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ACHIEVEMENT MOTIVATION AND ATTITUDE OF MEDICAL LABORATORY ASSISTANTS TO CONTINUING EDUCATION

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Abstract. *Introduction.* The problem of improving competence by means of continuing education of health specialists is not sufficiently discussed and studied, especially in terms of medical laboratory assistants. The emphasis of the present study is on the ability to update achievement motivation of laboratory assistants through new opportunities and forms of continuing professional education. Their interest in continuing education indicates an aspiration for improving their professional competence with respect to innovative professional practices including dynamically changing methods, technologies and devices facilitating health examinations that reflect the highly significant results of their work for the health and life of their patients.

The *aim* of the present research is to study the achievement motivation of students and medical laboratory technicians and its influence on the main variables and descriptors of the attitude towards continuous learning.

Materials and research methods. The studied persons represent three target groups involved in continuing professional education – in-service medical laboratory assistants, heads of medical laboratories and students enrolled in the programme of Medical Laboratory Assistant at Bulgarian medical colleges. The methodological tools comprise standardised psychological tests, as well as questionnaires developed for the purposes of the specific study.

Results and scientific novelty. The main results support the thesis that motivation for achievement is updated in activities and situations where professional success is subjectively important and there are clear criteria of success or failure. The interest in continuing education depends on the motivation for achievement as a tendency in various individuals.

The higher achievement motivation determines a stronger need to improve professional competences, aspiration to acquire a graduate degree in their professional field, preferences to specialisations as a form of continuing learning and understanding of continuing education as a manifestation of the desire for new knowledge.

The results from the study may enrich the existing research data on the application of achievement motivation theory as an explanatory model of life-long learning behaviour, which may become an effective way to tackle the rapidly ageing and half-life of knowledge in medicine and technology.

Practical significance. The applicability of the results is very clearly visible in the formulated thesis of the necessary change in the educational policy in the country through new forms of continuous education of medical laboratory assistants which would update their achievement motivation and would result in increase in the efficiency of their professional functioning.

Keywords: achievement motivation, motivation to avoid failure, professional competence, professional training, continuous learning, medical laboratory assistants.

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МОТИВАЦИЯ ДОСТИЖЕНИЙ И ОТНОШЕНИЕ МЕДИЦИНСКИХ ЛАБОРАНТОВ К НЕПРЕРЫВНОМУ ОБУЧЕНИЮ

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Аннотация. *Введение.* Проблема повышения компетентности путем непрерывного обучения специалистов здравоохранения, в частности медицинских лаборантов, недостаточно изучена. Основное внимание в настоящем исследовании уделяется возможности актуализировать мотивацию достижений лаборантов посредством новых методов и форм непрерывного профессионального образования.

Интерес лаборантов к непрерывному обучению является индикатором стремления к повышению их профессиональной компетентности в условиях инновативности профессии с ее динамически меняющимися методами, технологиями и аппаратурой для медицинских исследований и при высокой значимости результатов их работы для здоровья и жизни людей.

Цель работы – исследовать мотивацию достижений у студентов и медицинских лаборантов и ее влияние на основные переменные и дескрипторы отношения к непрерывному обучению.

Материалы и методы. Респонденты являются представителями трех целевых групп, имеющих отношение к непрерывному обучению в профессии: практикующие медицинские лаборанты, руководители медицинских лабораторий и студенты специальности «Медицинский лаборант» в болгарских медицинских колледжах. Методический инструментарий включает в себя стандартизированные психологические тесты, а также вопросники, разработанные для целей конкретного исследования.

Результаты и научная новизна. Основные результаты работы обосновывают тезис о том, что мотивация достижений становится актуальной в действиях и ситуациях, когда успех в профессии субъективно значим и существуют четкие критерии успеха или неудачи. Готовность к непрерывному обучению зависит от мотивации достижений как личностной тенденции.

Более высокая мотивация достижений обуславливает более сильную потребность в повышении профессиональных компетенций, стремление получить ученую степень в своей профессиональной области, предпочтение специализации как формы непрерывного обучения и понимание непрерывного образования как проявление стремления к новым знаниям.

Результаты исследования могут обогатить существующие данные по применению теории мотивации достижений в качестве объяснительной модели поведения при непрерывном обучении, что может стать эффективным способом решения проблемы быстрого старения и периода полураспада знаний в медицине и технологиях.

Практическая значимость. Применимость результатов выражается особенно четко в сформулированном тезисе о необходимом изменении образовательной политики страны посредством новых форм непрерывного обучения для медицинских лаборантов, которые смогут актуализировать свою мотивацию достижений и в результате повысить эффективность их функционирования в профессии.

Ключевые слова: мотивация достижения, мотивация к избеганию неудач, профессиональная компетенция, профессиональное обучение, непрерывное обучение, медицинские лаборанты.

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1. Introduction

The world Coronavirus (COVID-19) pandemic put to the test people's ability to cope with complex and challenging situations involving health and life threats. The biggest challenge was observed in the potential of the medical specialists to urgently add new competences for meeting the highest standards in diagnostics, examination and treatment that have an extreme impact on public health. The same challenges were faced by medical laboratory assistants in the months following the pandemic outbreak.

On the one hand, those who voluntarily took the challenges of the pandemic situation were expected to undergo training by means of new, unknown diagnostic methods and devices. On the other hand, they had to bear the liability for the precision and objectivity of the clinical results, with the clear idea that a wrong laboratory result may have serious and dangerous consequences for people's health. They voluntarily demonstrated aspiration for the achievement of difficult goals and an aptitude to cope in the fastest and the best possible manner – phenomena contained in the construct of achievement motivation (AchM).

The present study was carried out before the pandemic and was inspired by the conviction that the profession of the medical laboratory assistant generally presupposes constant improvement of competence, in compliance with the dynamics in the development of medical science and technological innovation of the profession.

In the pandemic situation, additional arguments were disclosed and the two problems related to the activity of medical laboratory assistants were posed even more urgently: the need of continuing professional education and the level of their achievement motivation as conditions for efficient professional activity.

The study of the dependence between achievement motivation and the interests of laboratory assistants in continuous learning (CL) has a theoretical and practical significance due to several considerations. Firstly, a significant part of the studies on individual achievement motivation proves its connection to the results of the learning process and to professional development and success, which is probably valid for continuing learning. Secondly, empirical results allude to possibilities and conditions of the professional or learning environment that stimulate achievement motivation in learners and in-service specialists. Therefore, state educational policy and work organisation in medical laboratories could provide more opportunities for the expression of achievement motivation in medical laboratory assistants. Unfortunately, we could not find any data from studies on achievement motivation in medical specialists, including medical laboratory assistants, in existing research.

The addition of empirical data on this professional community may enrich the information and facilitate the understanding of the connection between achievement motivation and different forms of learning. The empirical data presented in this article are part of a much wider study of objective and subjective factors of continuous learning of medical laboratory assistants.

The **objective** of the present study is to establish the influence of achievement motivation in students and in-service medical laboratory assistants on their interest in continuous learning.

Tasks of the study. The following shall be established step by step: (T.1) the type and level of achievement motivation of current medical laboratory assistants and students enrolled in medical laboratory assistant courses; (T.2) the influence of achievement motivation on variables describing the interest in continuous learning; (T.3) the dependence of AchM on environmental factors and demographic parameters.

Main hypothesis. It can be expected that achievement motivation is a predictor of the interest of medical laboratory assistants in continuous professional learning and that the manifestation of achievement motivation depends on several conditions of their professional environment, potentially stimulating their activity towards various forms of continuous learning.

Applicability of the results. The results may contribute to a change in the educational policy in the country by means of new forms of continuous learning and education for medical laboratory assistants, who shall update their achievement motivation, thus increasing the efficiency of their professional activities.

2. Literature Review

2.1. Achievement motivation

Studies on achievement motivation have a long history, dating back to the introduction of psychology as a scientific subject in the 18th–19th century. Since then, the theory of achievement motivation (AchM) is being constantly upgraded, showing a different degree of completion, conceptual consistency and applicability of the main concepts. Achievement motivation relates to and is regarded within the frameworks of various other constructs, such as achievement goals, achievement goal orientation, ability self-concepts, achievement values, and achievement motives [1–5].

The problem of achievement motivation has provoked interest in several aspects: firstly – of the needs inducing and directing the individual towards a specific behaviour; secondly – within the aspect of achievement motivation as a predictor of the success of the activity, satisfaction and professional development; thirdly – the possibilities for stimulation of achievement motivation through environmental factors.

Most often achievement motivation is defined by researchers using two concepts: as a need of excellent, significant achievements (n Achievement), spontaneous aspiration for good performance and success, regardless of the rewards [6–8, 10–11], as a motivation for achievements corresponding to the desire of overcoming obstacles and mastering difficult challenges, and manifestation of more serious persistence in the activity [6, 9, 10–11].

This allows John Atkinson in his Theory of Achievement Motivation to include a risk assumption model in types of behaviour with their expectations for success and avoidance of risk [12]. Very often the two concepts of *need of achievement* and *motive for achievement* are used as synonyms [13–15].

This poses an additional problem, existing in a significant part of the psychological theories on the obscurity in the differentiation of the meanings of *need* (spontaneous, unaddressed need, deficit), *motive* (a complex of need and image of an object able to satisfy it) and *motivation* (motives, values, convictions, etc., often a complex thereof, which govern the behaviour).

Regardless of the interpretation (either as a *need* or as a *motive*), researchers support the idea that *aspiration for achievement* is related to a comparison with some standard for outstanding achievements, mastering of complex tasks through individual efforts. Even when the individual is not able to achieve the goal, he/she may continue to exert an effort, regardless of the results of others. Individuals who express their need of achievement turn their attention to realistic but challenging goals [7–11].

2.1.1. Connection of achievement motivation to competence, high standards and self-esteem

Back in the middle of the 19th century, William James constructed a theory on the connection of success, aspiration for competence, related to the self-esteem of the individual under the formula "self-esteem = success/pretensions". According to this formula, self-respect increases in case of actual success or withdrawal from it. Moreover, success not always leads to enrichment of the personality [16–17]. Murray also relates the need of achievement to the realisation of one's potential, thus leading to an increase of self-respect [18].

Their theses are constantly being re-examined. For instance, Harter [19] confirms the fact that the difference in the individual subjective assessments of personal competence in different areas is connected to self-esteem. She also concludes that not competence by itself, but rather competence in areas important to the individual is strongly correlated to self-esteem [19, 4]. Thus, achievement motivation is expressed as a tendency of the aspiration for competence energising and inducing competence related types of behaviour [10, 20–21]. The availability of such a tendency explains why and how people aspiration for competence in an area that would bring them success and increase of self-esteem, why they work hard, try to accomplish their tasks well and concentrate on their completion. On the basis of previous personally shown abilities and competence of the individual or in comparison to the abilities and competence of others, the individual believes that skills and competence influence their results [21]. And *vice versa* – they avoid such behaviour in areas of incompetence, that is likely to bring them failure and decreased self-respect, feeling of inability and shame, and therefore they show no excessive efforts and reluctance to perform the task. According to Hough, achievements are a good predictor of important results in life – including professional and educational success [10, 20].

Similar ideas of the connection between achievement motivation and self-esteem are offered by Covington [22], who applies a targeted approach within the framework of The Self-Worthy Theory. According to this theory, the objectives determined by achievement motivation, reflect individual aspiration for the keeping one's face as being competent and appreciated by others. A measurer of self-esteem is the high ability of achievement (success) and the results of the activity are the measure of one's worth. Goals, on the other hand, may be success-oriented, regardless of others' achievements or striving to acquire a status of a better performer in comparison to others. The ability for achievement is the means which leads to the achievement of the final goal – the expression of one's worth [23].

As long as the update of achievement motivation depends on the subjective assessment of the process and the result of the activity, it is necessary to

specify that assessment itself consists of two parameters: the subjective significance of the result and the judgment for the general competence for the achievement of success [24]. On the other side, the subjective assessment of the process and/or result of the activity contains both a cognitive and affective component. The intensity of the dominating motivational tendency varies depending on the change in the above-indicated parameters both in people motivated to succeed and in those motivated to avoid failure (Mf) [24].

Murray and McClelland regard the aspiration for achievement as a list of values occurring as a result of socialisation, upbringing and education. For Murray, they are based on instincts, needs of achievement, aggression, independence, respect, protection, dominance, avoidance of failure, guardianship, mutual understanding, knowledge, creation, etc. [25, 27].

An emphasis in the McClelland's theory is placed on three most significant groups of needs: need of achievement – defined as a need of competitive success measurable with personal standards of perfection; need of joining and need of power [7–8, 27–28].

At a later stage, another group of needs is included in the McClelland's scheme – the need of competence, which is close to the needs of achievement and includes the desire to feel good, to prove your worth under any circumstances [28].

Such groups of needs which MacClelland outlines as basic for the occupational behaviour of people can be formed and studied in case people recognise possibilities for their satisfaction in their environment [29]. Thus, the theory of achievement motivation is also presented as a theory of acquired, learned needs [8].

Moreover, the theory of achievement motivation is applicable to such contexts and spheres of achievement-directed activities (such as continuing learning), where the individual is responsible for the result [27].

2.1.2. Achievement motivation as a sustainable characteristic feature of the individual

Achievement motivation was first described by Murray [25] as a sustainable characteristic feature of the individual, followed by Heckhausen [26] and other authors [10, 12]. It is seen as a spontaneous desire for achievement of a specific level of performance of an activity. It determines the attempts for an increase or maintenance of an optimal ability of the personality to overcome obstacles, to show strong will, to perform difficult activities in a fast and independent manner, for which success or failure criteria can be applied depending on ideal or otherwise high standards and belief in the possibilities for success [10, 12, 30].

Murray [25], McClelland [14], Cigularov [12], Metz [10], Heckhousen [26], Paspalanov and Shtetinski [24] discuss two different motivation tendencies related to activity. They are motivation for success and motivation to avoid failure [26]. One of those tendencies dominates in the individual and achievement motivation reflects a sustainable and strong need of the individual to achieve the desired result. The motivation to avoid failure is based on a disturbing attitude towards any possible failure and is shown as a mental mechanism of avoiding predictable mistakes and failure or refraining from action because of fear of failure and impact on the self-esteem. Murray describes the avoidance of failure as a need to terminate inconvenient discrediting situations or to avoid conditions which may lead to a downgrade, contempt, mockery or indifference shown by others [10]. Additionally, they restructure their goals in a closer perspective and probably demonstrate a more non-realistic individual standard in the complexity of the undertaken tasks [31].

Thus, individuals are motivated towards success by focusing their attention on the goal. Those motivated to avoid failure focus their attention on the rejection and avoidance of errors, even if this requires withdrawal from the goal or its complete or partial transformation [32]. The need of achievement may be clarified through the following descriptors: independent and active performance of something difficult, continuous and multiple efforts related to overcoming obstacles and achievement of high results; unidirectional focusing on a high and distant goal, determination for success; enjoying competition with others; strong will for overcoming boredom and fatigue; organisation and management of people, handling of physical objects or ideas; improvement [10, 18, 32]. The motivation for achievement is directed towards a specific final result – the achievement of success or avoidance of failure, which has been obtained thanks to one's abilities. Therefore, the revision of goals is typical for achievement motivation [33]. Paspalanov and Shtetinski share the claim that the need of achievement is a sustainable individual characteristic and offer a methodology, an adapted variant of McClelland's test, for a reliable instrument of differentiating people with high and low need of achievement [24].

Veroff also discusses two other forms of achievement motivation. One of them is directed towards personally selected goals for achievement and is regarded by the author as autonomous achievement motivation. It includes internal (internalised) personal standards of assessment and does not involve social comparison. The reward for the performance is inherent to performance itself as a desire to complete a task and devotion to the activity leading to the fulfilment of some standard, which is inherent to the internal achievement motivation. Successful achievement subsequently may lead to external rewards – an increase in remuneration, reputation, etc. [34, 23]

According to Veroff, the second form of achievement motivation is achievement motivation by means of social comparison. It is shown in the search for knowledge about oneself through a comparison with others. It may be used to either assess and improve one's abilities (internal motive) or obtain social approval (external motive) [23]. Therefore, it is possible to have a success-oriented behaviour with entirely external motivation, and behaviour managed by both internal and external achievement motivation [34].

The high levels of achievement motivation can lead to individual success and satisfaction with a particular activity, which may affect the balance of one's own professional and personal life. On the other hand, people with high achievement motivation may be interested in coping and their success but not in the success and coping of the others [10, 11]. McClelland sees the application of the theory of achievement motivation on labour motivation in two aspects: 1) as a basis for an adequacy programme between employees' motivation profiles and the requirements of the specific activity, for workers to satisfy optimally their leading needs by occupying a particular position; 2) as a basis for an educational programme that trains achievement-oriented behaviour and goal-setting [35].

Currently, achievement motivation is a subject of the increased interest of study both in psychology where research focuses on a specific variety of occupational activity and in the field of sports, organisational psychology, developmental and social psychology [36].

Success-driven learners usually attribute their success and higher academic achievement to their abilities and efforts and not to luck. They assume higher responsibility for their results in comparison to individuals with lower achievements, who more frequently explain the results as externally controlled and independent of their abilities, skills and efforts. Hsieh [13] has found that the relation of success to abilities and bigger efforts incorporated in learning leads to high levels of satisfaction and bigger rewards. Therefore, the subsequent formation of the belief that individual abilities, skills and efforts are the reasons for one's success may be useful for maximisation of learners' academic results [13].

A significant part of the studies is based on the assumption that the intensity of the needs and the achievement motives in each individual depend both on the specific personality within the relevant situation in life, and the environment [2, 10, 37–39].

Empirical evidence in the sphere of teaching high school and undergraduate students and more rarely among entrepreneurs and other respondents, proves the suppositions of influence on the achievement motivation of the stimuli from the environment and the organisation of the activity – e.g. primary socialisation, methods of presenting information, actual achievements at a later stage of life, occupational ethics, rewards, pandemics [6, 10, 37, 40, 41].

The present publication is based on the summary of Dweck and Elliott's thesis which states that achievement motivation reflects the individual's level of motivation to realise the types of behaviour based on a complex of needs of achievement and competence, the expectation of success in a specific task; and individual significance of success, bound by self-esteem. Expectation of success, on the other hand, includes a whole system of mutually asserted assessments, prognoses, standards and emotional reactions which could be irrational, incorrect and contradictory to a different degree [42].

The authors share the opinion that the application of this motivation theory may also be further extended in the direction of the educational and professional achievements, as long as student medical laboratory assistants are the future professionals who shall adopt new methodologies for diagnosing new and unknown diseases, for which the COVID-19 pandemics is the most recent evidence.

In-service laboratory assistants may be the potential future owners of medical laboratories expected to incorporate the newest and advanced methods and appliances to provide aid at a high level of responsibility for their patients' health.

2.2. Continuous learning

2.2.1. The concepts of life-long learning, permanent education, continuing education, continuous learning

As in the achievement motivation theory, there is a mixture and interreplacement of the concepts of life-long learning, permanent education, continuing education and continuous learning. The idea of continuing education found support among many politicians and scholars and was spread in the 1960s throughout the world. In 1973, the Educational Commission of UNESCO determined the strategy of educational development serving as a foundation for the idea of continuous learning. This concept is now used throughout the whole world although a standard model of such an educational system does not exist [43]. Some authors are inclined to equalise education with learning and others admit that the concept of "continuing education" contains ambiguity which is overcome with its turning from theory to educational practice and educational experience [43]. Continuing education as a means of ensuring life-long learning is directed towards systematic mastering of knowledge, skills, habits and relations whose final goal is the personal and professional realisation of individuals. It also influences motivation and the increasing ability of people to be involved in a self-management educational activity. Karapenchev [43] defines life-long learning from an institutional point of view as "a system of education ensuring a framework for an integral educational process of people of all ages, which shall be carried out in different ways, at different times or parallel in different places, i.e. as, when and

where necessary and possible" [43]. Thus life-long learning shall cover all educative and educational activities at all ages – from the cradle to old age [44–45].

Knapper and Copley [46] offer an individual approach while defining the concept: the main specifications of life-long learning are the availability of cognitive goals, giving individuals the grounds to satisfy their need of knowledge, which they will use for a long period of time [47].

The theory of permanent education is regarded as part of life-long learning which emphasises the continuing of education and training throughout the mature years of the individual [44]. According to Katanski, human resource development through permanent studies and education throughout the whole life should be assumed as a necessity without an alternative [44]. Continuous professional development may contribute to the safe and efficient practice of professionals.

Life-long learning and development in our dynamic world requires new types of technological, digital and social competences and is often regarded as a guarantee for success in a personal and professional aspect. Exactly the aspiration for success can be the point of intersection between continuous learning (CL) and the individual's tendency for "achievement motivation" [48]. The process of continuous learning, as well as the achievement motivation, depend both on subjective factors – the individual, unique needs of people and their specific abilities, and on objective environmental factors, creating conditions for the manifestation of the subjective factors. According to contemporary educational psychology, "learning is an active process of individual construction and reconstruction of knowledge, competences, values and attitudes to achieve unity between professional and personal development" [48].

Hartzell [49] defends the thesis that the theory of teaching adults occupies an important place in the basic and post-graduation medical education directed towards abilities for independent life-long learning. The main emphasis of this theory is that adult people study best when they have a cognitive motivation to learn something which they can use independently in an actual working environment, to develop their efficiency. In such a case, the stimulus is more internal than external [17].

Very often the terms for education for adults, regular education and continuing education are used as synonyms of continuous professional development [50–51].

Prothero [52] views education and training as "processes which could be used by people for self-development – both personal and professional".

Within the context of the present study, the attitude towards CL is identified through personal readiness, activity and orientation of each participant in the study towards continuing education with its forms, components and activities.

For the purposes of this study we refer to postgraduate professional education as continuous learning. According to Ordinance №1 of the Bulgarian law, it includes specialisation and continuous qualification. Specialisation aims at mastering a principal or profiled speciality from the specialities nomenclature within the healthcare system, and the continuous qualification is an ongoing process of learning after the acquisition of the right to exercise the profession in the form of courses, individual studies, professional qualification programs, participation in workshops, congresses, conferences, etc.[1]

As it has already been clarified, achievement motivation influences the goals and contents of human activity and is an important precondition for success both in the professional and in the educational activity at different stages of one's life [53].

2.2.2. Specification of the profession of medical laboratory assistant

Laboratory assistants are healthcare professionals whose profession is recognised as regulated under Directive 2005/36/EC.[2] The regulation of professions recognises the transparency of professional qualifications as a formal expression of professional competence. More specifically, EU member states are encouraged to stimulate the continuous professional development (CPD) of medical specialists.

The scope of the continuous professional development specified in Directive 2013/55/EU is "technical, scientific, regulatory and ethical changes and motivation of the specialists to participate in life-long learning, which is significant for their profession".[3]

All specialists should comply with the rules for good medical practice while exercising their profession within their competence. They are obliged to increase their professional qualification through continuing education. The process of postgraduate learning is coordinated and registered by the Bulgarian Association of Healthcare Professionals.[4]

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[1] Наредба №1 за придобиване на специалност в системата на здравеопазването [Internet]. 2015 Dec 28 [cited 2016 Sep 15]. Available from: https://www.lex.bg/laws/ldoc/2136417712 (In Bulgarian)

[2] European Union, Directive 2005/36/EC of the European Parliament and of the Council. Official Journal of the European Union L 255/22 [Internet]. 2005 Sept 30 [cited 2016 Nov 23]. Available from: https://eur-lex.europa.eu/legal-content/BG/TXT/?uri=celex%3A32005L0036

[3] European Union, DIRECTIVE 2013/55/EU of 20 November 2013. Official Journal of the European Union L 354/132 [Internet]; 2013 Dec 28 [cited 2016 Dec 20]. Available from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0132:0170:en:PDF

[4] ВАНРN = Българска асоциация на професионалистите по здравни грижи; Закон за съсловните организации на медицинските сестри, акушерките и асоциираните медицински специалисти, на зъботехниците и на помощник-фармацевтите чл. 39 (5) = Bulgarian Association of Health Professionals in Nursing. Law on the professional Organizations of Nurses, Midwives and Associated Professionals Dental Practitioners Assistant Pharmacists [Internet]. 2005 Jun 3 [cited 2016 Dec 20]. Available from: https://www.lex.bg/laws/ldoc/2135504377

The problem with the update of professional knowledge and competences becomes more and more pertinent for all health professions, considering the rapidly outdating knowledge in medicine and technological development. Several authors point out that investment in professional knowledge ensues from the comprehension of the fact that the information delivered in any course of CPD becomes obsolete within two to five years [54–55]. This problem is related to the guarantee of quality in patient care [56].

Grozdeva reviews the links between new technologies in education and CL and business requirements and provides data on a fact indicated by Danailova, that in the USA a unit measure called "Half-life for ageing of knowledge", which assesses the ageing of knowledge. It is believed that for this period professional competence is reduced by half and currently this period is determined to be between 4 and 5 years [57].

The main suppliers of various forms of continuous learning are universities, whose conduct is regulated by an Ordinance, which does not envisage an opportunity for specialisation for medical laboratory assistants. At this stage, laboratory assistants in Bulgaria are not able to study for a master's degree in their principal area. This limits laboratory assistants to medical laboratories in their opportunities for continuous professional and career development (Ordinance No: 1).

3. Materials and Methods

3.1. Contingent

The empirical study has been carried out with respondents from three target groups:

The first group – 42 first- and second-year students enrolled in the laboratory assistant course at the Medical College of Trakia University of Stara Zagora, Bulgaria.

– The average age of the students covered by the survey is 20.8 years, the minimum age being 20 years and the maximum – 37 years.

– The distribution of the students participating in the survey according to sex is the following: men – 7.14 %, women – 83.33 %.

The second group – 111 laboratory assistants from laboratories in three areas of South Bulgaria. From them, depending on the population of the cities in which they work and live – working in cities with a population from 100 to 200 thousand people – 48.64 %, working in cities with a population from 50 to 100 thousand people – 36.03 %; working in cities with up to 50 thousand people – 7.21 %; the distribution of the laboratory assistants by *age* is: below 30 years of age – 13.64 %; from 31 to 40 years – 13.64 %; from 34 to 40 years – 14.55 %;

from 41 to 50 years – 73.16 %; from 51 to 60 years – 20.00 %; over the age of 60 – 3.64 %.

The third group – 37 laboratory physicians with different clinical specialities, some of whom – owners of laboratories in 4 regions of the country. The questions they received are comparable by content to the questions for the other two target groups and reflect another point of view regarding the requirements and needs of continuous learning practices for laboratory assistants.

The empirical data presented in this article have been collected by means of a direct questionnaire. The questionnaire contains standardised psychological, as well as diagnostic tests on the attitude towards continuing education expressed by laboratory assistants. The tests have been developed for the specific survey. The modules in the questionnaire enable the comparison of the information for the different target groups because of the relevance of the questions.

3.2. The methodological set of tools

The methodological tools used for the survey presented in this publication include:

– *A test studying achievement motivation* (AchM 4) – under D. McClelland [4] (Bulgarian adaptation and standardisation – I. Paspalanov and D. Shtetinski IP – BAS) [20]. Achievement motivation is studied as a sustainable feature of the personality, combining individual differences in the direction and level of achievements and motives urging the individual to act. Therefore, it is an important precondition for success in human activities.

The test contains 43 items related to the psychological specifications of any activity connected to achievements and experiences, estimates and ways of acting related to this activity, with a three-step Likert scale for answers. The test studies the motivation for success: direction towards planning and successful result, fear of failure, responsibility for the performance of the activity, readiness for assuming the risk for the achievement of efficiency in work and life. It is used for the analysis of the degree of motivation for success in the activity as personal diagnostics. The coefficient of validity and reliability of the methodology is α Cronbach = 0.86.

As a consequence of the expectations for success and the fear of failure, two types of behavioural orientations occur: 1) the orientation for approximation, expressed in the readiness for action (as a consequence of the expectation for success) and 2) the orientation for the avoidance of action (as a consequence of the expectation for failure). This corresponds to two types of personal factors determining the direction of human activity: the motivation to achieve success or the expectations for success (Ms) and the motivation to avoid failure or the fear of failure (Mf). The predominance of one of these motivators determines the

dominating motivation tendency for achievement in the individual. According to this point of view, the individuals for whom the fear of failure prevails over the motivation for success avoid situations connected with achievements. The individual's attitude towards the assigned task is also taken into account – the extent to which it is important and stimulating for them.

– *Questionnaire for the study on the behavioural and cognitive components of the readiness for continuous learning* and profiled specialisation for laboratory assistants – in two modules:

Main determinants of the interest in continuous learning:

• Interest in the opportunities for continuous learning for laboratory assistants;

• Declared needs of additional preparation in areas related to professional activity;

• Subjective assessment of the respondents' need of constant update of their professional knowledge;

– *Descriptors of the readiness for* continuous learning (CL):

• Information about the contents of CL;

• Main sources of information about CL;

• Satisfaction with the forms of continuous learning;

• Stimuli for CL for laboratory assistants.

Statistical methods

The results have been statistically processed using dispersion analyses ANOVA/MANOVA, Pearson correlation analysis, Student – Fischer t-test and percentage analysis of the frequency of answers of the respondents.

4. Results and Discussion

4.1. Results

Results under T1: The type and level of achievement motivation of in-service laboratory assistants and the students following a laboratory assistant course are visualised in Fig. 1.

As seen from Fig. 1, a low degree of achievement motivation (we interpret it as a motivation for the avoidance of failure) is demonstrated by 11.9 % of the students and 4.54 % of the in-service laboratory assistants. The highest share of the respondents with a medium level of AchM in both target groups belongs to 66.67 % of the students and 69.09 % of the laboratory assistants. Highly motivated for success are 14.29 % of the students and a significantly higher percentage of the employees – 20.91 % (Fig. 1). Student-Fischer's t-test shows statistically significant higher AchM in practising laboratory assistants in comparison to the students-laboratory assistants ($t = 2{,}42$; $p < 0{,}05$).

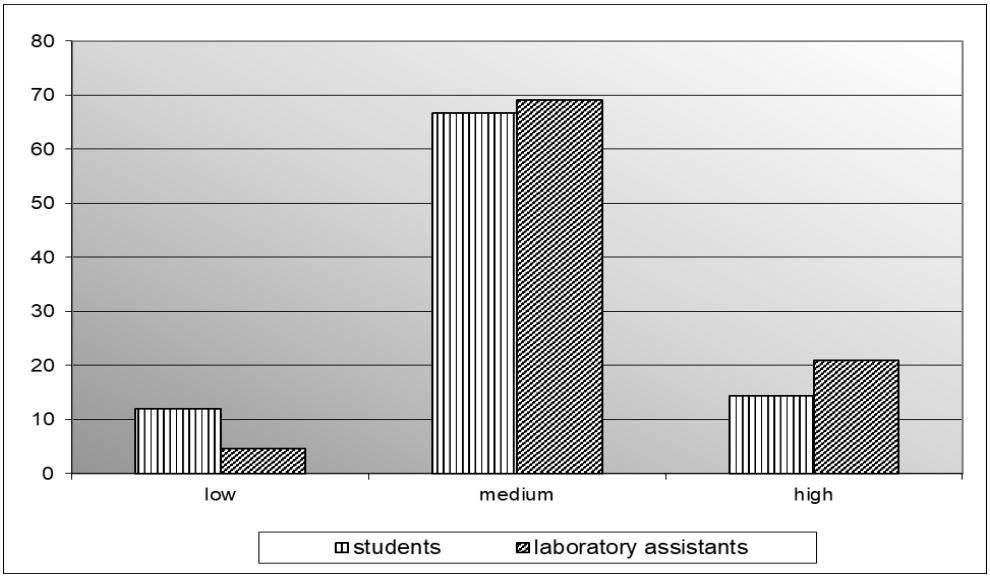

Fig. 1. Achievement motivation of students and laboratory assistants

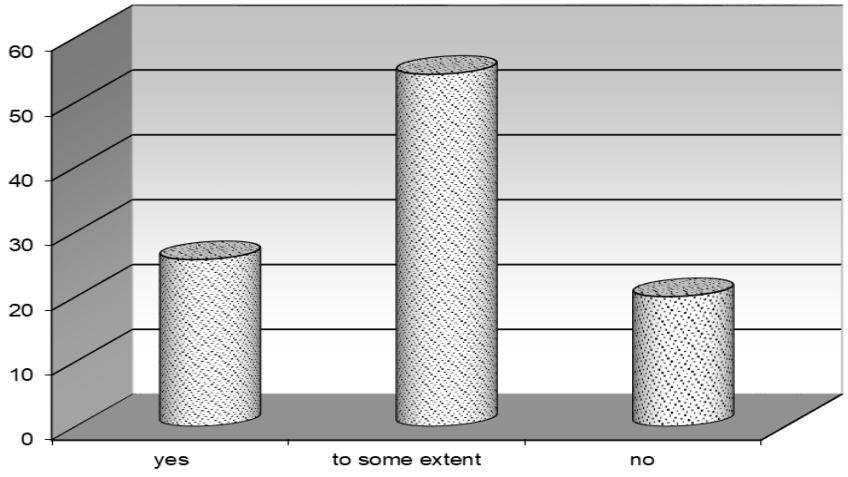

Fig. 2. Assessment of the achievement motivation of laboratory assistants by their laboratory physicians

On the other hand, according to laboratory physicians, one-fourth of the specialists working with them are motivated for achievements (25.71 % and a little more than half of the members of their teams are somehow or on a medium

level motivated for success – 54.29 % (Fig. 2). A considerable part of the laboratory assistants (20.00 %), however, have been assessed with a low AchM by laboratory physicians (Fig. 2). Through the Student – Fischer's t-test it is established that laboratory physicians establish a statistically significant lower level of AchM of the laboratory assistants working with them, in comparison to the level of AchM of the laboratory assistants according to the applied test ($t = 2.15$; $p < 0.05$).

Results under T2: Using an ANOVA dispersion analysis, the influence of the motivation for achievement is established on the main variables and descriptors of the readiness of laboratory assistants for continuous learning.

The laboratory assistants have a statistically significant high level of AchM, in comparison with those who are motivated to avoid failure (Table 1):

- also have a higher need of professional competence *in a similar area to the one* in which they operate ($F = 3,22$; $p < 0.05$; $M = 1,82$);

- they express more frequently a desire to acquire *a higher educational and qualification degree* ($F = 3,08$; $p < 0.05$; $M = 3,38$);

- they believe more frequently that continuous learning is *a precondition for stimulation of the aspiration for new knowledge* ($F = 5,50$; $p < 0,005$; $M = 3,65$);

- they have a stronger preference for a professional *specialisation* as a form of continuous learning ($F = 3,51$; $p < 0,005$; $M = 1,95$) in comparison to those laboratory assistants with a low level of motivation for achievements ($M = 1,40$).

Table 1

Influence of the achievement motivation of laboratory assistants on continuous learning (ANOVA)

Independent variable/ Factor	**Dependent variable**	**Degrees of the independent variable/factor**	**Mean**	**F**	**p**	**T**
Motivation for achievement	Need of professional competence in a similar area to the area of practice	Mf	1,54	3,22	$p < 0.05$	$t_{2,3} = 2,38$ $p < 0.05$
		AchM	1,82			
	Desire to acquire a higher educational and qualification degree	Mf	1,80	6,08	$p < 0,005$	$t_{1,3} = 3,38$ $p < 0,005$
		AchM	3,38			
	CL is a precondition for stimulation of the aspiration for obtaining new knowledge	Mf	2,20	5,50	$p < 0,005$	$t_{1,3} = 5,30$ $p < 0,005$
		AchM	3,65			
	Preference of specialisation as a form of CL	Mf	1,40	6,51	$p < 0,005$	$t_{1,3} = 3,80$ $p < 0,005$
		AchM	1,95			

Results under T3: The Pearson correlation analysis shows dependence between AchM and the type of laboratories in which in-service laboratory assistants operate. Laboratory assistants in clinical laboratories have a higher statistically significant level of AchM, in comparison with the laboratory assistants from all other types of laboratories ($R = 0,31$; $p < 0,05$). Compared to them, those working in microbiology and immunology laboratories have a lower statistically significant AchM and are more often motivated to avoid failure ($R = 0,29$; $p < 0,05$). This fact is very clearly visualised in Table 2, showing that a higher level of AchM is only attributable to laboratory assistants in clinical laboratories and none of the laboratory assistants from the other types of laboratories.

Table 2

Cross table of the distribution of the laboratory assistants according to their achievement motivation and the type of laboratory in which they operate

	Motivation for avoidance of failure	**Medium AchM**	**High AchM**
Clinical laboratory	2,90 %	68,12 %	28,99 %
Immunology laboratory	10,25 %	89,75 %	0,00 %
Microbiology laboratory	11,76 %	88,24 %	0,00 %

A statistically significant, though low correlation exists between the educational degree and AchM ($R = 0,21$; $p < 0.05$). The laboratory assistants with a bachelor's degree in Healthcare Management have a higher level of AchM in comparison to those who have graduated from a medical college as professional bachelors.

The results in Table 3 also show that none of the laboratory assistants in the small populated areas (with a population below 50 000) has a higher motivation for achievement, which is typical of around ¼ of those working in the cities with a population higher than 50, 100 and 200 thousand.

Table 3

Cross table of the distribution of laboratory assistants according to their motivation for success and the size of the city in which they work and live

Population	**Motivation for avoidance of failure**	**Medium AchM**	**High AchM**
Up to 50 000	0,00 %	100,00 %	0,00 %
50-100 000	10,00 %	67,50 %	22,50 %
100-200 000	0,00 %	74,51 %	25,49 %

This is also confirmed by another correlation dependence (Table 4) – the laboratory assistants who live in big cities seek development in a higher educational degree more categorically and in a statistically significant way ($R = 0,23$; $p < 0.05$).

Table 4

Cross-table of the distribution of the laboratory assistants according to their aspiration for a higher educational and qualification degree and the size of the city in which they work and live

Population of the cities	**Aspiration for a higher educational and qualification degree**			
	No	**Rather no**	**Rather yes**	**Categorically yes**
Up to 50 000	42,86 %	28,57 %	28,57 %	0,00 %
50-100 000	23,8 %	2,56 %	51,28 %	23,08 %
100-200 000	15,38 %	13,46 %	30,77 %	40,38 %

4.2. Discussion

The empirical fact that the laboratory assistants who are motivated for achievement outnumber from a statistically significant point of view the students enrolled in a laboratory science course (Fig. 1) shows that those working in the actual laboratory environment with specification of the professional activity are more strongly provoked to update the achievement motivation compared to those immersed in the educational environment at the university. Probably, this fact is a result of the challenge which in-service laboratory assistants face for constant improvement of their competence and skills because of frequent changes and innovations in the methodologies and equipment for medical examinations in a significant part of the laboratories. The need of overcoming challenges is likely to update the achievement motivation of the practising laboratory assistants [10–11].

Probably students, as they are not in an actual professional situation, do not feel so clearly the dynamic factors of the working environment and the profession. Therefore, students who are in the process of fundamental professional training demonstrate statistically significant lower AchM. The educational situation (studying at a medical college) with its criteria for success and failure in the course of studies is not such a strong stimulus of AchM, as the criteria of success and failure in the profession. McClelland's thesis that the need of achievement may be formed and learned on condition that students would see in their environment enough opportunities for its satisfaction, is important for the educational practice [29].

The different subjects included in the curriculum for the laboratory assistant course focus on separate aspects of medical science where each has a specific set of knowledge for the professional careers of the laboratory assistants. Since obtaining detailed knowledge and skills for work with specific technologies is not possible, the focus of the studies is mostly on the basic principles of laboratory medicine. Thus, laboratory assistants should acquire motivation for life-long learning and fast professional adaptation [58].

A study in Bulgaria among healthcare professionals from different professions shows similar results regarding the individuals with a motivation to avoid failure – 4.0%. The share of respondents with medium (55 %) and high (41 %) achievement motivation is higher. Such differences are probably the result of professional differences, objective opportunities for career development and the professional environment in which the specialists implement their knowledge and skills [59].

The results of the survey (Table 1) fully confirm the point of view of a large number of researchers of AchM [12, 14, 19, 21, 25, 26] etc., that the motive for achievements determines the attempts for improvement of the individual's competence in areas in which success is of great subjective significance (such as professional success) and for which clear criteria of success or failure are applied, as is in the activity of the laboratory assistants. Precision, realisation and errors in the laboratory results are objective criteria for the quality of performance of the tasks.

Moreover, the above empirical fact also confirms the thesis that the update of achievement motivation depends on the subjective assessment of the process and result of the activity (acquisition of new knowledge and preferences for specialisations as a form of AchM) (e.g. [60]). There is also a connection between achievement motivation and the aspiration for professional development, as identified in previous studies [10, 43].

In the present study, this aspiration is manifested through the desire for the acquisition of a higher education and qualification degree. Laboratory assistants in Bulgaria graduate from medical colleges as professional bachelors. The dependencies established in the study pose a conceptual problem to the education of medical laboratory assistants, related to their achievement motivation: their need to acquire a higher educational degree in their area faces the lack of such options in the country. The reciprocal dependence is also observed: laboratory assistants who consequently obtain a bachelor's degree in another area, such as Healthcare Management, have a statistically significant higher achievement motivation, in comparison to those who are only professional college graduates.

In his discussion on educational expectations Singh claims that they are linked to academic achievement, referring to research done by Bui, Sanders,

Field and Diego. We view the acquisition of a higher educational degree as an academic achievement, though in another speciality – Healthcare Management

The studies of Sanders, Field and Diego disclose that the educational expectations and academic achievements are mutually predictable and a similar interrelation has also been reported in the study of Bui [61–63].

The present study also confirms the empirical hypothesis of the authors that the influence of academic achievements on educational expectations is stronger than the reverse influence.

On the other hand, the results in Table 1 show that the laboratory assistants with a high achievement motivation perceive continuous learning as a way of not only increasing, but also expanding the competence in similar areas, the final purpose of which is probably better employability. Knapper and Copley state that increasing competence levels by means of continuous learning becomes a realised goal and that it provides laboratory assistants with the possibility to satisfy their needs of knowledge and development [47]. It turns out that AchM, by stimulation of the interest in continuous learning, supports the resolution of the problem described by Ferrel, Brennan and Grozdeva as ageing and half-life of knowledge in the medical and technological professions [54, 55, 57]. On the other hand, the ageing of knowledge is due to the fast innovations and the fact that more than half of the medical techniques become "useless" after 16-18 years [64].

This is a problem of exceptional importance for public health, as the periods between the invention of new technologies, their integration and replacement with new ones become shorter and shorter.

The laboratory assistants, motivated for achievements, express categorical preferences to specialisations as a form of continuous learning, which is currently unavailable in Bulgaria. It turns out that the preferences of practicians correspond to the views of Marope, Chakroun and Holmes [65] that despite the efforts of the higher schools in terms of adequate education, the fast pace of technological obsolescence requires more flexibility of the systems for continuous learning.

The thesis of Dessler and Metz that one of the best ways to motivate people to work is to enrich the work process with challenges capable of satisfying the needs at a higher level and accomplishment of achievement-related goals [10, 66].

An interesting task from a research point of view is to compare the objectively measured level of achievement motivation of laboratory assistants through a reliable psychological test and the subjective judgment of laboratory managers (laboratory physicians), about the AchM of the laboratory assistants working with them (Fig. 2).

According to the results, the laboratory physicians assess the AchM of the laboratory assistants working with them as significantly lower, which could probably determine the decreased efforts of some of the laboratory managers to

stimulate AchM of their laboratory assistants through management influences on the working environment, the relationships within the team and the conditions they create for CL of their staff. As already discussed, some of the studies generate the presumption that the intensity of achievement motivation depends on environmental factors [10, 37, 38]. Underestimating the achievement motivation of the laboratory assistants by the laboratory physicians could be expressed in the restriction of the financial, temporal and other types of support of the laboratory assistance for continuous learning. This could be a secondary impediment to the personal responsibility in the undertaking of training for improving professional competences, which is a key point in the continuous professional and career development of the employees [67].

Moreover, it would be useful if the working environment is structured in the direction of provocation/update of achievement motivation, for instance, through more precise standards of success and failure in the activity in general, setting clearer goals to the teams, providing positive feedback on the performance of the obligations of the laboratory assistants. This could create specific conditions for achievement motivation through clear criteria for the assessment of the results of the performance as favourable or unfavourable [30].

The present survey established one more interesting fact (Table 2): laboratory assistants in clinical laboratories express a higher AchM from a statistically significant point of view in comparison to the laboratory assistants from the other types of laboratories – microbiological and immunological.

This confirms the thesis that when the situation is structured through applicable and subjectively significant criteria of success and competence even in the same profession, this leads to an update of AchM with considerably more employees [10, 12, 29, 30].

Here are the considerations clarifying this argument in the specific case – in the clinical laboratories the following is available:

- larger work dynamics due to the introduction of new parameters; increase in the number of diagnostic methods, expansion of the range of laboratory tests and more frequent changes of the equipment, which requires constant training to keep up with the new technology [68];

- more contacts with patients and colleagues from the clinics;

- more frequent cases of serious clinical conditions, which increases the subjective feeling of responsibility for the result [27] and is a precondition for the activity of clinical thinking in laboratory assistants;

- a more expressed work shift dynamic, including in cases of emergency;

- more continuous practical preparation of the students majoring as laboratory assistants by means of internships in clinical laboratories with in-service laboratory assistants.

All these objective conditions of innovation probably maintain and require from the laboratory assistants a high level of practical and theoretical preparation, provoke a more serious inquisitiveness and interest, which naturally update AchM and determine the interest in CL.

In comparison, the other types of laboratories (microbiology, immunology and parasitology, etc.), experience a relatively routine workload, with regular schedules and procedures, in most cases without direct contact with patients and clinicians, and almost half less loading with practical training (practice) of students. This is another argument confirming the thesis that the intensity of the AchM depends on the environmental specifications [37, 38]

Such processes are expected to be imminent also in microbiology laboratories for several reasons: the progressive ageing of the population would make them increasingly necessary; robotisation, automation and integration into large laboratory teams will also increase. There is already a deficit of well-trained personnel in microbiology laboratories [69]. Environmental changes may lead to the higher activity of the specialists in terms of continuing professional education, as a possibility for coping with the challenges._

Another objective condition also updates AchM and the readiness for CL in laboratory assistants – the number of people and the size of the populated area in which they work and live (Table 3). The empirical fact is that none of the laboratory assistants in the small populated areas (with a population below 50 000) is a bearer of a high achievement motivation, which is typical for about ¼ of those working in cities with a population exceeding 50, 100 and 200 thousand people.

It can be presumed that those working in large cities more frequently meet a stronger competition. The above mentioned challenges which clinical laboratories are facing due to the availability of more and larger hospitals in the bigger cities are also a contributing factor. In addition, perhaps the presence of higher educational institutions in bigger cities facilitates the possible continuing education and training in terms of space, time and finance. In the current study, this is another proof that environmental parameters influence the intensity of AchM [38].

Therefore, exactly the laboratory assistants who live and practice their profession in the larger cities, more categorically seek development in a higher educational degree (Table 4).

One of the possible solutions for expansion of the opportunities for continuous professional development is the change in the framework of the continuing education of medical laboratory assistants. As the higher educational institutions are the main suppliers of various forms of CL, they can use the resources of electronic learning, on-the-job training, etc., which could facilitate those working in remote areas [70].

Another change which would be reasonable is the offering of a profiled specialisation for laboratory assistants. This step would increase the availability of environmental capacities for continuous professional development. Simultaneously, if the specialisation in a certain area of laboratory medicine is bound by the award of a higher educational degree, there will be better possibilities for the development of the laboratory assistant with a high level of AchM, including the acquisition of higher professional competences and career development. This could be achieved by searching for opportunities for diversification of the courses offered by the higher educational institutions [67].

The established research hypothesis that the motivation for achievement would be a predictor of the attitude towards continuing education was confirmed to a significant degree. According to it, with reference to the laboratory assistants with higher motivation for achievement, it may be assumed with a higher degree of probability that they would form stronger needs of continuing professional education.

The laboratory assistants who have a high degree of motivation for achievements, in comparison to those who are motivated to avoid failure, have a stronger need of professional competence in an area other than that in which they operate; a stronger desire for their professional development to be officially recognised by acquiring a higher education and qualification degree or professional specialisations; they see continuing education as an expression of their aspiration for new knowledge (Table 1).

The needs of medical laboratory assistants for professional competence in a similar field may be provoked by two other factors: the processes of consolidation of laboratories and the shortages of specialists in particular types of laboratories [68].

Pool et al. [71] also find as fundamental the motivation for participation in continuous learning by nurses, obtaining profound knowledge, improvement of healthcare quality, while continuing education is accepted as a possibility for career development. They discuss four significant motives – for improvement of competence, compliance with requirements, comprehensiveness of the knowledge and improvement in career development. The motives to increase self-esteem are found to have less significance [71].

5. Conclusion

The advantage of this article is that it presents a study of an interdisciplinary approach to the problem of achievement motivation, both psychological and management and organisational, within the context of the professional training of healthcare specialists. Such an approach may be more adequate to the specific

public practice as it studies it as a complex phenomenon, rather than strictly psychological, organisational or managerial.

The authors of the present article believe that the results of the study can contribute to the enrichment of the scientific information in three directions:

- application of the achievement motivation theory as an explanatory model for the types of behaviour directed towards adding competence through continuous learning, which is a very insufficiently studied problem.

- influence of the size of the cities where the respondents live and work, and the environmental conditions on the achievement motivation in the process of education of students in higher educational institutions, as well as in the different forms of CL. Within this context, it is especially interesting to check this empirical hypothesis which has not been confirmed elsewhere yet in future studies.

- study of the achievement motivation for professions in the field of healthcare, which studies are almost unavailable.

Moreover, the application of the achievement motivation theory to CL may be an efficient way for the more successful overcoming of the problem of fast ageing and half-life of the knowledge in medicine and technology.

The contribution of the study is that it provides arguments for the need of change in the state educational policy for training of laboratory assistants in Bulgaria by creating conditions for studying for a higher educational degree in the principal area and continuous learning in profiled specialisations, just as this is possible for other medical specialists. It could be expected that the introduction of new forms of study shall provoke an update of the achievement motivation, expansion and enrichment of the professional competence in the speciality. This could increase the efficiency of the activity in the profession which is socially significant for the health and treatment of people.

Limitations of the study. The study does not cover variables established in other studies, which could influence the interest in continuous learning and AchM of laboratory assistants, such as work satisfaction, organisational structure and the level of professional ethics, team specifics, management styles, etc.

Furthermore, the study covers in-service laboratory assistants from 3 districts of the country and students majoring as laboratory assistants in one of the colleges in Bulgaria, which may not represent very precisely the general coherence.

Future research. Future research should be directed towards additional study and expansion of the sample, for even more reliable verification of the influence of AchM on other basic variables of the interest in continuous learning: readiness for visits of forms of continuous learning for improvement in the

professional competence; factual attendance and satisfaction with the forms of continuous learning, information about the contents of CL. Such variables were also subject of the present study but dependencies on AchM were not found; therefore, future verifications and additional empirical evidence are necessary.

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