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OPPORTUNITIES FOR THE DEVELOPMENT OF EMERGENCY MEDICAL CARE

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Abstract— Introduction. The rising frequency of crises and emergencies demands efficient emergency medical systems, including aeromedical services. In Bulgaria, air ambulance services are a recent development, with the first mission launched in June 2024. A survey of the attitude of health personnel is essential for the development of this high-risk sector of emergency medical care. The aim of the study is to assess the motivation of future specialists for working in emergency situations, including willingness to provide air emergency assistance. Materials and Methods. In July 2025, a cross-sectional survey was conducted among 333 students from the Medical University – Sofia (medicine, nursing, paramedics, and related specialties). Mathematical and statistical methods were used to process the data from the sociological survey. Results. Almost two-thirds of respondents expressed interest in joining an air medical transport team. Key motivators for 38.7% included the appeal of novelty, avoidance of routine, and opportunities for personal achievement under risk. Remuneration ranked nearly as high (33.6%), with 66.7% believing air ambulance staff should receive higher pay than ground emergency personnel due to greater occupational hazards. In unexpected situations such as war, industrial accidents or natural disasters, 76% would be willing to temporarily serve in air ambulance operations. Conclusion. Air ambulance services attract substantial interest, particularly among students with a high tolerance of risk. Competitive pay aligned with the elevated risks, together with careful selection and targeted motivation of personnel, are critical for the sustainable development of this specialized and demanding field.

Keywords— air transport, disasters, emergency medical care, motivation

I.INTRODUCTION

According to published data, in recent years, there has been an increase in the number of casualties and the severity of injuries in emergencies and disasters. This requires effective emergency medical systems, including air transport. [Blok B, Slagt C, van Geffen GJ, Koch R.] [Thomas SH, Thomas SW, Thomas SA, Pathan S.] As a result, this high-risk sector of emergency medical care is continuing to develop in many regions worldwide, including across the European Union. [Schmid M, Schüttler J, Ey K, Reichenbach M, Trimmel H, Mang H.] [Hennelly D, Deasy C, Jennings P, O'Donnell C, Masterson S.] Air ambulance services in Bulgaria began in 2024, and the number and frequency of flights have gradually increased, as has the variety of clinical cases and situations requiring specific and rapid transport over long distances. [Air Ambulance Center at the Ministry of Health]

The provision of this type of emergency care poses new opportunities and challenges, including risks to the physical and mental health of medical personnel. [Hoogerwerf N, Heijne A, Geeraedts LM Jr, van Riessen C, Scheffer GJ.]

The scientific literature provides evidence from multiple authors showing that helicopter emergency medical services are associated with a higher risk of accidents compared with the average risk for standard flights. Hinkelbein and co-authors report that each year, an average of between 2 and 4 HEMS (helicopter emergency medical services) helicopters in Germany suffer serious accidents/incidents. [Hinkelbein J, Schwalbe M, Genzwuerker HV]

Helicopters also have limited cabin space, which can facilitate the spread of infection within the aircraft. This should not be underestimated, and the risk of infection was particularly evident during the COVID-19 pandemic, when significant levels of infection were reported among air crews. The high number of staff who became ill made it difficult to form teams and impaired EMS operations in some countries.[Spoelder EJ, Tacken MCT, van Geffen GJ, Slagt C.].
Several studies have shown that the level of cognitive and emotional stress among HEMS (helicopter emergency medical services) workers is significant. Managing high work-related stress is directly related both to their motivation and performance in the workplace and to their overall well-being. [Van Herpen, Merel et al.]
A review of the literature indicates that there are substantial risks to the physical and mental health of air ambulance workers, yet health professionals are still required to perform this specialised work in unusual and challenging conditions.
A survey of the attitudes of health personnel is essential for the development of this high-risk sector of emergency medical care. The aim of this study is to assess the motivation of future specialists to work in emergency situations, including the provision of air emergency assistance.

II. MATERIALS AND METHODS

In July 2025, a cross-sectional survey was conducted among 333 students from the Medical University – Sofia, including 31 medical students, 115 nursing students, 20 paramedic students, and 167 students from related specialties. Of these, 291 were women and 41 were men.
The questionnaire specially created for the purpose of the survey contains 20 questions aimed at analyzing several sub-topics. The results presented here are an essential part of a comprehensive study on the possibilities for ensuring the sustainable development of emergency medical care by air.
Mathematical and statistical methods were used to process the survey data. Descriptive statistics were applied, with results presented as absolute frequencies (n) and relative frequencies (%). A chi-square test was used to examine associations between categorical variables. The relationships between participants' responses and their gender were examined. The accepted level of significance is $\alpha=0.05$. Statistical significance is assumed when the p value is less than α ($p<0.05$). The data were analysed using SPSS (Statistical Package for the Social Sciences), version 20.0.

III.RESULTS

Almost two-thirds of respondents expressed interest in joining an air medical transport team. Among those who would not choose this job, the fear of flying by helicopter is the leading one (26.1%). The analysis showed statistically significant differences between men and women regarding their willingness to work in an air medical transport team ($p = 0.002$). The proportion of men who expressed interest was 78.0%, which is significantly higher compared with the proportion of women (59.1%). (Table 1 and Fig. 1)

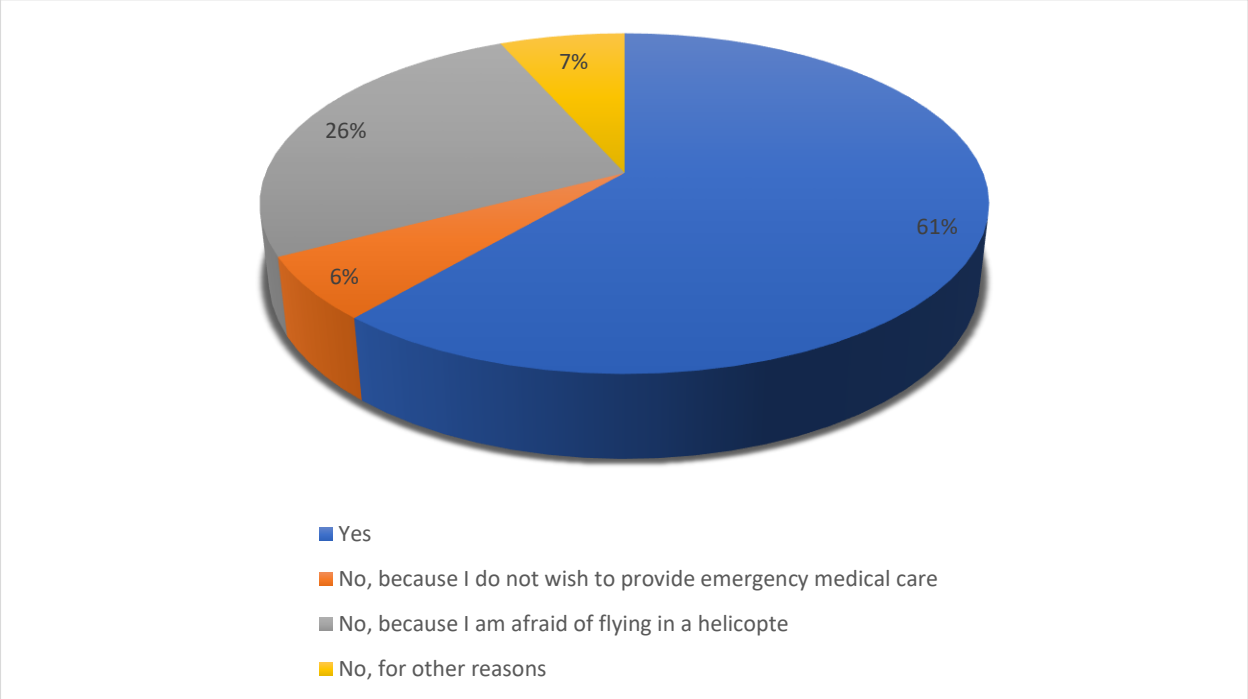

Fig. 1. Willingness to work in an air medical transport team?

TABLE 1. Distribution of Respondents by Gender According to Their Answers to Question, With Results of the Chi-Square Test

Question			Gender		Total	p
			Men	Women		
Would you work in an air medical transport team?	Yes	N	32	172	204	0,002
		%	78,0%	59,1%	61,4%	
	No, because I do not wish to provide **emergency** medical care	N	3	17	20	
		%	7,3%	5,8%	6,0%	
	No, because I am afraid of flying in a helicopter	N	1	85	86	
		%	2,4%	29,2%	25,9%	
	No, for other reasons	N	5	17	22	
		%	12,2%	5,8%	6,6%	

Key motivators for 38.7% included the appeal of novelty, the avoidance of routine, and opportunities for personal achievement in high-risk situations. Remuneration ranked nearly as high (33.6%) (Fig. 2).

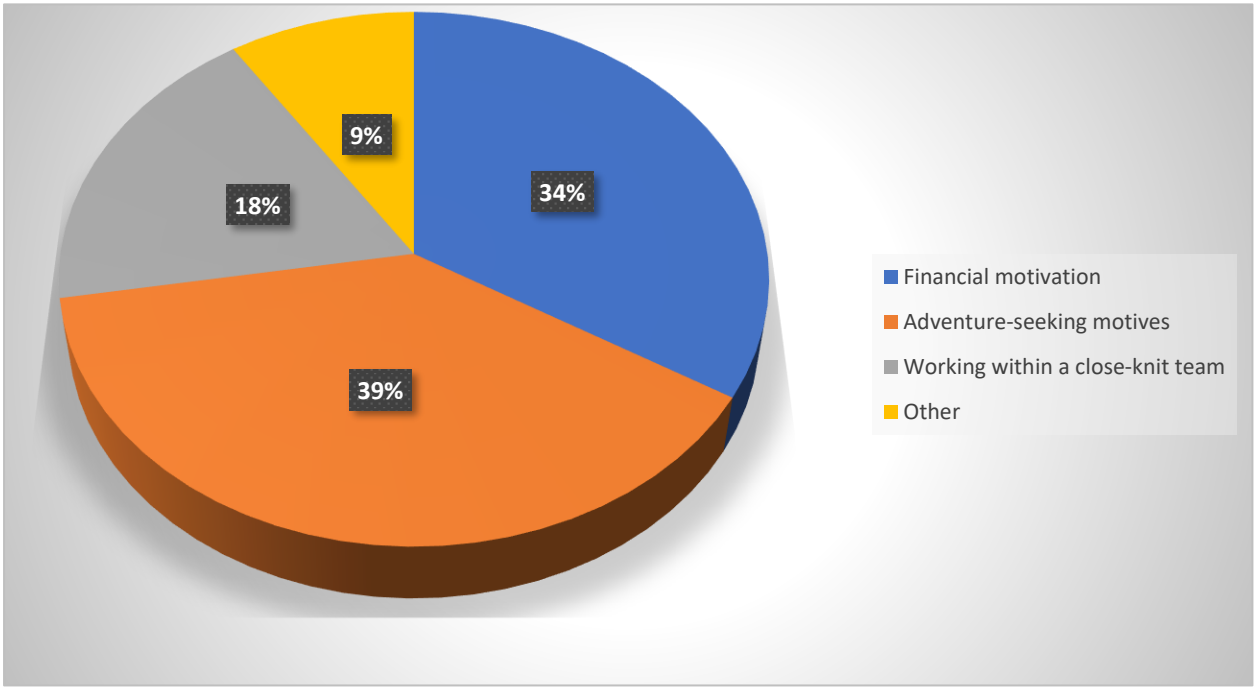

Fig. 2. What do you think is the main reason why some medical professionals choose to work in air ambulance?

66.7% believe that air ambulance staff should receive higher pay than ground-based emergency personnel due to greater occupational hazards. One third of respondents held the opposite view. They cited two main reasons for supporting equal pay: the belief that all teams carry equal responsibility (15.0%), and the concern that different pay levels could lead to conflicts between personnel performing the same work using different modes of transport (13.2%). (Table 2)

TABLE 2. Opinions on Whether Air Medical Personnel Should Receive Higher Salaries than Ground Emergency Staff

Do you think that medical personnel who are part of air medical teams should receive **higher** salaries than those working in ground emergency medical care teams?	N	%
Yes, because the risk is greater	222	66,7
No, because the responsibility is the same	50	15,0
No, because different salaries can lead to conflicts between them	44	13,2
Other	17	5,1

Total	333	100,0

A significant proportion of respondents (72.7%) believe that air ambulance workers require additional medical care, such as regular preventive examinations and additional medical tests (Fig. 3). Nearly one quarter (22.5%) of respondents believe this would be unfair to other medical professionals, as they are also exposed to occupational risks.

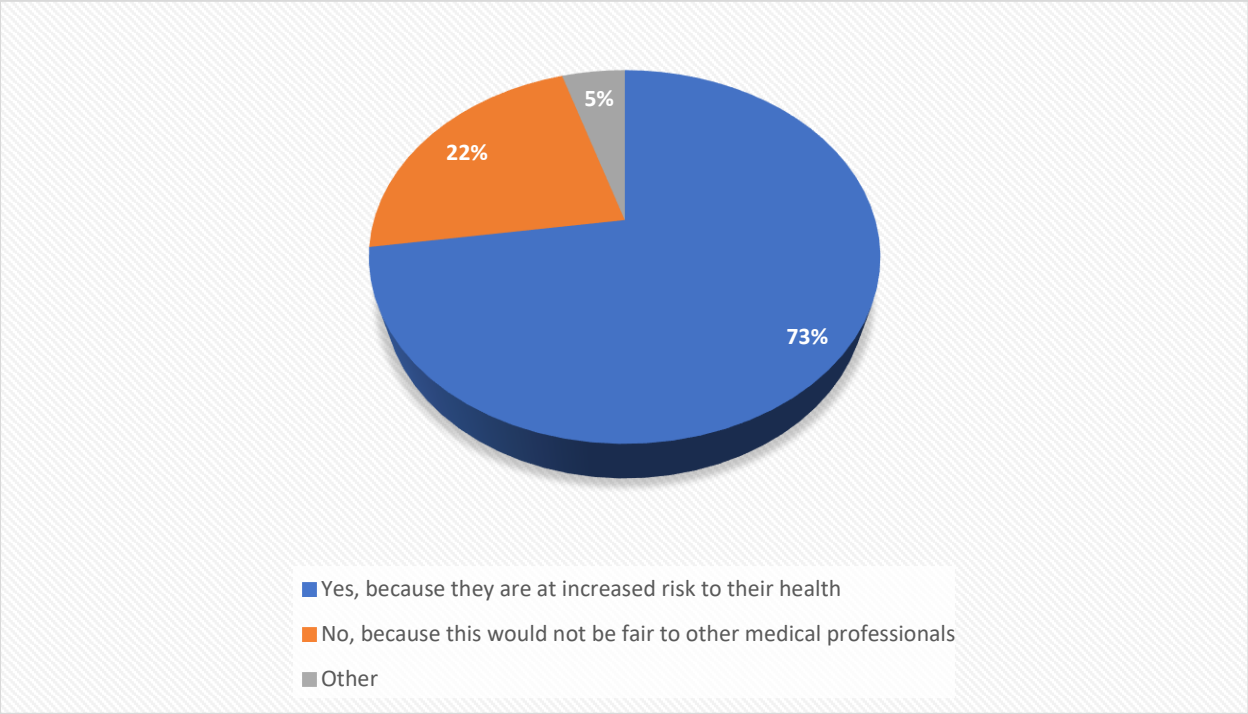

Fig. 3. Do you think that air ambulance workers need additional medical care (regular preventive examinations, medical tests, etc.)?

In unexpected situations such as war, industrial accidents, or natural disasters, 76% of respondents would be willing to temporarily serve in air ambulance services (Table 3).

TABLE 3. Willingness to Temporarily Join Air Emergency Medical Services in Crisis Situations

In unforeseen circumstances (war, epidemic, natural disasters, etc.), would you temporarily join the emergency medical service by air to help those in need?	N	%
Yes	253	76,0
No	63	18,9
Other	17	5,1
Total	333	100,0

IV.CONCLUSIONS

Effective personnel management in emergency medical services requires careful planning, flexible staffing models, and the application of contemporary scientific approaches to workload assessment and resource allocation. The highly specialised nature of nursing and healthcare activities demands accurate workforce planning, the use of modern and adaptable scheduling methods, and clear, regularly updated job descriptions that define responsibilities and competencies. Selection and evaluation processes should incorporate psychological assessment tools and team-based decision-making to minimise subjectivity and ensure the recruitment of competent and resilient staff. In addition, the development of differentiated roles based on education, experience, and competence—widely implemented in many developed countries—could support future workforce optimisation. As nursing and medical work is associated with high physical and psychological demands, effective leadership must combine supportive working conditions with meaningful motivation strategies that extend beyond financial incentives, including respectful communication, empathetic management, and recognition of individual capabilities. Implementing such structured and holistic human resource practices is essential for maintaining high-

quality care and sustainable performance in demanding environments such as air emergency medical services. [Mihaylova Tsv.]

Students in various professional fields at medical universities represent the future workforce of the healthcare system. Despite being aware of the challenges, there is considerable interest in working in air ambulance services, particularly among students who have a high tolerance for risk and strong resilience.

Salary remains an important motivating factor and should reflect the higher level of risk compared with ground ambulance services.

Additional medical care and preventive activities aimed at reducing occupational risks would also serve as motivating factors for those working in air ambulance services.

In unforeseen circumstances such as war, industrial accidents or natural disasters, many health professionals would temporarily join air ambulance services. Their motivation stems from the psychological reward of helping those in need, despite the risks to their own health and safety.

Competitive pay that reflects the elevated risks, together with careful selection and targeted support for personnel, is critical for the sustainable development of this specialised and demanding field.

The data presented help define the profile of medical professionals who would be suited to work in air ambulance services. Therefore, this study supports workforce planning for this specialised area of medical practice.

ACKNOWLEDGEMENT

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REFERENCES

[1] Blok B, Slagt C, van Geffen GJ, Koch R. Characteristics of trauma patients treated by Helicopter Emergency Medical Service and transported to the hospital by helicopter or ambulance. BMC Emerg Med. 2024 Sep 27;24(1):173. doi: 10.1186/s12873-024-01088-6. PMID: 39333895; PMCID: PMC11437721.

[2] Thomas SH, Thomas SW, Thomas SA, Pathan S. Helicopter emergency medical services literature 1972–2017: Characteristics and Trends. Air Med J. 2019;38(2):115–24.

[3] Schmid M, Schüttler J, Ey K, Reichenbach M, Trimmel H, Mang H. Equipment for pre-hospital airway management on Helicopter Emergency Medical System helicopters in central Europe. Acta Anaesthesiol Scand. 2011 May;55(5):583-7. doi: 10.1111/j.1399-6576.2011.02418.x. Epub 2011 Mar 21. PMID: 21418154.

[4] Hennelly D, Deasy C, Jennings P, O'Donnell C, Masterson S. The Development of helicopter emergency medical services in the republic of Ireland. Air Med J. 2023;42(3):150–6.

[5] Center for Emergency Medical Care by Air at the Ministry of Health of the Republic of Bulgaria – official information on the activities according to Order No. 15-185/12.06.2025 of the Director of the Center for Emergency Medical Care by Air [in Bulgarian]

[6] Hoogerwerf N, Heijne A, Geeraedts LM Jr, van Riessen C, Scheffer GJ. Nachtelijke inzet Helikopter-Mobiel Medisch Team: ervaringen van 2 jaar in de Acute Zorgregio Oost Helicopter emergency medical service missions at night: 2 years of experience in the Dutch Regional Emergency Healthcare Network East]. Ned Tijdschr Geneeskd. 2010;154:A2149. Dutch. PMID: 20977787.

[7] Hinkelbein J, Schwalbe M, Genzwuerker HV. Helicopter emergency medical services accident rates in different international air rescue systems. Open Access Emerg Med. 2010 Apr 21;2:45-9. doi: 10.2147/oaem.s9120. PMID: 27147837; PMCID: PMC4806826.

[8] Spoelder EJ, Tacken MCT, van Geffen GJ, Slagt C. Helicopter transport of critical care COVID-19 patients in the Netherlands: protection against COVID-19 exposure-a challenge to critical care retrieval personnel in a novel operation. Scand J Trauma Resusc Emerg Med. 2021 Feb 26;29(1):41. doi: 10.1186/s13049-021-00845-x. PMID: 33637112; PMCID: PMC7909374.

[9] Van Herpen, Merel et al. Wellbeing of Helicopter Emergency Medical Services (HEMS) Personnel in a Challenging Work Context: A Qualitative Study, June 2023, Prehospital and disaster medicine, DOI: 10.1017/S1049023X23004193

[10] Mihaylova Tsv., Role of motivation in the management of medical specialists in hospital care, Sofia, 2014 [in Bulgarian]