Influence of Contextual Variables and Health literacy on Teamwork Skills in Spanish Military Personnel

ABSTRACT

Background and Objectives: Teamwork skills are essential for military personnel, influencing both professional performance and adaptation to civilian life. Health literacy has been identified as a factor that can further enhance these skills.
To analyze the influence of contextual variables, such as military rank, marital status, and training experiences, on teamwork skills and their relationship with health literacy among Spanish military personnel.
Materials and Methods: This cross-sectional study included 671 Spanish Army personnel. Data were collected via the Teamwork Skills Questionnaire (TSQ), evaluating six dimensions of teamwork, and correlated with health literacy levels. Contextual variables such as rank, marital status, training, and internships were also assessed. Statistical analyses included the Kruskal-Wallis test and decision tree modeling to identify predictors of health literacy.
Results: The results showed that the military enjoy good levels of health literacy, with only 5.7% of the participants have a low level of health literacy, while 56.6% have a standard health literacy and 37.9% have excellent health literacy. Military rank significantly influenced teamwork skills, with officers scoring higher in leadership and adaptability, and non-commissioned officers excelling in coordination. Marital status impacted specific skills; separated participants displayed superior decision-making and adaptability, while married individuals excelled in communication, coordination, and leadership. Training and internships significantly enhanced teamwork skills across multiple dimensions. A positive correlation was observed between teamwork skills and health literacy, with urban residency, higher parental education, and strong personal skills emerging as key predictors of excellent health literacy.
Conclusion: Tailored training programs are recommended to enhance teamwork skills, especially for military personnel with diverse contextual backgrounds. Incorporating health literacy training into military curricula could optimize professional performance and career progression. These findings underscore the importance of addressing contextual and personal factors to improve teamwork and health literacy in the military.

Paper Type: Research Article
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Iago Portela-Pino
Department of Health Sciences, Faculty of Health Sciences, Isabel I University, Burgos, Spain.
Alejandro Sal-de-Rellán
* Department of Education and Educational Innovation, Faculty of Law, Education and Humanities, Universidad Europea de Madrid, Madrid, Spain. (Corresponding Author)
Tehranih@mums.ac.ir
Ariadna Hernaiz-Sánchez
Department of Education and Educational Innovation, Faculty of Law, Education and Humanities, Universidad Europea de Madrid, Madrid, Spain.
Javier Raya-González
Research Group on Sport and Physical Education for Personal and Social Development (GIDEPSO), Department of Specific Didactics, Faculty of Education Sciences and Psychology, University of Córdoba, Córdoba, Spain.
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Introduction

Health literacy has been the subject of numerous studies in various contexts, such as the school curriculum (1), university students (2), adolescents (3), and even individuals without health problems (4). Although research on health literacy in veteran military personnel has been conducted, studies specifically addressing this topic in active-duty military personnel remain insufficient (5, 6).

In today's labor market, professional roles require competent profiles that align with the specific demands of each position. According to some authors, competencies encompass skills, knowledge, and attitudes that enable individuals to navigate complex situations and continuously improve throughout their lives (7).The significance of competencies extends beyond individual professional development, influencing societal functioning; a population equipped with diverse competencies benefits both daily life and the workplace. Within the Spanish military sector, professionals undergo training to develop competencies relevant to their occupational roles. Some studies highlight the critical role of skills training in the navy (8), emphasizing its responsibility in both delivering and receiving comprehensive training to effectively meet societal demands (3).

Other researchs indicates that military personnel exhibit strong teamwork skills. This is largely attributed to the continuous training inherent in their profession, particularly in areas such as leadership and decision-making. As a result, they undergo a highly structured and complex training system (3-7). However, beyond formal training, external factors may also influence their competency profile

The acquisition of competencies is essential in both military and non-military organizations (14), as it influences perceptions of working conditions, enhances commitment levels, and facilitates the development of future skills (15). This process is shaped by various external factors, including personal (16), familiar (11) and professionals (18) influences, all of which play a critical role in the development and acquisition of key competencies in the military. In this context, personal factors such as gender (19), age (20) and parental education level (21), play a role in the acquisition of skills. However, these are not the only determinants; other variables, such as marital status (16) and military rank (17) can also significantly impact competency development. Considering these factors is crucial, as military personnel must fulfill a diverse range of responsibilities, making competency acquisition vital (18) for effectively carrying out their duties.

Moreover, skill acquisition in the military plays a crucial role in the transition to civilian life after service (15). Some authors (25), identified positive effects on the development of specific competencies among former military personnel, noting that they are more likely to complete vocational training upon leaving the armed forces. However, despite gaining valuable skills applicable to civilian life during military service, the reintegration process presents significant challenges (26), asking competency acquisition a key factor in facilitating this transition. Therefore, it is essential to further examine the relationship

between skill development and the diverse profiles of military personnel.

Finally, beyond teamwork skills, other factors significantly influence the military's adaptation to civilian life. This transition is often associated with health-related challenges (27), making a high level of health literacy particularly beneficial. In this regard, teamwork skills have been positively correlated with higher levels of health literacy (25, 26) suggesting that developing these skills may also play a crucial role in facilitating this aspect of the transition process.

In summary, the acquisition of competencies is essential for military personnel, not only for their professional performance within the armed forces but also for their successful transition to civilian life. Factors such as training, personal and external influences, and teamwork skills play a crucial role in shaping their competency profile. Moreover, health literacy emerges as a key element in addressing the challenges associated with this transition. Given the complexity and impact of these factors, further research is needed to deepen our understanding of how competency development influences both military effectiveness and reintegration into society.

Materials and Methods

Participants

The sample of this work was composed of a total of 671 military personnel of the Spanish Army. The sample is comprised of all active military personnel from the Pontevedra military base, belonging to the 'Brigada "Galicia" VII.

Instrument

The Teamwork Skills Questionnaire (TSQ) (29), which assesses an individual's level of ability to participate effectively in teamwork, has been used to measure the level of teamwork. This questionnaire has a high validity and reliability for Spanish populations (30). The questionnaire has six subscales: (a) coordination (5 questions), (b) decision-making (6 questions), (c) leadership (7 questions), (d) interpersonal skills (6 questions), (e) adaptability (5 questions), and (f) communication (7 questions) (31). All questions can be answered from 1 almost never to 4 almost always. In addition, the questionnaire includes a series of biographical characterization variables that will serve to contextualize the participants and correlate with health literacy factors.

The interpretation of the scores for each subscale follows a numerical system that can range from 1 to 5 or 1 to 7, where a low score indicates areas of weakness or need for improvement, a medium score usually indicates an adequate level, but with some areas for improvement, while a high score reflects a high level of competence in that specific area.

Procedures

A cross-sectional, study was designed. A questionnaire was distributed to Spanish military personnel of the Army. A total of 671 professionals responded to the questionnaire. The questionnaire was distributed through the army's own web platform, thus allowing anonymous, voluntary, and confidential participation. The data collected was processed in accordance with Organic Law 3/2018, of December 5, on Personal Data Protection and guarantee of digital rights in Spain. The questionnaire itself informed the participants that answering the questionnaire was the acceptance of an

informed consent and that their answers would be processed in a general way and would only be used for scientific purposes. Data available on request due to privacy/ethical restrictions. The ethical procedure always follows the rules of the Declaration of Helsinki.

Statistical analysis

The biographic characteristics of the sample were presented as percentages and frequencies in the case of categorical variables and as means and standard deviations in the case of numerical variables. To perform the hypothesis testing, the Kolmogorov-Smirnov test was first performed, which established the sample as non-parametric since it did not follow the parameters of the normal distribution. Having established the nature of the sample, the Kruskall-Wallis hypothesis test was selected to establish differences between the biographic characteristics of the population and their results in the questionnaire (the level of statistical significance was set at $p<0.05$). Ultimately, a decision tree was used to determine those variables with the greatest weight in the level of physical literacy of the sample.

Results

Of the total number of participants 583 were men (86.9%) and 88 were women (13.1%), the mean age of the total sample was 34.46 ± 7.42 (Men = 34.21 ± 7.5; Women = 36.08 ± 6.3), of the total sample 7.9% had university studies. The biographical characterization of the sample is shown in Table 1.

Regarding the overall results on health literacy, the results showed that only 5.7% of the participants have a low level of health literacy, while 56.6% have a standard health literacy and 37.9% have excellent health literacy. The contrast of hypotheses between the aspects of teamwork and the contextual variables showed that there are significant differences in some of the variables. Figure 1 shows the differences found based on the rank of the sample for each of the dimensions of the questionnaire. Apart from personal skills, all the dimensions of the questionnaire show significant differences according to rank. More specifically, it can be observed that the troops show lower levels in all teamwork skills while the officers show higher levels than the other two groups in leadership ($p<0.000$) and adaptability ($p = 0.040$) On the other hand, the group of non-commissioned officers shows a higher level in coordination ($p<0.000$). Figure 2 shows the differences in teamwork dimensions as a function of the marital status of the sample. As with the military rank, there are no differences between groups in interpersonal skills ($p= 0.122$). The data showed how separated participants have higher levels in decision making skills ($p= 0.007$), and adaptability ($p= 0.048$), while those married or in a couple show higher skills in communication ($p= 0.036$), coordination ($p= 0.009$), and leadership ($p= 0.002$).From another point of view, previous training in teamwork has been shown to have significant differences in leadership ($p= 0.000$) and decision-making skills ($p= 0.002$), with those who have received previous training having higher levels of these skills as shown in Figure 3. As with previous teamwork training, it appears that internships in professional settings also have a positive influence on all skills except for intrapersonal skills ($p= 0.000$). The differences can be seen in Table 2.

Table 1. Biographical characterization of the sample

		Troop	Warrant Officer	Officer	
Scale	n	516	111	44	
	%	76.90%	16.50%	6.60%	
Area of residence		Rural	Semiurban	Urban	
	n	161	235	275	
	%	24%	35%	41%	
Level of education		Basics	mid-level studies	Higher education	
	n	447	151	73	
Mother	%	66.60%	22.50%	10.90%	
	n	428	172	71	
Father	%	63.80%	25.60%	10.60%	
		Single	Married	Widower	Divorced
Marital status	n	351	283	5	32
	%	52.30%	42.20%	0.70%	4.80%

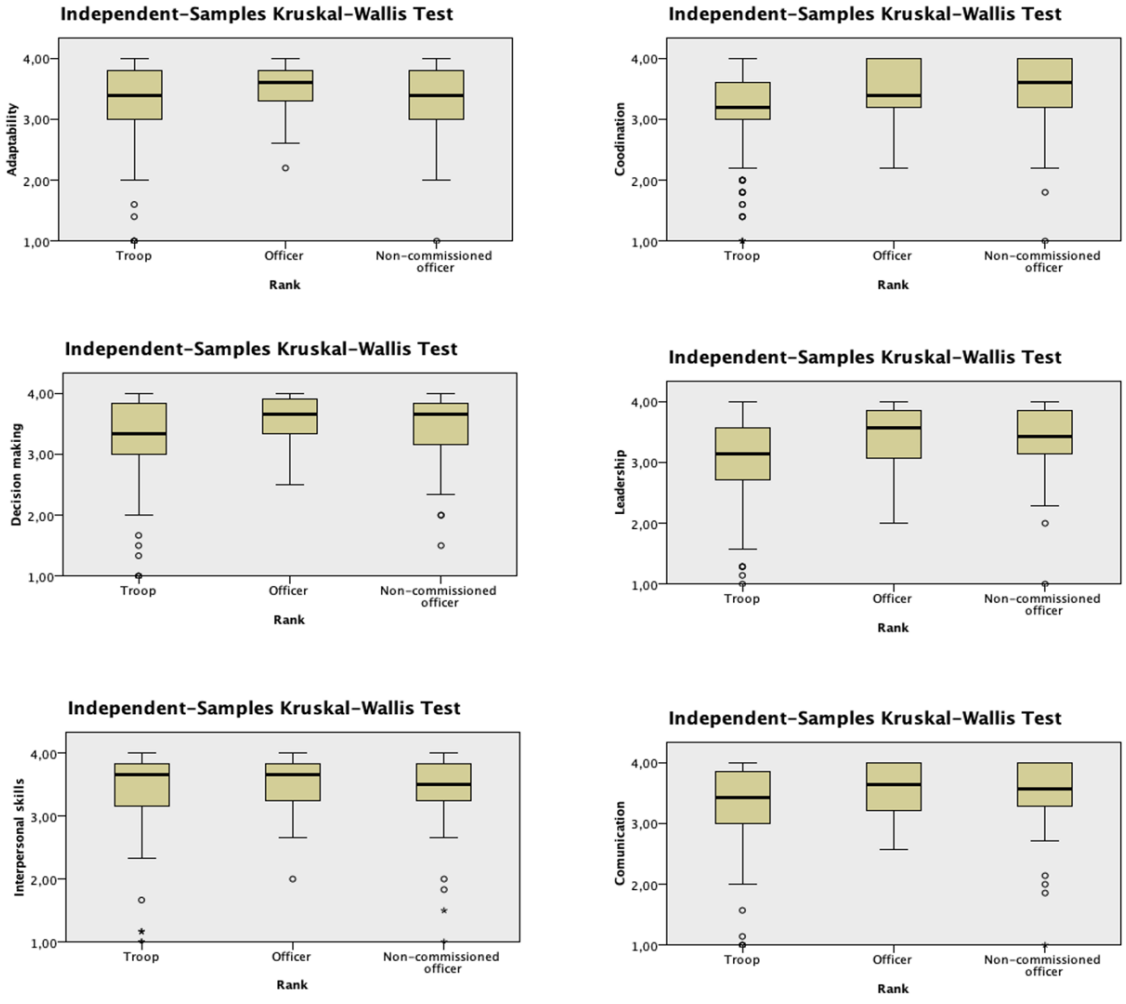

Figure 1. Differences in teamwork skills based on rank

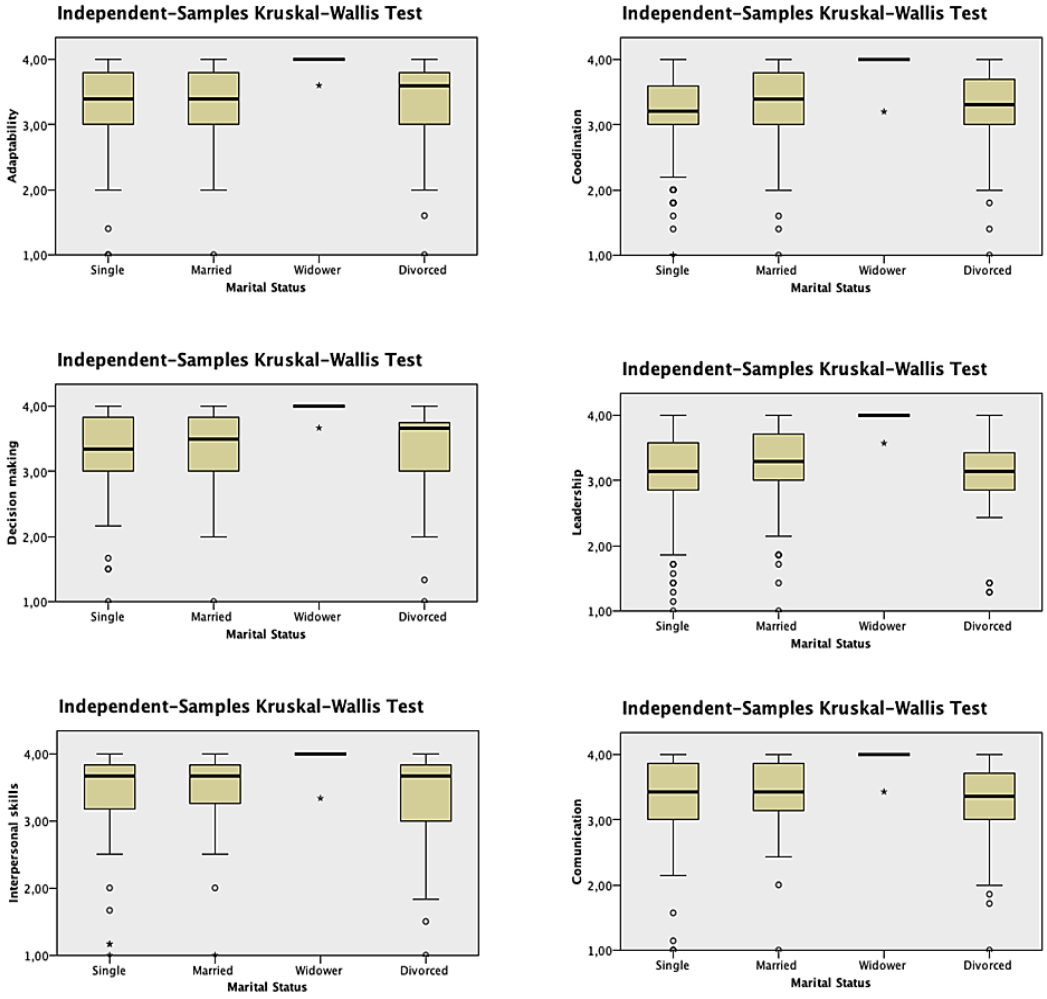

Figure 2. Differences in teamwork skills based on marital status

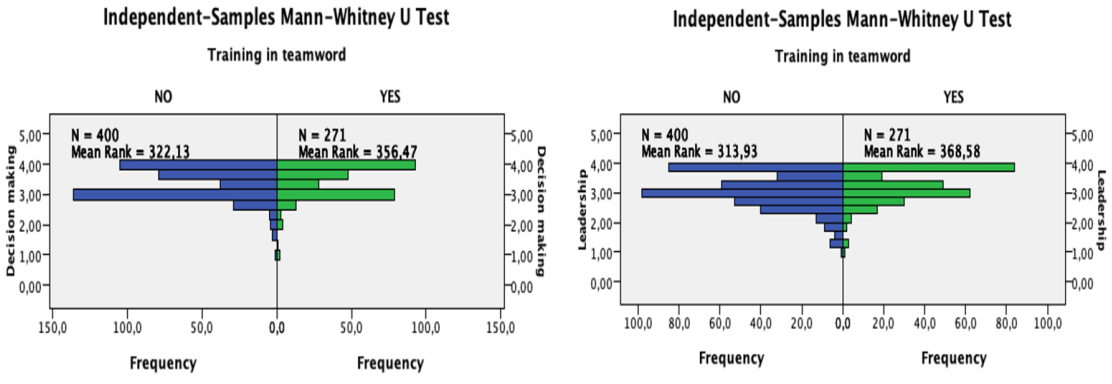

Figure 3. Differences based on training in teamwork

Table 2. Differences between teamwork skills as a function of internships

	No intership (mid-range)	Intership (mid-range)	U	p
Adaptability	3.17	3.28	2.497	0.013
Coordination	3.08	3.64	3.814	0.000
Decision-making	3.17	3.55	2.508	0.012
Leadership	3.12	3.60	3.271	0.001
Interpersonal skills	3.32	3.40	0.551	0.582
Comunication	3.19	3.53	2.298	0.022

The relationship between teamwork skills and health literacy shows a significant correlation, as shown in Figure 4. Those participants with excellent health literacy levels having higher levels of teamwork skills (p= 0.000), while lower levels of teamwork skills appear to be predictors of lower health literacy (p= 0.000).

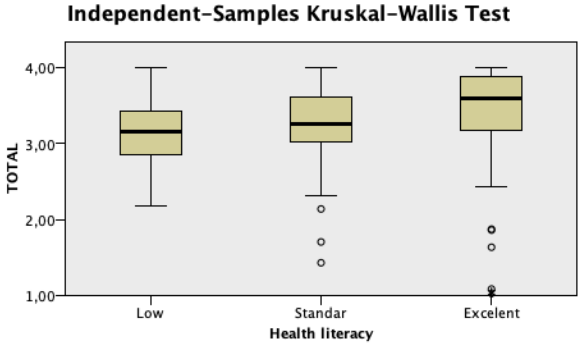

Figure 4. Correlation between health literacy level and teamwork skills

In addition to leadership skills, a predictive model of participants' level of health literacy was established as a function of contextual variables. Figure 5 shows the decision tree with health literacy. The analysis showed that the most influential variable in having excellent health literacy is personal skills (which previous results showed to be a teamwork skill that does not depend on contextual factors), in addition to personal skills, those who reside in urban or semi-urban areas are more likely to develop excellent health literacy compared to those living in rural areas, who tend to have normal levels of health literacy. Ultimately, those whose parents have higher or medium education have higher levels of health literacy compared to those whose parents have basic education, who tend to have normal levels of health literacy. Overall, it could be concluded that personal skills, residence in urban or semi-urban areas and a high level of parental education seem to be predictors of an excellent level of health literacy.

Discussion

The aim of this study was threefold: a) to analyze the influence of contextual variables such as military rank, marital status, or teamwork training on teamwork skills in Spanish military personnel, b) to confirm the relationship between teamwork skills and health literacy, and c) to explore the characteristics of military personnel with higher health literacy. Although some studies have analyzed the influence of several variables on teamwork skills of military personnel (32,33), this is the first one that includes rank or marital status, in addition to determining the characteristics that military personnel must possess to have a high level of physical literacy. The findings of this study revealed that higher military ranks have better teamwork skills compared to soldiers in all skills except interpersonal relationships.

Also, separated participants have higher levels of decision-making skills and adaptability, while those married or in a couple show higher skills in communication, coordination, and leadership. Additionally, military personnel who received teamwork training and completed internships presented better teamwork skills than their peers. Finally, health literacy is closely related to teamwork skills, with military personnel with high personal skills, residing in urban or semi-urban areas, and having a high level of parental education being those who presented excellent health literacy values.

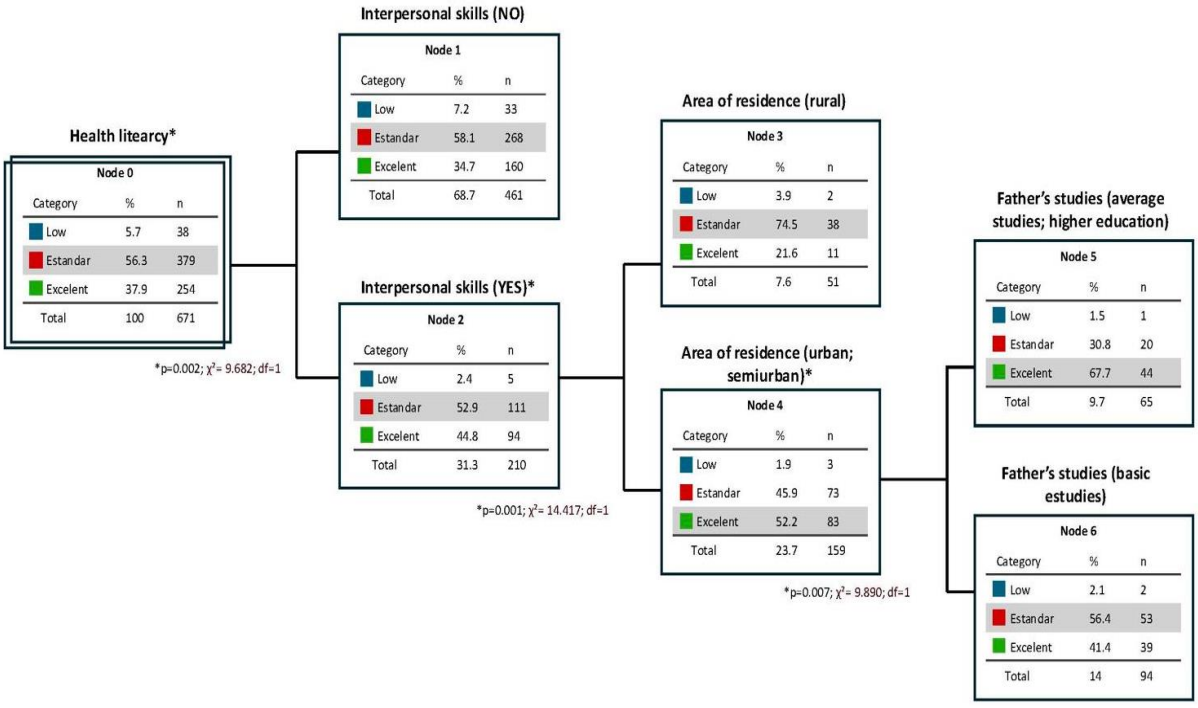

Figure 5. Predictors of health literacy levels

Several authors have emphasized the relevance of several contextual variables, such as rank or marital status, in the acquisition of teamwork competencies in military personnel (34, 35). In this regard, our findings showed no differences in interpersonal skills based on ranks. Higher rank is associated with higher scores, primarily in adaptability and leadership skills, as expected since the highest rank must be capable of leading many companions in their troop and adapting to the needs of each rank. This is particularly relevant with soldiers, whose leadership skills are the lowest, potentially leading to a lack of understanding of decisions made by their superiors, requiring adaptation on their part to avoid conflicts and achieve set goals. Additionally, soldiers presented the lowest values in coordination, decision-making, and communication, as expected, given their generally younger age, less training and experience. It may even be indicative that they are in that rank because they have yet to

acquire those skills (34, 35). Regarding marital status, separated participants exhibited higher levels in decision-making skills and adaptability, possibly influenced by their marital experiences, which could make them more discerning in the decisions to be made and more adaptable to reduce conflicts. Furthermore, military personnel who are married or in a relationship demonstrated higher skills in communication, coordination, and leadership. We hypothesized that this could be attributed to those who share their lives as a couple typically align their actions with their partner, facilitated by effective communication between them. Due to these findings, specific strategies tailored to rank and marital status are necessary to enhance teamwork skills in military personnel.

Several studies have stated that military personnel undergo teamwork training throughout their careers (36, 37). This form of training is a crucial factor in enhancing teamwork skills in military personnel, particularly leadership and decision-making skills. In this context, our results validate this assertion, as military individuals who completed multiple teamwork training programs exhibited higher values in leadership and decision-making skills compared to their counterparts who did not participate in such programs. These findings align with the outcomes reported by Astika & Suharyo (2021), underscoring the significance of skills training for the navy. It emphasizes the need for comprehensive training that not only military personnel provide but also the training they receive to meet the societal demands effectively. Therefore, it is recommended that soldiers increase their participation in teamwork training. This serves two purposes: firstly, to acquire specific skills that optimize their professional performance, and secondly, to facilitate their promotion within the military rank. As demonstrated earlier, higher ranks possess better teamwork skills. Another crucial action for improving teamwork skills appears to be the completion of internships during studies. This is supported by the fact that individuals who completed internships during their studies exhibited better values in all teamwork skills except intrapersonal skills. This improvement may stem from the experience gained during these internships, often supervised by individuals with higher ranks and greater experience, which helps internalize the importance of these skills. Therefore, it is recommended that military personnel, to the extent possible, actively engage in multiple internships during their studies for enhanced training and subsequent professional performance.

Health literacy is defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (39). This is of great importance for military personnel, as a substantial percentage of suicides, mental disorders, and stigmatization toward health problems have been reported in this population (40). Additionally, a previous study demonstrated that teamwork skills are positively associated with a higher level of health literacy (32). In our study, a positive correlation was observed between the overall level of teamwork skill and the level of health literacy. Furthermore, military personnel were divided into three groups (i.e., low, medium, and excellent), confirming

that those with excellent health literacy levels exhibited higher levels of teamwork skills. This underscores the necessity for comprehensive military training, offering programs that enable them to enhance their health (41) and, consequently, the fundamental skills for their career, (37). This is crucial to optimize their performance and facilitate their progression within the military hierarchy. Given the significant influence that health literacy has on teamwork skills, it is relevant to understand which variables related to the military contribute to better health literacy. In this sense, the results of this study indicate that personal skills, residence in urban or semi-urban areas, and a high level of parental education seem to be predictors of an excellent level of health literacy. These results align with expectations, as residing in urban areas facilitates access to higher education and health-related training (42). Additionally, the level of education of parents plays a role, as children of those with higher education tend to have better academic results and reach higher levels of education (43,44). These findings should be considered when conducting health literacy training, focusing on groups with characteristics furthest from the ideals obtained to achieve comprehensive improvement, including their teamwork skills, essential within the military career.

This study is not without limitations, which should be acknowledged by practitioners. The primary limitation is that all military personnel were from Spain, making it possible that the results may vary in other countries with different rank structures, thus complicating the extrapolation of the findings. Another limitation is the general consideration of teamwork training and practices, without differentiation between types, duration, or frequency. Lastly, there was no differentiation between sexes due to the low number of participating women, potentially influencing the results. Different outcomes between male and female military personnel could be possible.

Conclusions

In conclusion, higher-ranking military personnel exhibit better teamwork skills compared to ordinary soldiers in all aspects except interpersonal relationships. Marital status also influences certain skill outcomes. Furthermore, military personnel who undergo teamwork training and internships demonstrate enhanced teamwork skills compared to their counterparts. Lastly, health literacy is intricately linked to teamwork skills, with military personnel possessing high personal skills, residing in urban or semi-urban areas, and having a high level of parental education demonstrating excellent health literacy values. From a practical standpoint, this study underscores the importance of enhancing teamwork skills among military personnel to optimize their professional performance and facilitate rank progression within the military hierarchy. A promising avenue could be incorporating health literacy training, considering its significant correlation with teamwork skills in this population. Such training should be targeted towards individuals who do not align with the characteristics predictive of excellent health literacy identified in this study (i.e., personal skills, residence in urban or semi-urban areas, and a high level of parental education).

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Consent for publication: Not applicable.

Ethical approval and consent to participate: This study was conducted in accordance with the principles of the Declaration of Helsinki. All participants were informed about the purpose of the research, and informed consent was obtained prior to participation. The study protocol was approved by the Universidad Isabel I de Castilla.

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