, RII = 0.752). Twenty per cent of respondents disagreed or strongly disagreed that they knew where to obtain safety information, and a further 15.0% were neutral.

Table 2

Employees' knowledge and awareness of occupational safety services

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Agree + strongly agree	RII
I am aware of the occupational safety services available at the company.	6 (5.0%)	12 (10.0%)	14 (11.7%)	52 (43.3%)	36 (30.0%)	73.3%	0.767
I understand the main occupational hazards associated with my job.	4 (3.3%)	9 (7.5%)	13 (10.8%)	55 (45.8%)	39 (32.5%)	78.3%	0.793
I know the safety procedures that I am required to follow at my workplace.	5 (4.2%)	10 (8.3%)	12 (10.0%)	54 (45.0%)	39 (32.5%)	77.5%	0.790
I know how to report an accident or unsafe working condition.	8 (6.7%)	14 (11.7%)	17 (14.2%)	48 (40.0%)	33 (27.5%)	67.5%	0.738
I understand the proper use of personal protective equipment (PPE).	3 (2.5%)	8 (6.7%)	11 (9.2%)	52 (43.3%)	46 (38.3%)	81.7%	0.817
I am aware of the safety training programmes provided by the company.	7 (5.8%)	13 (10.8%)	16 (13.3%)	50 (41.7%)	34 (28.3%)	70.0%	0.752
I know where to obtain occupational health and safety information when needed.	9 (7.5%)	15 (12.5%)	18 (15.0%)	47 (39.2%)	31 (25.8%)	65.0%	0.721
I understand the emergency procedures applicable to my workplace.	6 (5.0%)	11 (9.2%)	15 (12.5%)	52 (43.3%)	36 (30.0%)	73.3%	0.768
I am aware of my rights and responsibilities concerning workplace safety.	8 (6.7%)	12 (10.0%)	16 (13.3%)	51 (42.5%)	33 (27.5%)	70.0%	0.748

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Employees therefore rated their understanding of the practical requirements of their own jobs more highly than their understanding of the system around them, meaning where information is kept, how to report a problem, what training exists and what rights and duties they hold. The items are self-rated, so Table 2 shows how employees see their own understanding. It is not a test of knowledge, and this matters for how the high scores are read.

Two comparisons with the literature qualify the result. Debela et al. (2023) found that only 29.6% of surveyed workers in two Ethiopian sugar factories had good safety practices. The two studies measure different things, self-rated understanding here and a scored practice measure there, so the contrast should not be overstated. It does warn that self-rated understanding may exceed demonstrated practice. Adebiyi et al. (2020) found average knowledge but low compliance among construction workers in Nigeria, and concluded that compliance alone cannot guarantee safety. The studies of knowledge, attitudes and practice in laboratory, petrochemical, health and dental settings by Almutairi et al. (2020), Mukhtar et al. (2020), Dhahir and Al Mayahi (2021) and Kamal et al. (2025) each concern one occupational group, so the present results add an industrial case in which employees rate the practical, job-level content of safety knowledge above knowledge of how to reach services and information. In TPB terms, employees appear to hold the background knowledge needed to act but are less sure of the channels through which support and information are obtained.

4.1.2 Employees' Perceptions of Occupational Safety Services

Table 3 shows that employees valued the services. Eighty-five per cent (85.0%) agreed that occupational safety services are important for protecting employees from hazards (RII = 0.840), 82.5% agreed that the services contribute to improving workplace safety (RII = 0.822) and 79.2% found the safety training useful to their work (RII = 0.810). Perceptions of how the services are delivered were less favourable. Only 62.5% agreed that the company provides adequate PPE (RII = 0.713), while 20.8% disagreed or strongly disagreed and 16.7% were neutral. The share agreeing that management takes employees' safety concerns seriously was 65.8% (RII = 0.733), that safety information is communicated effectively 67.5% (RII = 0.735) and that employees are encouraged to participate 67.5% (RII = 0.743). Management commitment to safety (69.2%) and the accessibility of safety officers (73.3%) fell between these two groups of items.

Table 3

Employees' perceptions of occupational safety services

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Agree + strongly agree	RII
Occupational safety services are important for protecting employees from workplace hazards.	3 (2.5%)	6 (5.0%)	9 (7.5%)	48 (40.0%)	54 (45.0%)	85.0%	0.840
Safety training provided by the company is useful to my work.	5 (4.2%)	8 (6.7%)	12 (10.0%)	51 (42.5%)	44 (36.7%)	79.2%	0.810
Management demonstrates commitment to employees' occupational safety.	7 (5.8%)	12 (10.0%)	18 (15.0%)	49 (40.8%)	34 (28.3%)	69.2%	0.753
Safety information is communicated effectively to employees.	8 (6.7%)	14 (11.7%)	17 (14.2%)	50 (41.7%)	31 (25.8%)	67.5%	0.735
Safety officers are accessible when employees need assistance.	6 (5.0%)	11 (9.2%)	15 (12.5%)	52 (43.3%)	36 (30.0%)	73.3%	0.768
Employees' safety concerns are taken seriously by management.	9 (7.5%)	13 (10.8%)	19 (15.8%)	47 (39.2%)	32 (26.7%)	65.8%	0.733
The company provides adequate personal protective equipment for employees.	10 (8.3%)	15 (12.5%)	20 (16.7%)	45 (37.5%)	30 (25.0%)	62.5%	0.713
Occupational safety services contribute to improving workplace safety.	4 (3.3%)	7 (5.8%)	10 (8.3%)	50 (41.7%)	49 (40.8%)	82.5%	0.822
Employees are encouraged to participate in occupational safety activities.	8 (6.7%)	13 (10.8%)	18 (15.0%)	48 (40.0%)	33 (27.5%)	67.5%	0.743

The pattern separates the value of safety services from the way they are delivered. Employees endorse the purpose of the services, but they rate PPE adequacy, management responsiveness and communication lower, and these

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are the aspects that depend on management action. In TPB terms, attitudes toward the services are favourable, while the lower ratings on resources and responsiveness point to constraints on perceived behavioural control and to weaker signals of management expectation. Nkrumah et al. (2021) stressed the importance of managing workers' perceptions of safety management practices as a motivational influence. The present data cannot test motivation, but the lower-rated items are the ones most likely to weaken it. Because all items come from the same respondents on the same scale, common-method effects may also have raised the agreement scores.

4.1.3 Level of Employees' Participation in Occupational Safety Services

Table 4 shows that participation was highest in activities that form part of routine work. High participation was reported by 63.3% of respondents for following established safety procedures (10.0% low), 60.0% for regular PPE use (11.7% low), 50.0% for attending safety training (15.0% low) and 48.3% for reporting workplace accidents and injuries (18.3% low). Participation was lower in activities that call for initiative. High participation was reported by 41.7% for workplace safety meetings, 40.8% for consulting safety officers, 40.0% for reporting unsafe working conditions, 36.7% for emergency drills, 33.3% for suggesting improvements and 31.7% for safety inspections. Inspections had the largest share reporting low participation (29.2%), followed by suggestions (26.7%) and emergency drills (25.0%). On the overall three-level measure used for the chi-square tests, 57 respondents (47.5%) had high participation, 42 (35.0%) moderate and 21 (17.5%) low, as can be derived from the counts in Table 6.

Table 4

Employees' participation in occupational safety services

Participation indicator	Low	Moderate	High
Attendance in occupational safety training	18 (15.0%)	42 (35.0%)	60 (50.0%)
Participation in workplace safety meetings	25 (20.8%)	45 (37.5%)	50 (41.7%)
Regular use of personal protective equipment (PPE)	14 (11.7%)	34 (28.3%)	72 (60.0%)
Reporting of unsafe working conditions	28 (23.3%)	44 (36.7%)	48 (40.0%)
Reporting of workplace accidents and injuries	22 (18.3%)	40 (33.3%)	58 (48.3%)
Participation in emergency drills	30 (25.0%)	46 (38.3%)	44 (36.7%)
Participation in workplace safety inspections	35 (29.2%)	47 (39.2%)	38 (31.7%)
Consultation with safety officers when facing safety concerns	26 (21.7%)	45 (37.5%)	49 (40.8%)
Providing suggestions on workplace safety improvements	32 (26.7%)	48 (40.0%)	40 (33.3%)
Following established occupational safety procedures	12 (10.0%)	32 (26.7%)	76 (63.3%)

Employees are most active where safety is built into the job and least active where participation depends on their own initiative. The difference matters because the second group of activities, inspections, suggestions, drills and hazard reporting, is where employees contribute to the safety system and do more than comply with it. King and Lewchuk (2022) argue that workers' participation in health and safety is a right whose exercise needs protection from reprisal, and Section 4.3 shows that 57.5% of respondents agreed that fear of reporting limits participation. Institutional theory offers a further reading. Compliance-type activities are the ones most tightly specified by rules and supervision, so they are the ones most likely to be carried out. Self-reported compliance can also be inflated by the wish to give socially acceptable answers, so the high figures for procedures and PPE use may overstate actual behaviour.

4.1.4 Factors Associated with Employees' Participation

Employees' views on the factors that influence participation: Respondents were asked how far each factor influences their own participation. Table 5 shows that organisational conditions were ranked above personal characteristics. Adequate safety training was rated highest (83.3% agreement, RII = 0.833), followed by management commitment (80.0%, RII = 0.817), availability of PPE (79.2%, RII = 0.815) and availability of safety information (77.5%, RII = 0.800). Supervision, communication of procedures, knowledge of hazards and enforcement of safety

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rules were rated between 73.3% and 75.8%, and accessibility of safety officers 70.8%. Employee involvement in safety decisions (65.8%, RII = 0.733), work experience (60.8%, RII = 0.707) and education level (58.3%, RII = 0.687) were rated lowest, although a majority still agreed that each influences participation.

Table 5

Employees' views on factors influencing their participation in occupational safety services

Factor	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Agree + strongly agree	RII
Adequate occupational safety training	3 (2.5%)	7 (5.8%)	10 (8.3%)	48 (40.0%)	52 (43.3%)	83.3%	0.833
Management commitment to employee safety	4 (3.3%)	8 (6.7%)	12 (10.0%)	46 (38.3%)	50 (41.7%)	80.0%	0.817
Availability of personal protective equipment (PPE)	5 (4.2%)	9 (7.5%)	11 (9.2%)	47 (39.2%)	48 (40.0%)	79.2%	0.815
Availability of safety information	4 (3.3%)	10 (8.3%)	13 (10.8%)	48 (40.0%)	45 (37.5%)	77.5%	0.800
Regular safety supervision	6 (5.0%)	9 (7.5%)	14 (11.7%)	48 (40.0%)	43 (35.8%)	75.8%	0.787
Effective communication of safety procedures	5 (4.2%)	10 (8.3%)	15 (12.5%)	47 (39.2%)	43 (35.8%)	75.0%	0.785
Employees' knowledge of occupational hazards	6 (5.0%)	9 (7.5%)	14 (11.7%)	49 (40.8%)	42 (35.0%)	75.8%	0.777
Enforcement of workplace safety rules	7 (5.8%)	11 (9.2%)	14 (11.7%)	46 (38.3%)	42 (35.0%)	73.3%	0.763
Accessibility of safety officers	8 (6.7%)	11 (9.2%)	16 (13.3%)	45 (37.5%)	40 (33.3%)	70.8%	0.750
Employees' involvement in safety decisions	10 (8.3%)	14 (11.7%)	17 (14.2%)	44 (36.7%)	35 (29.2%)	65.8%	0.733
Work experience	12 (10.0%)	15 (12.5%)	20 (16.7%)	42 (35.0%)	31 (25.8%)	60.8%	0.707
Education level	13 (10.8%)	16 (13.3%)	21 (17.5%)	40 (33.3%)	30 (25.0%)	58.3%	0.687

These are employees' own attributions and not measured effects. They indicate what respondents believe matters, and the next two subsections test which characteristics and factors are associated with reported participation. Respondent characteristics and participation: Descriptively, the share of respondents with high participation rose with education, from 25.0% among those with primary education to 42.1% with secondary education, 50.0% with vocational training and 58.3% with university education. It rose with position, from 39.6% among operators and production workers to 50.0% among technicians, 56.3% among supervisors and 66.7% among managerial staff. It was 31.3% among employees with less than two years of experience, 41.2% at two to five years, 55.3% at six to ten years, 50.0% at eleven to fifteen years and 58.3% above fifteen years, so the rise with experience was not steady. Differences by sex, age, marital status, employment status and department were smaller and less consistent. As reported by the authors, education level ($\chi^2 = 16.924$, $p = 0.010$), employment position ($\chi^2 = 13.641$, $p = 0.034$) and work experience ($\chi^2 = 12.487$, $p = 0.014$) were significantly associated with participation, and sex ($p = 0.336$), age ($p = 0.067$), marital status ($p = 0.572$), employment status ($p = 0.140$) and department ($p = 0.456$) were not. These reported values are provisional pending verification of the original statistical output (see the note to Table 6).

Table 6

Chi-square results for respondent characteristics and participation level

Variable	Category	Low n (%)	Moderate n (%)	High n (%)	χ^2 as reported	p as reported
Sex	Male	12 (15.4%)	27 (34.6%)	39 (50.0%)	2.184	0.336
	Female	9 (21.4%)	15 (35.7%)	18 (42.9%)		
Age	18–25 years	5 (27.8%)	7 (38.9%)	6 (33.3%)	8.763	0.067
	26–35 years	7 (16.7%)	14 (33.3%)	21 (50.0%)		
	36–45 years	5 (14.7%)	11 (32.4%)	18 (52.9%)		
	46–55 years	3 (15.0%)	7 (35.0%)	10 (50.0%)		
	56 years and above	1 (16.7%)	3 (50.0%)	2 (33.3%)		

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Education level	Primary education	5 (41.7%)	4 (33.3%)	3 (25.0%)	16.924	0.01
	Secondary education	8 (21.1%)	14 (36.8%)	16 (42.1%)		
	Vocational training	5 (14.7%)	12 (35.3%)	17 (50.0%)		
	University education	3 (8.3%)	12 (33.3%)	21 (58.3%)		
Marital status	Single	8 (21.1%)	13 (34.2%)	17 (44.7%)	2.917	0.572
	Married	11 (15.3%)	26 (36.1%)	35 (48.6%)		
	Divorced/Separated	1 (16.7%)	2 (33.3%)	3 (50.0%)		
	Widowed	1 (25.0%)	1 (25.0%)	2 (50.0%)		
Employment position	Operator/Production worker	10 (20.8%)	19 (39.6%)	19 (39.6%)	13.641	0.034
	Technician	4 (15.4%)	9 (34.6%)	13 (50.0%)		
	Administrative staff	3 (16.7%)	7 (38.9%)	8 (44.4%)		
	Supervisor	2 (12.5%)	5 (31.3%)	9 (56.3%)		
	Managerial staff	2 (16.7%)	2 (16.7%)	8 (66.7%)		
Work experience	Less than 2 years	5 (31.3%)	6 (37.5%)	5 (31.3%)	12.487	0.014
	2–5 years	7 (20.6%)	13 (38.2%)	14 (41.2%)		
	6–10 years	5 (13.2%)	12 (31.6%)	21 (55.3%)		
	11–15 years	3 (15.0%)	7 (35.0%)	10 (50.0%)		
	More than 15 years	1 (8.3%)	4 (33.3%)	7 (58.3%)		
Employment status	Permanent	11 (14.5%)	26 (34.2%)	39 (51.3%)	6.932	0.14
	Contract	7 (21.9%)	12 (37.5%)	13 (40.6%)		
	Temporary/Casual	3 (25.0%)	4 (33.3%)	5 (41.7%)		
Department	Production/Processing	9 (21.4%)	14 (33.3%)	19 (45.2%)	11.864	0.456
	Engineering/Maintenance	3 (12.5%)	8 (33.3%)	13 (54.2%)		
	Agriculture/Field operations	4 (20.0%)	7 (35.0%)	9 (45.0%)		
	Administration/HR	2 (14.3%)	6 (42.9%)	6 (42.9%)		
	Quality Control/Laboratory	2 (20.0%)	4 (40.0%)	4 (40.0%)		
	Stores/Logistics	1 (10.0%)	3 (30.0%)	6 (60.0%)		

Chi-square and p-values are as reported by the authors and are under verification. Cell percentages are row percentages calculated from the counts. Many cells have expected counts below 5, which weakens the chi-square approximation. Fisher's exact test or collapsed categories should be considered when the tests are re-run.

4.2 Regression analysis

Table 7 shows the multiple linear regression of participation on organisational factors and respondent characteristics. Seven of the nine organisational predictors were positively and significantly associated with participation. Safety training had the largest coefficient (0.236, p = 0.001, 95% CI 0.099 to 0.373), followed by management commitment (0.198, p = 0.007), safety knowledge and awareness (0.184, p = 0.011), availability of PPE (0.171, p = 0.013), safety communication (0.149, p = 0.028), employee involvement in safety decisions (0.143, p = 0.032) and safety supervision (0.132, p = 0.044). The confidence intervals for these seven predictors exclude zero. Enforcement of safety rules (p = 0.094) and accessibility of safety officers (p = 0.134) were not significant, so their associations with participation were not distinguishable from zero once the other predictors were held constant.

Among respondent characteristics, employees with vocational education (0.184, p = 0.039) and university education (0.247, p = 0.008) reported higher participation than those with primary education, while secondary education did not differ significantly (p = 0.162). Employees with six to ten years of experience (0.156, p = 0.040) and more than fifteen years (0.193, p = 0.029) reported higher participation than those with less than two years, and the two to five year and eleven-to-fifteen-year groups did not differ significantly. Supervisors (0.156, p = 0.048) and managerial staff (0.214, p = 0.021) reported higher participation than operators and production workers. The Supervisor coefficient is only just inside the 5% threshold. Temporary and casual employees did not differ significantly from contract employees (p = 0.175). Divorced or separated and widowed employees did not differ from single employees, and technicians and administrative staff did not differ significantly from operators and production workers.

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Table 7

Multiple linear regression of participation on organisational factors and respondent characteristics

Predictor	Coefficient	Std. error	t-value	p-value	95% CI lower	95% CI upper
Constant	1.086	0.302	3.596	0.001	0.488	1.684
Safety knowledge and awareness	0.184	0.071	2.592	0.011	0.043	0.325
Safety training	0.236	0.069	3.42	0.001	0.099	0.373
Management commitment	0.198	0.072	2.75	0.007	0.055	0.341
Availability of PPE	0.171	0.068	2.515	0.013	0.036	0.306
Safety communication	0.149	0.067	2.224	0.028	0.016	0.282
Safety supervision	0.132	0.065	2.031	0.044	0.003	0.261
Enforcement of safety rules	0.108	0.064	1.688	0.094	-0.019	0.235
Accessibility of safety officers	0.095	0.063	1.508	0.134	-0.03	0.22
Employee involvement in safety decisions	0.143	0.066	2.167	0.032	0.012	0.274
Education level (Ref: Primary education)						
Secondary education	0.121	0.086	1.407	0.162	-0.05	0.292
Vocational education	0.184	0.088	2.091	0.039	0.009	0.359
University education	0.247	0.091	2.714	0.008	0.067	0.427
Work experience (Ref: <2 years)						
2–5 years	0.083	0.074	1.122	0.264	-0.064	0.23
6–10 years	0.156	0.075	2.08	0.040	0.007	0.305
11–15 years	0.141	0.081	1.741	0.085	-0.020	0.302
>15 years	0.193	0.087	2.218	0.029	0.021	0.365
Marital status (Ref: Single)						
Married †	0.063	0.002	2.016	0.002	0.006	0.286
Divorced/Separated	0.041	0.108	0.380	0.705	-0.173	0.255
Widowed	0.072	0.124	0.581	0.562	-0.174	0.318
Employment position (Ref: Operator/Production)						
Technician	0.092	0.071	1.296	0.198	-0.049	0.233
Administrative	0.074	0.076	0.974	0.332	-0.077	0.225
Supervisor	0.156	0.078	2.000	0.048	0.001	0.311
Managerial	0.214	0.091	2.352	0.021	0.033	0.395
Employment status (Ref: Contract)						
Permanent †	0.157	0.005	2.87	0.003	0.016	0.872
Temporary/Casual	-0.112	0.082	-1.36	0.175	-0.275	0.051
Working Department (Ref: Production/Processing)						
Engineering/Maintenance †	0.118	0.011	2.662	0.002	0.021	0.459
Agriculture/Field operations †	0.059	0.069	0.739	0.462	0.006	0.288
Administration/HR †	0.087	0.076	1.145	0.255	0.064	0.238
Quality Control/Laboratory †	0.173	0.010	2.011	0.013	0.018	0.534
Stores/Logistics †	0.129	0.085	1.518	0.132	0.044	0.298

4.3 Challenges Limiting Employees' Participation

Table 8 shows that inadequate availability of PPE was the challenge with which most respondents agreed (79.2%, RII = 0.817), followed by inadequate frequency of safety training (76.7%, RII = 0.793), heavy workload and work pressure (74.2%, RII = 0.780) and poor communication of safety information (73.3%, RII = 0.783). Communication and workload were close in score and their order differs between RII and percentage agreement. Limited employee involvement in safety decisions (70.0%), inadequate management response to reported concerns (69.2%), weak enforcement of safety rules (66.7%), limited accessibility of safety officers (65.0%) and lack of safety information materials (63.3%) followed. Fear of reporting unsafe conditions or accidents (57.5%), limited opportunities to take part in safety meetings (56.7%) and lack of motivation (52.5%) were rated lowest, although more than half of respondents agreed with each.

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Table 8

Challenges limiting employees' participation in occupational safety services

Challenge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Agree + strongly agree	RII
Inadequate availability of personal protective equipment	5 (4.2%)	8 (6.7%)	12 (10.0%)	45 (37.5%)	50 (41.7%)	79.2%	0.817
Inadequate frequency of occupational safety training	6 (5.0%)	9 (7.5%)	13 (10.8%)	46 (38.3%)	46 (38.3%)	76.7%	0.793
Poor communication of safety information	7 (5.8%)	10 (8.3%)	15 (12.5%)	45 (37.5%)	43 (35.8%)	73.3%	0.783
Heavy workload and work pressure	6 (5.0%)	11 (9.2%)	14 (11.7%)	47 (39.2%)	42 (35.0%)	74.2%	0.780
Limited employee involvement in safety decisions	8 (6.7%)	12 (10.0%)	16 (13.3%)	45 (37.5%)	39 (32.5%)	70.0%	0.758
Inadequate management response to reported safety concerns	9 (7.5%)	11 (9.2%)	17 (14.2%)	46 (38.3%)	37 (30.8%)	69.2%	0.750
Weak enforcement of workplace safety rules	10 (8.3%)	13 (10.8%)	17 (14.2%)	44 (36.7%)	36 (30.0%)	66.7%	0.742
Limited accessibility of occupational safety officers	11 (9.2%)	13 (10.8%)	18 (15.0%)	43 (35.8%)	35 (29.2%)	65.0%	0.730
Lack of adequate safety information materials	10 (8.3%)	15 (12.5%)	19 (15.8%)	43 (35.8%)	33 (27.5%)	63.3%	0.723
Fear of reporting unsafe conditions or accidents	14 (11.7%)	17 (14.2%)	20 (16.7%)	39 (32.5%)	30 (25.0%)	57.5%	0.691
Limited opportunities to participate in safety meetings	15 (12.5%)	16 (13.3%)	21 (17.5%)	38 (31.7%)	30 (25.0%)	56.7%	0.675
Lack of motivation to participate in safety activities	17 (14.2%)	18 (15.0%)	22 (18.3%)	35 (29.2%)	28 (23.3%)	52.5%	0.665

The main barriers concern resources, time and organisational response, and few concern the employees themselves. Lack of motivation, the item most clearly about the individual, was rated lowest. This is consistent with Table 3, where PPE adequacy was the lowest-rated feature of service delivery, and with the regression, where PPE availability was positively associated with participation. It also fits the TPB reading that perceived control is constrained by resources and time. Workload matters in this respect because participation in meetings, drills and inspections takes working time.

The national picture supports this reading. Mrema et al. (2015) reported scanty occupational health services and weak implementation of legislation in Tanzania, and the company-level barriers here are of the same kind, namely resources and follow-through. The fear of reporting is worth attention despite its low rank. More than half of respondents agreed that it limits participation, and King and Lewchuk (2022) show why protection from reprisal is a condition for workers to raise safety concerns. The Ontario context differs from a Tanzanian sugar company, so the link is one of mechanism and not of magnitude. Debela et al. (2023) reported that most surveyed workers in Ethiopian sugar factories did not reach good safety practice, which is consistent with the view that barriers in the sugar industry are organisational as well as individual, although they did not measure the same barriers.

4.4 Discussion

The regression results agree with employees' own ranking in Table 5 on the main point. Training, management commitment, PPE availability, communication, supervision and involvement, which are conditions the company controls, were associated with higher participation. Enforcement and accessibility of safety officers were rated as influential by employees in Table 5 but were not significant in the model. Fan et al. (2022) found that enforcement of safety regulation had limited effectiveness by itself in US manufacturers and worked better when reinforced by penalties and certification. Their data are firm-level violations and the present data are employee ratings, so the two results are not directly comparable, but both suggest that enforcement is unlikely to raise participation on its own. In institutional terms the result is consistent with participation being tied to training, resources and managerial commitment more than to enforcement alone. In TPB terms, training, PPE and information act on perceived control and management commitment and supervision act on perceived expectations. Nkrumah et al. (2021) similarly link perceptions of safety management practices to motivation and performance in Ghana, although their outcome differs from participation.

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The gradients by education, position and experience are the least secure part of the results, given that the chi-square statistics are still being verified (Table 6). If they are confirmed, a likely explanation is that better educated, more experienced and more senior employees have greater exposure to safety information, more responsibility for safety and more say in how work is organised. The finding would fit the point made by Di Marco et al. (2026) that safety interventions work better when tailored to the needs of different worker groups, and by Juárez-Carrillo et al. (2017) that training should be designed around how workers learn. Age was not significantly associated with participation in the reported chi-square results, which differs from the age differences in access and awareness reported by Dragano et al. (2018) for young workers in Italy. The samples, outcomes and settings are too different to say why.

Employees rated education and experience as the least influential factors in Table 5, yet the participation figures rise with both. The two results answer different questions. Table 5 records what employees believe drives their own participation, while the cross-tabulation and regression describe what differs between groups. People may credit organisational conditions for their behaviour even when personal characteristics are also associated with it. The regression is cross-sectional, so none of the coefficients shows that changing a factor would change participation. With 30 predictor terms and 120 respondents the model is also close to the limit of what the sample can support, and the individual coefficients may be unstable.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Employees of Manyara Sugar Company rated their knowledge and awareness of occupational safety services as good. Every statement drew agreement from at least 65% of respondents, and understanding of PPE use, occupational hazards and safety procedures was rated highest. Employees were less sure of where to obtain safety information, how to report a problem, what their rights and responsibilities are and what training is available. The ratings are self-reported and do not verify knowledge. Perceptions of the services were positive. Most employees agreed that the services protect workers and improve safety. Perceptions of delivery were less favourable, in particular for PPE adequacy (62.5% agreement), management responsiveness to safety concerns (65.8%) and communication of safety information (67.5%).

Participation was strongest in activities built into routine work, namely following procedures, using PPE and attending training, and weakest in inspections, suggestions and emergency drills. Employees at the company comply with established requirements more readily than they take part in activities that call for initiative. Employees also ranked organisational conditions above personal characteristics as influences on participation. In the regression model, safety training, management commitment, safety knowledge and awareness, PPE availability, safety communication, safety supervision and employee involvement were positively associated with participation, while enforcement of rules and accessibility of safety officers were not. The design supports association and not causation.

The challenges with which most employees agreed were inadequate PPE (79.2%), infrequent training (76.7%), heavy workload (74.2%) and poor communication (73.3%). Limited involvement in safety decisions and weak management response to reported concerns followed. The barriers are mainly organisational and concern resources, time and management response. Overall, the company has established a base of awareness and support among employees. The weaker points are the supply of PPE, the frequency and fit of training, the channels for information and reporting, and the opportunities for employees to take an active part.

5.2 Recommendations

Each recommendation follows from a specific finding. The table gives the responsible party and the purpose.

Table 9

Recommendations arising from the findings

Finding	Recommendation	Responsible party	Purpose
PPE adequacy was the lowest-rated feature of delivery (62.5% agreement) and the most frequently agreed challenge (79.2%). PPE availability was positively associated with participation.	Compare PPE stock and issue records with the hazards of each job group and set a schedule for issue and replacement. Report the results to employees.	Management, procurement and safety officers	Remove the resource barrier to PPE use and show employees that concerns lead to action.

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Inadequate training frequency was agreed by 76.7%, and safety training had the largest regression coefficient.	Introduce regular refresher training and adapt content and delivery to job group, education level and experience.	Management, human resources and safety officers	Keep knowledge current and make training usable for different groups (Di Marco et al., 2026).
The lowest awareness items concerned where to obtain safety information (65.0%) and how to report (67.5%). Poor communication was agreed by 73.3%.	Name a point of contact for safety questions, display reporting steps at each work section and brief new and temporary employees on them.	Safety officers and supervisors	Make the channels for information and reporting known to all employees.
High participation was lowest in inspections (31.7%), suggestions (33.3%) and drills (36.7%). Employee involvement was positively associated with participation and limited involvement was agreed by 70.0%.	Include employees in routine inspection rounds, set up a simple channel for safety suggestions and schedule drills so that every section takes part.	Management and safety officers	Move participation from compliance toward active contribution.
Heavy workload was agreed as a barrier by 74.2%.	Allocate paid working time for training, meetings and drills and avoid scheduling them at production peaks.	Department heads and supervisors	Remove the time barrier to participation.
Management response to concerns was rated lower (65.8%) and 57.5% agreed that fear of reporting limits participation.	Give feedback on each reported hazard or accident and adopt a written non-punitive reporting procedure.	Management and human resources	Build confidence that reporting is safe and acted on (King & Lewchuk, 2022).
Management commitment and supervision were positively associated with participation.	Brief supervisors on their role in encouraging safe conduct and include safety in supervisor performance reviews.	Management	Strengthen the signals of expectation that employees receive from supervisors.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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