

# 04 Evaluating the Degree of Psychological Safety and Individual Perceptions Among Radiographer Teams

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## Abstract

### Objectives

Psychological safety, as the belief that an individual can freely express opinions, without any negative repercussions, must be safeguarded in all organisations. This is no exception to the healthcare industry where professionals experience workplace interpersonal risks, which influence their behaviours, hindering their ability to provide high-quality patient care in highly complex environments. The purpose of this study was to evaluate the degree of psychological safety and its influencing factors among radiographer teams employed within the Maltese public health sector. Additionally, the study investigated radiographers' individual perceptions on the degree of psychological safety, based on their varying demographics.

### Methods

Following a comprehensive literature review, a conceptual model incorporating the factors influencing psychological safety was developed. This informed the design of an online survey, which was based on established instruments. The quantitative survey was distributed via email to every eligible radiographer within the national health service in Malta in July – August 2022.

### Results

A response rate of 41% from the total 223 radiographers was attained. Findings revealed moderately positive perceptions of psychological safety, while the influencing factors were rated between moderately negative to moderately positive. Additionally, it was observed that the radiographers' perception of psychological safety was not influenced by their demographics, unlike some of the influencing factors which were affected by the radiographers' gender, nationality, the radiographer team, their organisational tenure, and position.

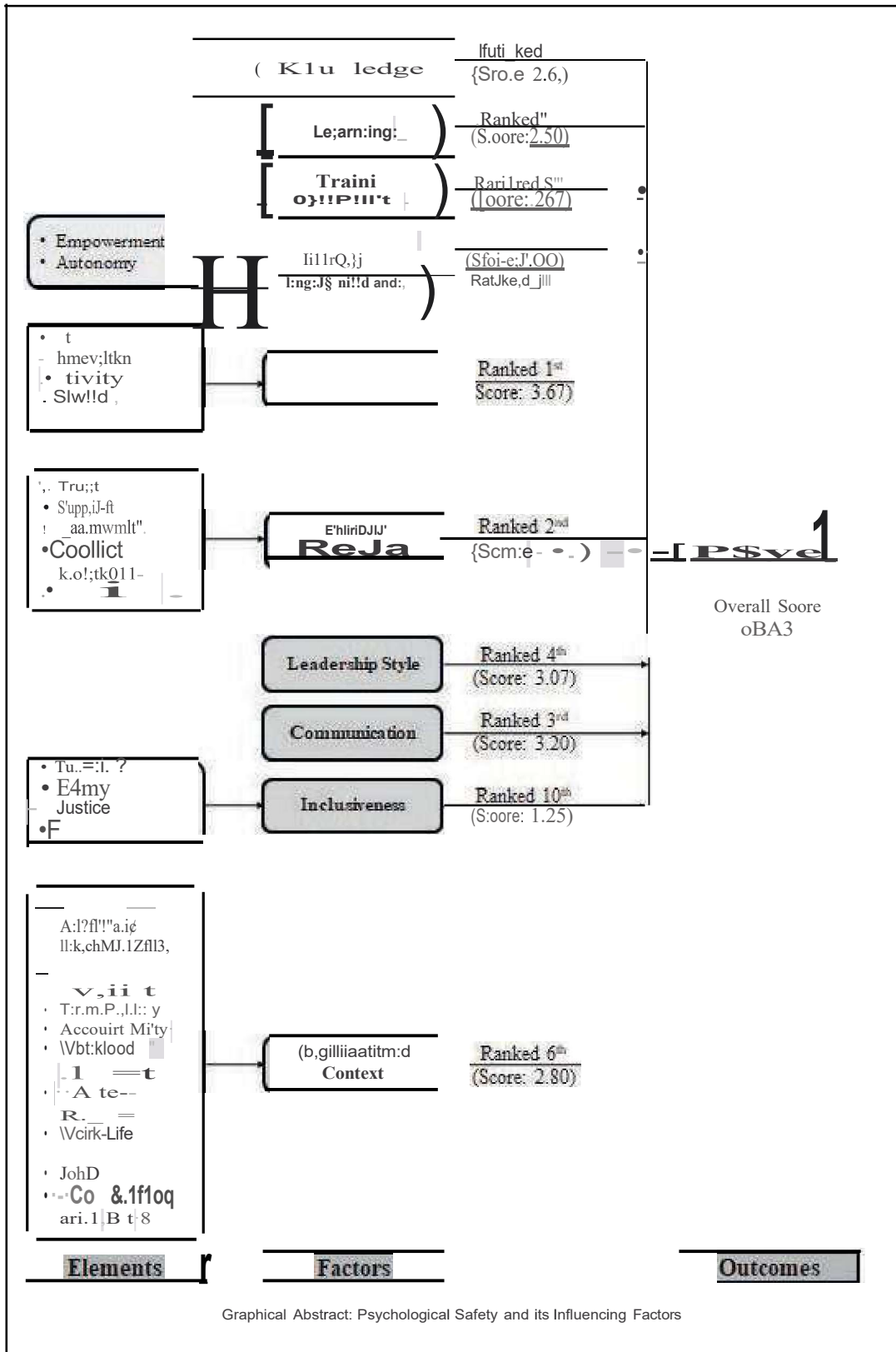
### Conclusions

Despite the moderately positive results attained for psychological safety among radiographer teams, this study indicates room for improvement. Therefore, a tailor-made, multi-level strategic intervention is necessary to establish psychological safety successfully within the organisation.

**Keywords:** "Psychological Safety", "Safety Culture", "Healthcare Management", "Healthcare Teams", "Job Satisfaction".

## Highlights

- While psychological safety has been widely researched amongst various health professionals globally, this concept has yet to be researched among radiographers. Consequently, following an extensive literature review, a comprehensive conceptual framework was developed comprising additional factors towards the preservation of psychological safety among radiographer teams, upon which the research survey tool for this study was subsequently based.
- The study outlined which factors merited improvement among the teams, and these will consequently be presented to the respective managerial bodies to enhance psychological safety for radiographers.
- The factor of inclusiveness among the radiographers ranked lowest with a moderately negative score, while the voice factor ranked highest on the Likert-scale.
- Radiographers occupying a managerial position had diverse, more positive perspectives of psychological safety than the rest of the radiographers.
- Despite the moderately positive results attained for psychological safety among radiographer teams, this study indicates room for improvement.



Graphical Abstract: Psychological Safety and its Influencing Factors

## Introduction

### Psychological Safety

The concept of psychological safety was defined by Maslow et al., (1945) as the sense of confidence, safety, and fear detachment, crucial to address current and future individual needs, claiming that psychological safety reassures individual employees when undertaking change, aiding them to overcome anxiety due to uncertainty in shifting from the status quo (Ming et al., 2015). Kahn, (1990), defined psychological safety as the individual's perception of whether it is secure to indulge in interpersonal risks, such as engaging in open communication, asking queries, and seeking feedback. Consequently, Brown and Leigh, (1996) lifted the conception of psychological safety to the organisational level, whereby the management and organisational environment must be supportive, providing clear job roles, and permitting individual self-expression, ultimately augmenting individual outcomes in terms of employee satisfaction, behaviours, motivation, and performance. Edmondson, (1999) raised the concept from an individual to the team level, relating to whether team members are able to speak freely, share similar beliefs and intellectual reasoning, feel trusted and respected. She explained how the occupational environment setting should provide a safe environment for interpersonal risks and actions, without any negative repercussions (Edmondson et al., 2016).

### Psychological Safety in Healthcare

Employees within every organisation experience uncertainty and have to cope with a variety of interpersonal risks and occupational health hazards within the workplace setting, which impact an individual's cognitive behaviour and emotions, constraining self-consciousness, motivation, and psychological well-being (Ming et al., 2015; WHO, 2022). Healthcare professional teams, including radiographers, inevitably experience various occupational conditions including biological infections and chemicals hazards, violence and harassment, augmented workloads, heightened stress levels, fatigue, burnout, radiation exposure, and heavy loads in manual handling. Furthermore, they are exposed to other conditions which deplete their motivation levels at the workplace, impacting their physical and mental well-being, namely extended working hours, delays and machine breakdowns, meagre salaries, limited training and development programmes, infrastructural and welfare deficiencies, ineffective communication and leadership, staff shortages and lack of resources (Rajan, 2018; WHO,

2022).

Psychological safety must be safeguarded in all organisations within every industry, particularly within the healthcare sector, since it is profoundly dependent on healthcare professionals, including radiographers, who work together in multidisciplinary healthcare teams to ensure efficient, safe, high-quality healthcare in highly complex, demanding, and rapidly evolving environments, for patients experiencing vulnerability due to injury or disease (O'Donovan et al., 2020). Unfortunately, healthcare organisations are still characterised by a culture of fear and low psychological safety, necessitating the development and implementation of suitable interventions to improve psychological safety. This was further accentuated by the crisis of the Covid-19 pandemic, hence psychological safety must be measured constantly over time, as this can be depleted by new multiple emerging factors, which require various healthcare teams to adapt in order to address additional challenges (O'Donovan et al., 2020).

### Radiographer Teams

Within the local healthcare setting, radiographers are generally employed in two main settings, namely diagnostic radiography and therapeutic radiography. In the public health service, diagnostic radiographers generally work in the Medical Imaging Department (MID), utilising X-ray, Ultrasound, Computed Tomography (CT), and Magnetic Resonance Imaging (MRI) machines to diagnose diseases within the Accident and Emergency, Outpatients, Operating Theatres, and hospital wards. Conversely, therapeutic radiographers work in the Radiotherapy Department (RTD) within the Oncology setting, to treat cancer patients. Moreover, a minute number of radiographers occupy a managerial role in administration and radiation protection (Table 1).



Hospital	Radiographer Teams	Total (N)	Grand Total	Percentage (%)
MDH	A&E	20	158	70.85%
	Angiosuite	6		
	Bone Density	1		
	Catheterisation Lab	7		
	CT	14		
	General Team & Dentals	26		
	General and Vascular Ultrasound	4		
	GUS	11		
	Mammography	8		
	MRI	17		
	Nuclear Medicine	10		
	Theatres & Mobiles	16		
	On Rotation	18		
SAMOC	Radiotherapy	29	29	13.00%
GGH	Medical Imaging	11	11	4.93%
Primary Health	Health Centres	13	15	6.73%
	SVPR	2		
NBSU	Breast Screening	3	3	1.35%
Management	Administration	4	7	3.14%
	Radiation Protection and Safety	3		
<b>Population Grand Total (N)</b>			<b>223</b>	<b>100%</b>

Table 1: Radiographer Teams in Malta  
Source: Provided by a Radiography Senior Allied Practitioner (2022)

### Purpose of the Study

Every radiographer team employed with the Maltese public health sector, operating in diverse locations, experiences different working conditions and multiple factors, which could impact on their psychological safety at the workplace. This steered the aim of the study to evaluate the degree of psychological safety, by investigating the presence of the influencing factors towards psychological safety, among different radiographer teams working in the local public health service in Malta and Gozo. The following objectives and research hypotheses were consequently devised to attain the aim of the study.

- **Objective 1: To identify the varying factors contributing towards psychological safety from the literature reviewed, and consequently design a research tool to evaluate the de-**

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logical safety among the different radiographer teams.

- **Objective 2: To assess the radiographers' individual perceptions on the degree of psychological safety, based on the demographic control variables.**

- o **H1 to H7: The perceived degree of psychological safety was dependent on gender, age, nationality, tenure, radiographer team, organisational position, and educational level.**

## Methodology

The literature reviewed outlined various influencing factors of psychological safety, which must be present for psychological safety to be preserved within work environments, such as in healthcare. These factors must be accompanied by different compulsory elements or antecedents, to maintain psychological safety and shape the culture within organisations. After reviewing multiple studies concerning psychological safety from the literature, a comprehensive conceptual framework was developed comprising of the factors towards the preservation of psychological safety, upon which the research survey tool for this study was

subsequently based (Figure 1). It was also noted that several influencing factors enable or hinder the preservation of workplace psychological safety, either independently or even collectively. This emphasises the need for such factors to be measured and evaluated at individual, team, and organisational level. Figure 2 depicts how the factors are interlinked together by means of the different coloured arrows, in that for instance enhancing knowledge, sharing, learning, and training opportunities within the organisation will augment employee engagement and involvement.

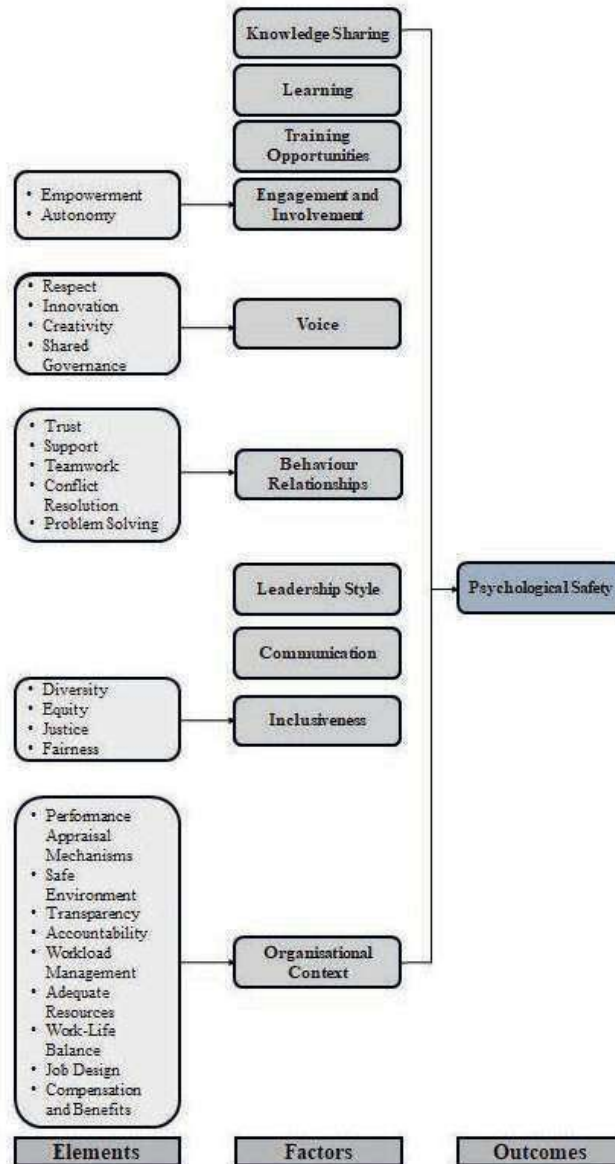


Figure 1: Conceptual Framework for this Study

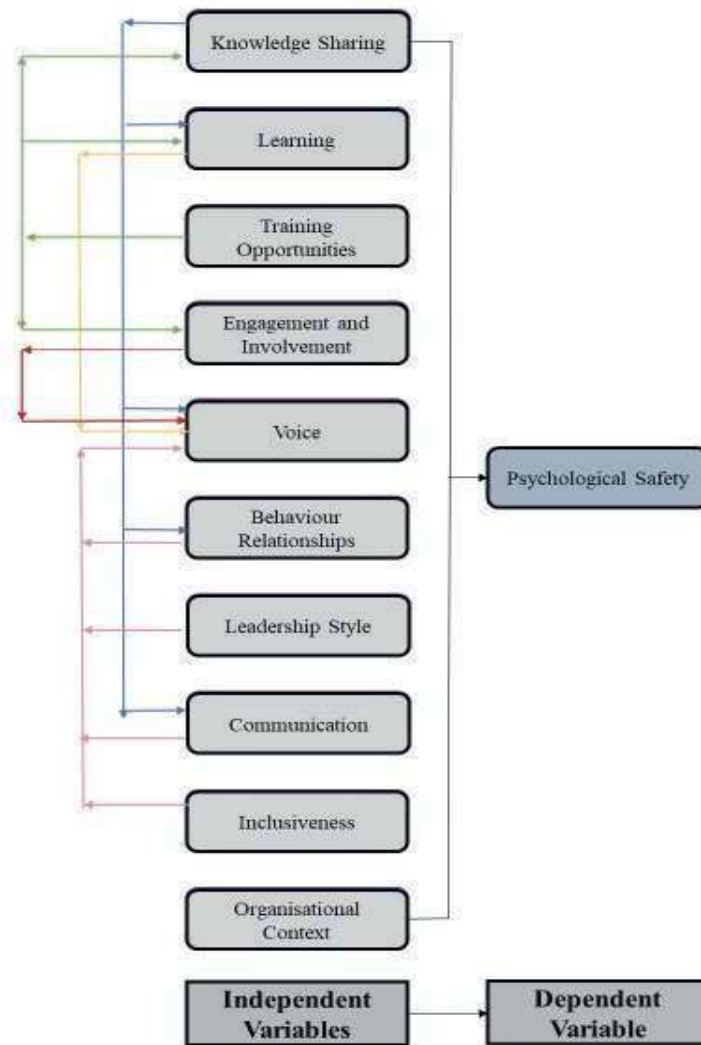


Figure 2: Depicts the Relationships Between the Influencing Factors of Psychological Safety

## Research Design

The concept of psychological safety and its contributing factors are widely researched in the literature. Therefore, the post-positivist philosophical assumption was applied to this study, since such an approach allows researchers to begin with an already verified theory, and then collect the necessary data to either support or reject that theory (Saunders et al., 2009). A deductive approach was applied for this study, utilising quantitative methods for data collection since the intent of the study was to test an existing theory, by examining the relationship among the variables, through the collection and analysis of numeric

data using statistical procedures (Saunders et al., 2009). The quantitative approach is based on the belief that there is a single reality that must be discovered, by asking the appropriate questions through a survey strategy, to aggregate the data and analyse common patterns with the use of statistical tests, charts, and tables, to test the hypotheses generated (Bordens and Abbott, 2011; Sheppard, 2021).

### **Study Population**

The study recruited the entire radiography population, comprised of a total of two hundred and twenty-three (223) radiographers employed with the Maltese public health sector, operating within the diverse locations in Malta and Gozo. No sampling techniques were utilised, but rather a census was performed due to the population size being limited. Therefore, in an effort to gather sufficient responses and data, the research tool was distributed to every eligible participant within the population, with the intent of enhancing the generalisability of results.

### **Research Tool**

An online survey questionnaire, a common technique used for data collection within quantitative research methodologies (Saunders et al., 2009), was utilised to collect data in this study. The questionnaire was drafted by the researcher using the Google Forms platform, based on established research instruments assessing psychological safety and the different contributing factors from multiple studies. A two-part survey was developed to attain the data required to quantify the relationships between the variables. The first part consisted of (1) an eligibility question to ensure that the participants were employed as radiographers within the Maltese public health sector and (2) eight (8) demographic questions. The survey did not collect any personal identifiable information. The second part comprised of forty-four (44) Likert scale statements pertaining to each of the factors depicted in the conceptual model, to determine the degree of psychological safety among the different teams. The Likert-style rating scale questions required the respondents to answer whether they strongly disagree or agree, from a five-point scale, with the presented statements.

### **Content Validity and Reliability Assessment**

In an effort to assess content validity, three professional experts with a minimum of seven years of experience in research and radiography, namely a senior radiographer and two radiography academics from the University of Malta (UM), were asked to rate, on a four-point scale, whether each question was relevant or not with the research aims and objectives, (Saunders et al., 2009). The majority of the questions was rated as relevant or highly relevant to the study, attaining an overall content validity index of 1 confirming a good content validity, since the value attained was greater than 0.90 (Polit and Beck, 2018). Moreover, to assess reliability, twenty-one (21) participants from the population were anonymously and random-

ly chosen and they were asked to complete the questionnaire on two attempts with a two-week time interval. On the first attempt, fourteen (14) responses were gathered, while on the second try nine (9) responses were collected. To evaluate this test-retest reliability, the Pearson Correlation Co-efficient ( $r$ ) for each statement was plotted on a scatter graph, with the majority of the dots plotted rested between 0.40 and 1, confirming reliability of the questionnaire. The Cronbach's Alpha co-efficient was additionally calculated to measure the internal consistency, attaining a collective Cronbach co-efficient for the entire survey of 0.906, confirming that the research tool was strongly reliable, as this was higher than the requisite value of 0.70.

### **Distribution of the Research Tool**

Completing the questionnaire was completely voluntary and anonymous, taking around fifteen (15) minutes to complete. In line with ethical committee requirements, three intermediary persons were appointed on the researcher's behalf to send out an email invitation to all radiographers working with the public health service in Malta. This invitation included an information letter and a link to the online Google Forms questionnaire. The Society of Medical Radiographers Malta (SRM) also acted as an intermediary contact in the process of sending the invitation email to all member radiographers. Data collection commenced from the last week of July 2022 up until the last week of August 2022; two reminders were sent with a two-week interval in between to try and augment the response rate.

### **Quantitative Statistical Analysis**

SPSS was used to analyse the quantitative data from the questionnaire, utilising descriptive analysis to describe and aggregate the constructs of interest, presenting them in tables and graphs, while inferential analysis tested the hypotheses. Prior to analysing the data collected, this was converted into a numeric format by using a codebook to guide the coding process. The statements which conveyed the opposite meaning from that of their underlying construct were reversed before they were compared or combined with the items that were not reverse coded (Saunders et al., 2009; Bhattacharjee, 2012).



For the first objective, descriptive statistics were calculated to gather the aggregate mean scores for each of the contributing factors towards psychological safety. Subsequently, the aggregate mean score for psychological safety was calculated. Consequently, the aggregated scores of each contributing factor towards psychological safety were then plotted per radiographer team to identify the common factors characterising each team.

For the second objective, inferential hypothesis testing was necessary to identify whether the control demographic variables of gender, age, nationality, organisational tenure, radiographer team, organisational status, and educational level affected the perception on the degree of psychological safety. The non-parametric Kruskal-Wallis Test was performed, as an alternative to the ANOVA Test, allowing a comparison of the scores of a continuous variable for three or more groups (Pallant, 2016).

### **Ethical Considerations**

Permission to conduct the study was attained from the IDEA Academy Research Ethics Committee. The researcher also asked the three intermediary contacts and the SRM for their approval to act on the researcher's behalf. Consequently, the clinical chairs and departmental managers of

the different radiographer teams, gave their permission to conduct the study among the radiographers under their lead. The researcher also obtained clearance from the hospital CEO and from the respective Data Protection Officers (DPOs).

No specific personal data, through which individual participants could be easily identified or traced, was collected from the participants. A password protected electronic file, which could only be accessed by the researcher, was created to keep all data collected confidential in order to abide by the Data Protection Act (2018). Moreover, participant anonymity was maintained as the questionnaire was sent by email through the intermediary contacts. Additionally, each completed questionnaire was numbered as a point of reference for the purpose of data analysis, while no hard copies were collected or kept. The invitation email also included an information letter explaining the research study and all ethical considerations to the participants, declaring that confidentiality and anonymity were preserved and that the questionnaire could be completed on voluntary basis. Furthermore, the information letter also stated that, by agreeing to complete and submit the questionnaire, the participants automatically granted their consent to participate in the study.

## **Results**

### **Response Rate**

Following sample power analysis, the target was to attain a minimum of one hundred and forty-two (142) responses, from the two hundred and twenty-three (223) radiographers, which would yield a confidence level of 95% with a 5% margin of error. However, following one month of data collection with two reminders, ninety-two (92) responses were gathered. This resulted in a response rate of forty-one percent (41%), allowing for a confidence level of 95%, with a 7.69% margin of error. Given that the average response rate for online

surveys ranges between thirty (30%) to forty-four percent (44%) (Wu et al., 2022), the response rate for this study was considered satisfactory. Nevertheless, it was acknowledged that the response rate among some individual radiographer teams was poor, especially those operating within MDH. This limited the researcher, in that the original idea to investigate the perceptions across the individual teams was no longer possible. Therefore, for the purpose of data analysis the teams were grouped by hospital instead as shown in Figure 3.

### Responses Per Hospital

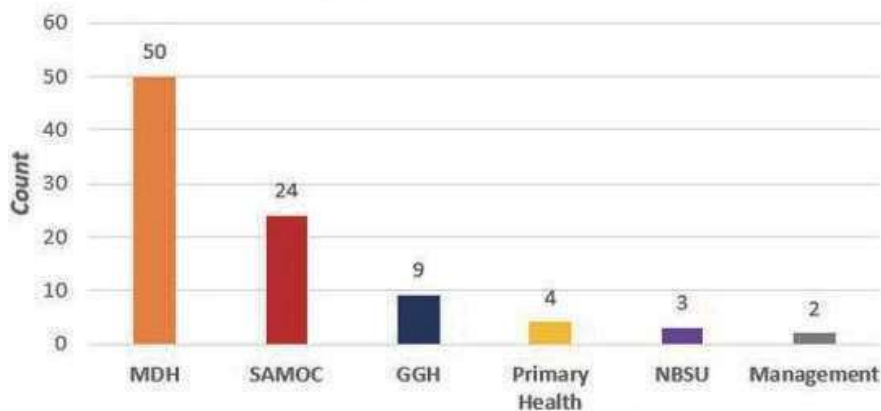


Figure 3: Responses by Hospital

### Demographic Analysis

The frequency analysis conducted revealed that profiles attained from the responses were a reflective of the actual proportions within the radiography population, in that 66.1% (n=61) were females while 33.7% (n=31) were males. 65.2% (n=60) of the respondents were aged between 20 to 35 years; while 33.7% (n=31) aged 36 to 55 years; and 1.1% (n=1) were aged 56 and over. 92.4% (n=85) were of Maltese nationality; 4.4% (n=4) were non-Maltese European Nationals and 3.3% (n=3) were Non-European Nationals. In terms of organisational tenure, 31.6% (n=29) of the radiographers were employed for less than five years; 45.7% (n=42) had between 6 to 15 years of experience; 16.3% (n=15) were employed between 16 to 25 years, while 6.6% (n=6) had over 26 years of experience. It was noted that di-

agnostic radiographers do not operate within the same radiographer team for their entire employment but shift from one team to another as they specialise in one specific modality or are shifted to meet the exigencies of the department. Conversely, therapeutic radiographers operate within an individual specialist team. Moreover, the analysis depicted that, as radiographers accumulated more years of experience, they escalated further in their organisational position along the Allied Health Professional (AHP) scale ladder, progressing in their level of studies. In fact, 23.9% (n=22) occupied professional scales 10 and 9, 67.4% (n=62) were in scales 8 and 7, while 8.7% (n=8) were in scales 6 and 5, whereby the majority of the radiographers possessed either a bachelor's, master's, or doctoral degree, as shown in Figure 4.

### Education

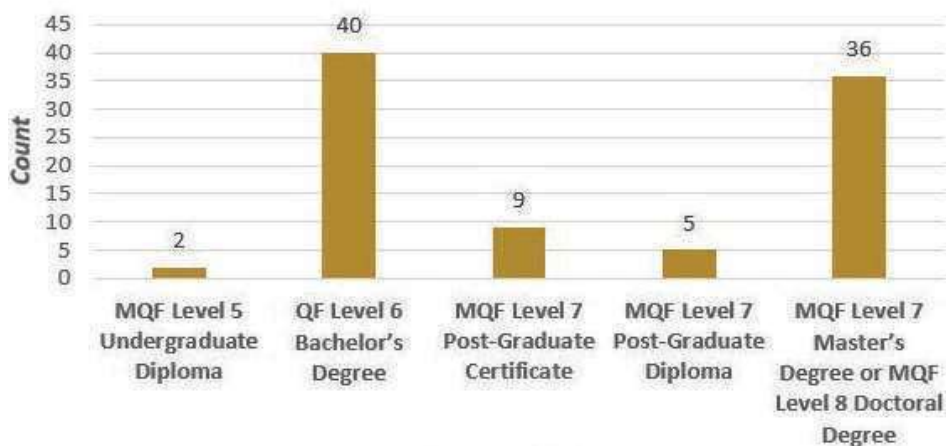


Figure 4: Radiographers' Educational Level

### Perception of Psychological Safety Among the Teams

The statements pertaining to each factor influencing psychological safety were aggregated to calculate the mean score for each variable, for each participant. Consequently, a normality test was conducted using the Kolmogorov-Smirnov statistic for each of the dependent and independent variables. A significance (Sig.) value of more than 0.05 indicates a non-significant result implying that the data is normally distributed (Pallant, 2016). The results obtained for normality indicated that the majority of the variables, apart from the dependent variable of psychological safety, had a significance value of less than 0.05 and, therefore, violated the assumption of normality. Pallant (2016) suggests that when the tests for normality fail, non-parametric statistics should be used instead of parametric statistics. There-

fore, in this study, instead of stating parametric descriptive statistics such as the means and standard deviation, non-parametric descriptive statistics like the median and interquartile range (IQR), were reported instead.

When analysed by hospital, the degree of psychological safety ranked lowest with 3.29 at the NBSU, while the highest score of 3.90 was attained at GGH (Table 2 and Figure 5). The aggregate score of 3.43 for psychological safety indicates that there is room for improvement to enhance the psychological well-being of radiographers employed with the public health sector in Malta and Gozo. The degree of psychological safety ranked lowest at the NBSU, highlighting the need for further actions to improve their level of psychological safety.

Hospital	N	Degree of Psychological Safety	
		Median	IQR
MDH	50	3.35	1.14
SAMOC	24	3.43	0.64
GGH	9	3.90	1.21
Health Centres and SVPR	4	3.86	1.71
NBSU	3	3.29	-
Management and Administration	2	3.36	-
<b>Aggregate Score</b>	92	3.43	1.11

Table 2: Degree of Psychological Safety per Hospital

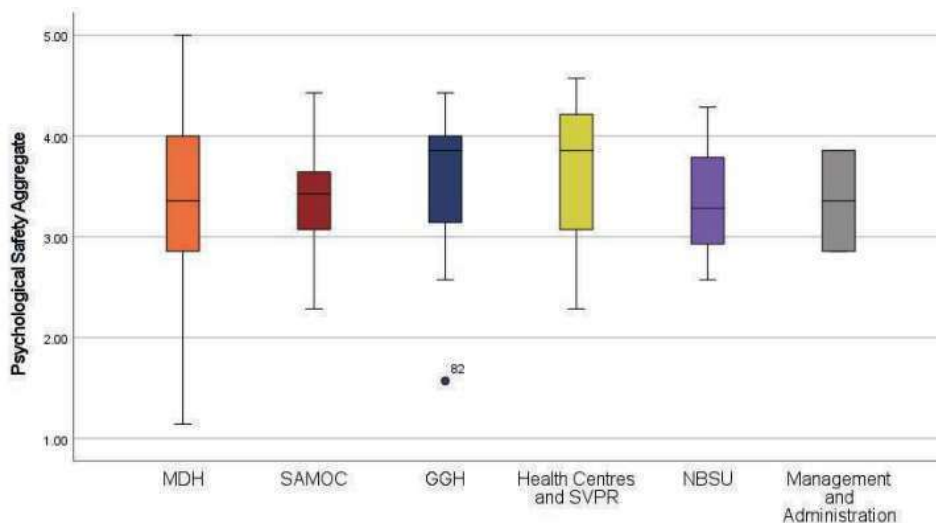


Figure 5: Psychological Safety Across the Hospitals

Moreover, the median scores for the influencing factors ranged between a moderately positive score of four (4) to a moderately negative score of two (2) for the teams operating at MDH, SAMOC, GGH, and Primary Health. On the other hand, the scores of the team at the NBSU ranged between a moderate score of three (3) to a very negative score of one (1). Conversely, the median scores for the managerial team ranged between a moderately positive score of 3.5 and a

very positive score of 4.5 on the Likert-scale. In summary, this further accentuates that the team at the NBSU requires further actions to improve their level of psychological safety. Contrarily, the radiographers occupying a managerial or administrative role had a rather different, more positive perspective, than the rest of the radiographers (Figure 6). Nevertheless, this result was generated from the responses of only two participants.

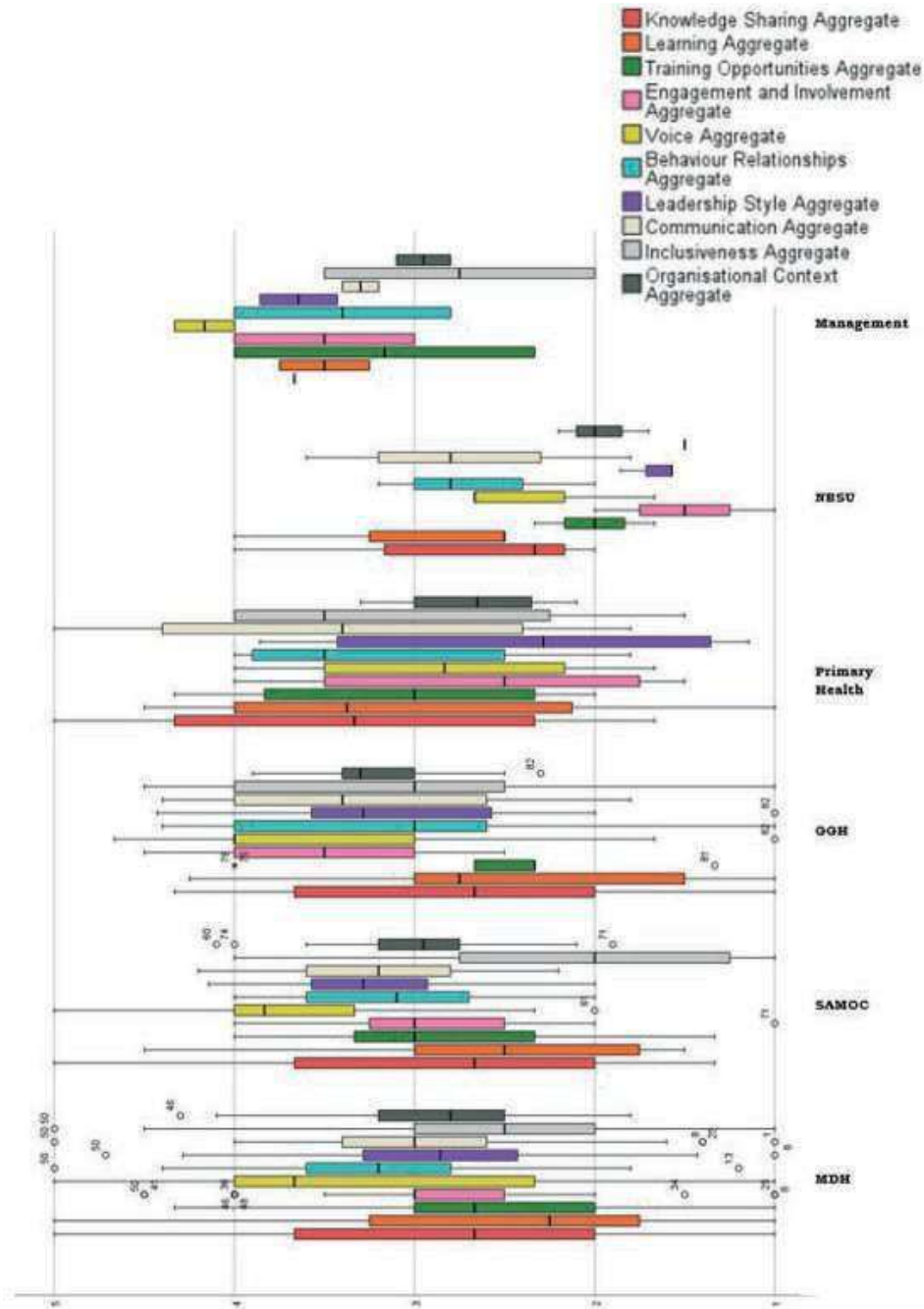


Figure 6: Influencing Factors of Psychological Safety Across Hospitals

## Perception of Psychological Safety Based on Demographics

When testing hypotheses 1 till 7, in an effort to investigate whether the radiographers' perception on the degree of psychological safety was influenced by their demographic factors, it was found that no statistically significant difference was noted between genders ( $p=0.147$ ), different age groups ( $p=0.132$ ), different nationalities ( $p=0.458$ ), organisational tenure ( $p=0.845$ ), the team they worked in ( $p=0.909$ ), their organisational position ( $p=0.510$ ), or their educational level ( $p=0.224$ ). Hence, H1o, H2o, H3o, H4o, H5o, H6o, and H7o were retained, as the significance values obtained were greater than 0.05. However, when delving deeper to investigate whether the influencing factors were affected by the dif-

ferent demographics, it was noted that females had a lower perceived level than males with regards to knowledge sharing ( $p=0.010$ ), learning ( $p=0.024$ ), voice ( $p=0.012$ ), leadership ( $p=0.005$ ), and communication ( $p=0.021$ ). Furthermore, non-Maltese European nationals had lower perceptions of communication ( $p=0.029$ ) and inclusiveness ( $p=0.020$ ) at the workplace. A curvilinear relationship was noted for learning ( $p=0.005$ ), engagement and involvement ( $p=0.009$ ), and the leadership style ( $p=0.022$ ) in that employees who had been working for less than a year had similar views to those who had been working for twenty-one (21) years or more, but had differing, more positive views to those who had been employed between a year to twenty (20) years (Figure 7).

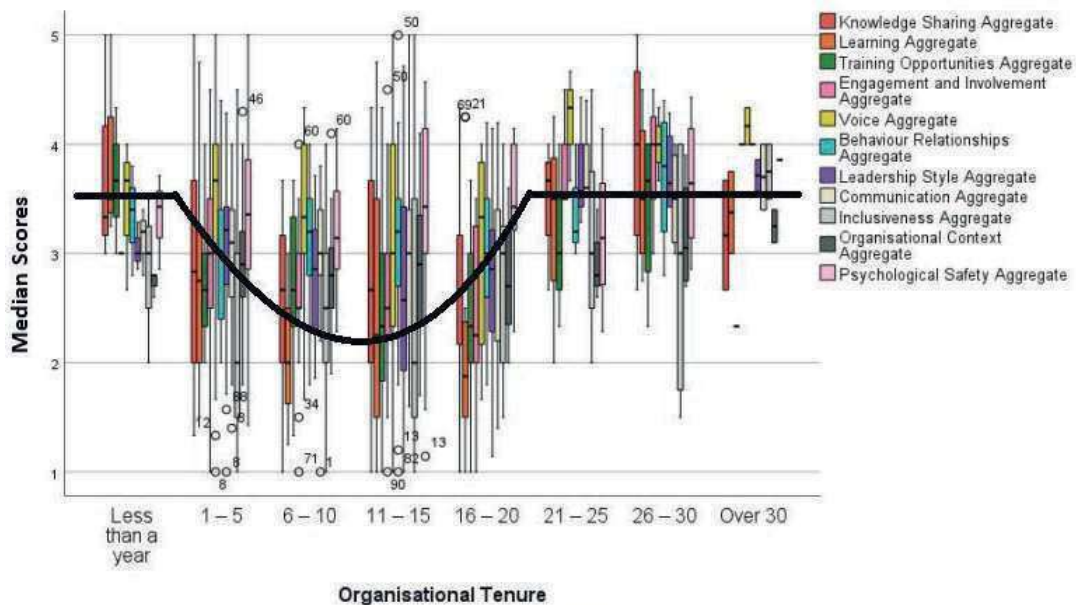


Figure 7: Curvilinear Relationship in terms of Organisational Tenure

## Discussion

Psychological safety was initially researched by Edmondson (1999), who stated that this phenomenon exists within groups or teams as a product of interactions at the workplace. Psychological safety determines the level of team performance, based on the degree of knowledge sharing, learning, training, engagement, voice, behaviour relationships, leadership, communication, inclusiveness, and the organisational context. Psychological safety is particularly crucial within high-risk work environments like the healthcare industry, which is predominantly dependent on the performance of healthcare professionals,

who must feel psychologically safe to engage in quality improvement initiatives, and implement new techniques, towards the effective delivery of safe high-quality patient care (O'Donovan and McAuliffe, 2020). Radiographers, who are highly skilled healthcare professionals, are an integral part of the multidisciplinary team (MDT), occupying a fundamental role in improving patient outcomes and experiences. Therefore, the psychological safety of radiographers is essential to ensure high-quality care (Rajan and Phil, 2014; Rajan, 2018).

### **Perception of Psychological Safety Among the Teams**

Collectively, the participating radiographers from the different teams reported a moderately positive perception of psychological safety. The participants outlined that they were often able to voice problems, and they could ask other teammates, who valued individual skills and talents and did not act in a way that undermined the efforts of others, for help. However, it was pointed out that team members did not feel safe to take risks within the team, due to the fact that if they made a mistake, it was often held against them. Moreover, radiographers indicated that, at times, they felt rejected for being different. These perceptions of psychological safety were comparable to the findings attained in the study by Edmondson et al., (2016), whereby healthcare professionals from different healthcare teams reported similar moderately positive perceptions, with a mean score of 4.2 on a seven-point Likert-scale.

The team at the NBSU reported the lowest degree of psychological safety (3.29), suggesting that further action may be required to enhance their psychological safety. This might be attributed to the fact that apart from being such a small team, this particular team operates in isolation in a separate location from the rest of the teams. Consequently, this team reported a lack of training opportunities, less engagement and involvement in comparison to the other teams, limited occasions to voice opinions, as well as inadequate leadership and working conditions. This was accentuated by the study of Tkalic et al., (2022), in that psychological safety is facilitated by face-to-face interactions. Therefore, teams that operate remotely or are segregated from the rest, tend to experience decreased levels of psychological safety, as the case of the NBSU, which operates as a stand-alone entity within the national health system.

Radiographers occupying a managerial or administrative role had a different, more positive perspective than the rest of the radiographers. This was similarly evident in the study by Edmondson et al., (2016), who noted increased mean scores among participants occupying an executive managerial position, when compared to those participants operating within the lower hierarchical levels of healthcare organisations. This might be attributed to the fact that status differences may amplify perceptions, in that managers enjoy a greater professional status than healthcare professionals occupying a more clinical role. In sum-

mary, a hierarchical organisational system may hinder psychological safety for those occupying a lower status, but grants enhanced perceptions of well-being to those employees among the higher ranks of the system (Edmondson et al., 2016). Nevertheless, it is acknowledged that these results could have been affected by the low number of responses gathered from these two teams, which could have skewed the results.

### **Perception of Psychological Safety Based on Demographics**

The Kruskal-Wallis testing of hypotheses H1 to H7 enabled the researcher to determine whether the degree of psychological safety was affected by the different demographic control variables of the individual radiographers. This statistical analysis revealed that gender did not influence the radiographers' level of psychological safety in this study. This mirrors the study by Heijdens, (2022), who conducted a quantitative comparative analysis of the behaviours of twenty-one (21) males and six (6) females, and reported no difference in the overall perceptions of psychological safety between genders. Similarly, the author went on to investigate whether the individual influencing factors of psychological safety were affected by gender differences. Contrarily to this study, Heijdens, (2022) reported that there was no statistical difference between genders for the influencing factors of knowledge sharing and learning, voice and supportive leadership. The difference in results might have been attributed to the fact that the study by Heijdens, (2022) recruited more males than females, while contrarily in this study the majority of the participants were females, affecting the generalisability of results.

Statistical analysis revealed that age did not influence the radiographers' degree of psychological safety. This result opposed what was reported in the quantitative study by Idrees et al., (2017), who had noted that older generation employees had diverse, more dominant perceptions of psychological safety than younger employees. Data was collected from two hundred and sixty-five (265) workers operating in the construction industry in Pakistan, out of which 54.7% pertained to the younger age group (18-35 years), while 45.3% made up the older generation group aged 35 years and over. The discrepancy in results between the two studies might potentially have been affected by the fact that the participants originated from different industries and cultures. Additionally, responses of this study were gathered primarily from younger employees, with fewer older generation radiographers.

Contrastingly, in the study by Idrees et al., (2017), the participants were more equally distributed across the age groups.

This study's findings revealed that psychological safety was not influenced by nationality. However, upon testing whether the individual factors influencing psychological safety were affected by nationality, statistical differences were noted for communication and inclusiveness, in that non-Maltese European nationals had lower perceptions than the rest of the radiographers. Conversely, the research by Singh et al., (2013), reported that psychological safety was dependent on racial diversity, due to the fact that a statistically significant difference was noted for racial minorities when compared to their white Caucasian counterparts. This quantitative study was conducted in the United States among supervisors and employees in a production organisation of which hundred (100) were White Caucasians, forty-eight (48) participants were Hispanics, and seventeen (17) belonged to other racial minority groups. The incongruity in results between the two studies may be attributed to the fact that the majority of radiographers who participated in this study were Maltese, with very few foreign nationals who submitted a response. Moreover, the participants of the two studies originated from diverse industries.

No statistically significant difference was found with regards to whether organisational tenure influenced the radiographers' perception of psychological safety, in terms of the number of years they have been employed with the Maltese public health sector. This was similar to the result attained in the research by Edmondson, (1999), who, likewise, reported no statistical difference between psychological safety and organisational tenure, in terms of the total years of service. However, a statistically significant difference was noted for learning, engagement, and leadership, as the radiographers who had been working for less than a year had similarly positive views to those who had been working for twenty-one (21) years or more, but had differing, more positive views to those who had been employed between a year to twenty (20) years. This particular curvilinear relationship was also reported by Koopmann et al., (2016), who conducted a quantitative survey among five hundred and sixty-seven (567) employees operating in a research and development team within a major technology entity in China. This curvilinear pattern originates because new recruits do not have adequate data and experience to judge and, therefore, may perceive

an augmented level of psychological safety. Conversely, employees with a moderate tenure have had more time to engage in information and learning, which led them to experience greater conflicts and uncertainty, degrading their psychological safety. On the other hand, individuals with a longer tenure have had extensive time to attain a deeper understanding and behaviour of relationships, greater task knowledge, and conflict resolution, resulting in heightened perceptions of psychological safety (Koopmann et al., 2016).

The dependence of psychological safety on the radiographer team was also evaluated, but no statistically significant difference was found. This is consistent with the findings reported by Edmondson et al., (2016), whereby radiographers from the different teams reported similar perceptions of psychological safety. However, a difference was found for the influencing factors of engagement, leadership, and the organisational context, on the grounds that the team at the NBSU reported lower perceptions, while the managerial team recorded higher perspectives than the rest of the radiographer teams. In turn, this is consistent with the findings reported by Tkalic et al., (2022), whereby teams which are segregated from the rest, as the case with the NBSU, recorded lower scores, while those occupying a managerial role scored higher on the Likert-scale when compared to the rest of the radiographer teams (Edmondson et al., 2016).

The statistical analysis established no statistically significant difference between the degree of psychological safety and the radiographers' organisational position. This is similar to what was reported by Edmondson, (1999). Conversely, a statistical difference was noted for the influencing factors of learning and leadership, coherent with the curvilinear relationship determined in H5. Radiographers working within the public health sector in Malta and Gozo progress upwards on the hierarchy ladder as they attain further qualifications and accumulate more years of service (Ministry for Health, 2020). Hence why this result was consistent with that discussed in H5, in that low level scale 10 and 9 radiographers with few years of experience had similarly positive perceptions to higher level scale 6 and 5 radiographers who had more years of experience within the organisation, but diverse, more positive views than middle level scale 8 and 7 radiographers (Koopmann et al., 2016).

Finally, the Kruskal-Wallis test determined that the educational level did not affect the radiographers' perception of psychological safety. This contrasted with the findings of Zhou and Pan, (2015) who, from their quantitative study among three hundred and fifty-eight (358) employees working within two IT firms in a southern province of the People's Republic of China, noted a positive relationship between psychological safety and the educational level. These diverse findings may be affected by the fact that the studies recruited participants from diverse industries and different cultures.

### **Limitations**

The population recruited for the study was limited and very specific pertaining to the radiography population employed with the Maltese public health sector, affecting the generalisability of results. Moreover, to fulfil the ethical considerations to safeguard participant anonymity and confidentiality, the researcher was forbidden to

approach the participants in person. Hence, an online link to the questionnaire was forwarded by four intermediary contacts to the participants eligible to participate. Furthermore, the data collection period of the study was set during the summer months of July and August 2022, which are the preferred months for vacation leave among the radiographers. This affected the response rate of the study, impacting the reliability of the results. Additionally, the low responses gathered from the individual teams operating within MDH restricted the researcher from analysing data and comparing the findings across the distinct teams. Instead, the researcher was compelled to group the teams and analyse the data by hospital. The low response rate might have potentially also affected the analysis conducted, whereby the researcher attempted to uncover whether the perception of psychological safety was influenced by the individual demographic characteristics of the radiographers.



## Conclusion

This study served to determine the current level of psychological safety as reported by radiographer teams within the public health sector, contributing towards acquiring an insight of the local setting upon which future studies and improvement strategies should be devised. The radiographers who consented to participate in this study reported moderately positive perceptions of psychological safety. The team reporting the lowest score for psychological safety overall was the team at the NBSU, while the team at GGH ranked highest with a moderately positive score. The factors influencing psychological safety at the workplace were rated between moderately negative to moderately positive, whereby inclusiveness ranked lowest with a moderately negative score, while the voice factor ranked highest with a moderately positive score on the Likert-scale. The influencing factors of psychological safety ranked lowest among the NBSU team, but highest for the managerial team, which had diverse, more positive perspectives than the rest of the radiographers. Statistical analysis revealed that the radiographers' perception of psychological safety was not influenced by their individual demographic characteristics. Conversely, some of the influencing factors were proven to be affected by the radiographers' gender and nationality, and the radiographer team, as well as by their organisational tenure and position.

This study gave more voice to the radiographers and highlighted the need for management to improve psychological safety for all radiographer teams, through the dissemination of information and engagement of all involved stakeholders. Psychological safety is a multi-level concept and,

therefore, an adequate multi-level interventional approach is necessary to establish psychological safety successfully. The strategic actions to improve psychological safety must be designed and tailor-made based on the measured individual experiences of the healthcare team members, as suggested by Grailey et al., (2021) and Kingston et al., (2022). While there is a demonstrable presence of psychological safety among healthcare teams, there is always room for improvement. Managers and leaders alone cannot improve the degree of psychological safety. Consequently, all involved stakeholders must exert the necessary efforts, within all levels of the organisation, to create and maintain a psychologically safe workplace environment.

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## References

- Bhattacharjee, A. 2012. *Social science research: principles, methods, and practices* Second edition. Tampa, Florida? Anol Bhattacharjee.
- Bordens, K.S. and Abbott, B.B. 2011. *Research design and methods: a process approach* 8th ed. New York: McGraw-Hill.
- Brown, S. and Leigh, T. 1996. A New Look at Psychological Climate and Its Relationship to Job Involvement, Effort, and Performance. *Journal of Applied Psychology*. 81(4), pp.358–368.
- Data Protection 2018. *Data Protection Act*. Available from: <https://idpc.org.mt/wp-content/uploads/2020/07/CAP-586.pdf>.
- Edmondson, A. 1999. Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*. 44(2), pp.350–383.
- Edmondson, A.C., Higgins, M., Singer, S. and Weiner, J. 2016. Understanding Psychological Safety in Health Care and Education Organizations: A Comparative Perspective. *Research in Human Development*. 13(1), pp.65–83.
- Fleming, J. 2018. Methodologies, methods, and ethical considerations for conducting research in work-integrated learning., p.9.
- Heijdens, E. 2022. The role of gender and psychological safety in effective Agile teams: An exploratory analysis., pp.1–13.
- Idrees, M., Hafeez, M. and Kim, J.-Y. 2017. Workers' Age and the Impact of Psychological Factors on the Perception of Safety at Construction Sites. *Sustainability*. 9(5), p.745.
- Kahn, W.A. 1990. PSYCHOLOGICAL CONDITIONS OF PERSONAL ENGAGEMENT AND DISENGAGEMENT AT WORK. *Academy of Management Journal*. 33(4), pp.692–724.
- Koopmann, J., Lanaj, K., Wang, M., Zhou, L. and Shi, J. 2016. Nonlinear effects of team tenure on team psychological safety climate and climate strength: Implications for average team member performance. *Journal of Applied Psychology*. 101(7), pp.940–957.
- Maslow, A.H., Hirsh, E., Stein, M. and Honigmann, I. 1945. A Clinically Derived Test for Measuring Psychological Security-Insecurity. *The Journal of General Psychology*. 33(1), pp.21–41.
- Ming, C., Xiaoying, G., Huizhen, Z. and Bin, R. 2015. A Review on Psychological Safety: Concepts, measurements, antecedents, and Consequences variables: In: Sanya, China. [Accessed 23 May 2022]. Available from: <https://www.atlantis-press.com/article/18784>.
- Ministry for Health 2020. *Agreement between the Government and the UHM - Voice of the Workers Pertaining to the Allied Health Professionals*.
- O'Donovan, R. and McAuliffe, E. 2020. A systematic review exploring the content and outcomes of interventions to improve psychological safety, speaking up and voice behaviour. *BMC Health Services Research*. 20(1), p.101.
- O'Donovan, R., Van Dun, D. and McAuliffe, E. 2020. Measuring psychological safety in healthcare teams: developing an observational measure to complement survey methods. *BMC Medical Research Methodology*. 20(1), p.203.
- Pallant, J. 2016. *SPSS Survival Manual Sixth*. England: McGraw Hill Education.
- Polit, D.F. and Beck, C.T. 2018. *Essentials of nursing research: appraising evidence for nursing practice* Ninth edition. Philadelphia: Wolters Kluwer Health.
- Rajan, D. 2018. Personal and Social Perception of Occupational Hazards by Health Care Workers: A Study among Radiographers. *Business Ethics and Leadership*. 2(4), pp.46–63.
- Rajan, D. and Phil, M. 2014. *Stress: Among Radiographers.*, p.17.

- Saunders, M.N.K., Lewis, P. and Thornhill, A. 2009. Research methods for business students 5th ed. New York: Prentice Hall.
- Sheppard, V. 2021. Research Methods for the Social Sciences: An Introduction 3rd ed. Creative Commons Attribution.
- Singh, B., Winkel, D.E. and Selvarajan, T.T. 2013. Managing diversity at work: Does psychological safety hold the key to racial differences in employee performance? *Journal of Occupational and Organizational Psychology*. 86(2), pp.242–263.
- Tkalich, A., Smite, D., Andersen, N.H. and Moe, N.B. 2022. What happens to psychological safety when going remote? p.8.
- WHO 2022. Occupational Hazards in the Health Sector. [Accessed 20 August 2022]. Available from: <https://www.who.int/tools/occupational-hazards-in-health-sector>.
- Wu, M.-J., Zhao, K. and Fils-Aime, F. 2022. Response rates of online surveys in published research: A meta-analysis. *Computers in Human Behavior Reports*. 7, p.100206.
- Zhou, Q. and Pan, W. 2015. A Cross-Level Examination of the Process Linking Transformational Leadership