

The Role of Life Skills Training In Developing An Attitude of Authentic Leadership In Public Health Specialists: A Multicenter Cross-Sectional Study In Poland

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Abstract

Background: Effective healthcare decision making involves the use of decision-making skills (DMS). DMS are considered to be crucial life skills conditioning proper group social functioning (i.e. support authentic leadership skills - ALS) and increasing one's chances of success and wellbeing in life. Nonetheless, the number of scientific papers addressing the role of LS in developing ALS in PH specialists is limited. Aim of the study was to develop a theoretical model to determine the role of selected LS in developing authentic leadership skills in public health specialists.

Methods: The study was conducted from January 16 through February 28, 2018. In total, 653 students undertaking in-service training in Master's degree programs were qualified for the study, and complete data sets were obtained from 329 students (response rate 50.38%). The error margin was 3.17% (95% confidence level). The data were collected by means of a paper questionnaire. Four research tools were used in the study: The Authentic Leadership Self-Assessment Questionnaire (ALSAQ), The Moral Foundations Questionnaire (MFQ), The General Self-Efficacy Scale (GSES), The Youth Leadership Life Skills Development (YLLSD).

Results: Two subgroups were identified among the public health specialists in the study: 1) the extra social skills training group (N = 113), and 2) the no extra social skills training group (N = 216). Both groups of the study participants did not differ significantly in age (M [SD]: 25.0 [3.89] vs. 25.0 [3.66]; $t = 0.068$, $P = 0.946$). On the other hand, clear differences were observed in the case of the respondents' participation in voluntary service. The respondents from the extra SST group declared participation in voluntary activities less frequently than the respondents from the no extra SST group (48.7 vs. 31.9%). Both calculated measures (CMIN = 15.020, $df = 8$ and $CMIN/DF = 1.88$) point to the empirical confirmation of the model.

Conclusions: A course aimed at strengthening authentic leadership competences should be modular, focus on self-improvement and critical reflection, as well as spread over time so as to enable and encourage each participant to grow and flourish at their own pace.

Introduction

The European List of Core Competences for the Public Health (PH) Professional developed by The Association of Schools of Public Health in the European Region, identifies effective decision making as a crucial skill for PH specialists [1]. Effective healthcare decision making involves the use of decision-making skills (DMS), i.e. the ability to make the best possible choice so as to achieve the best possible result [2]. The key role of these skills in PH is emphasized by, among others, Dobbins et al. [3] and McCarthy et al. [4]. It is thought that lack of skills in decision making in the healthcare setting may result in mistakes and possibly pose a risk to patient life or health [4].

DMS are considered to be crucial life skills (LS) conditioning proper group social functioning (i.e. support authentic leadership skills - ALS) and increasing one's chances of success and wellbeing in life [5]. This is due to the assumption that ALS build on interpersonal relationships and authentic group functioning [6–7]. In their comprehensive framework, Seevers et al. highlight the importance of LS in the formation of leadership skills [8]. Nonetheless, the number of scientific papers addressing the role of LS in developing ALS in PH specialists is limited.

DMS can be learned and developed through training programs and courses. For example, Dobbins et al. [3] demonstrated that proper “face-to-face training and active participation aimed at the development of evidence-informed decision making skills created the greatest impact on associated behaviours, knowledge, and skills”. It is worth noting that DMS may depend to some extent on personality traits, e.g. self-efficacy [9], which is particularly noticeable in clinical practice [10]. Self-efficacy is a trait that defines an individual's belief that s/he is able to take action towards achieving a set goal [9]. A person's beliefs in how to function in a group may constitute another important factor [8]. The belief in equal effort put by each group member in achieving a shared goal (i.e. fairness) and mutual aid based on empathy (i.e. care) may be of particular importance in this context [6–7, 11]. Therefore, training programs aimed at DMS development in PH specialists should take into account not only the methods of improving these skills, but also their dependence on leadership skills and potential personality predispositions that may modulate the relationship between DMS and ALS.

Research question, hypotheses

Bearing in mind the above considerations, we developed a theoretical model to determine the role of selected LS in developing authentic leadership skills in PH specialists. Therefore, the following research hypothesis was established (Hypothesis 1 - H1): There is a relationship between the individual's dispositions (beliefs about fairness in group cooperation (F), empathic attitude (C/E), self-efficacy and decision-making skills) and authentic leadership skills. With reference to H1, the following detailed hypotheses were formulated:

H1a: 'The beliefs about fairness in group cooperation (F) and self-efficacy will influence DMS, which, will, in turn, condition authentic leadership skills in public health professionals.'

H1b: 'Self-efficacy influences the development of leadership skills in public health specialists'. Such a detailed hypothesis was formulated on the basis of a literature review in which a strong relationship was noted between self-efficacy, and authentic leadership skills in some medical professions [12–13]. However, such studies have not been conducted among public health professionals.

H1c: 'Self-efficacy and empathic attitudes (C/E) will have both a direct and indirect impact on the development of leadership skills by affecting DMS.' This hypothesis was developed based on studies emphasizing that, apart from self-efficacy, it is empathy that plays an important role in the development of authentic leadership skills [6–7, 11].

The last main hypothesis was to verify the assumption that the declared participation in social skills trainings (SST) would differentiate the developed theoretical model as far as the analyzed variables are concerned. Such a hypothesis would allow to identify the potential factors that can be effectively modified, and then to prepare an appropriate intervention (Hypothesis 2: There are differences in the theoretical model concerning factors that affect developing leadership skills between the extra SST group and the No extra SST group.

Method

Settings and Participants

A nationwide cross-sectional multicentre study on a total of 329 public health specialists undertaking postgraduate education as part of their Master's degree. The study was conducted from January 16 through February 28, 2018.

We invited 31 universities, both public and private, educating health professionals to participate in the study. In 2017, there were a total of 1,362 students [14] in Master's degree programs (Level 7 of the European Qualifications Framework). Eight universities decided to participate in the study. In total, 653 students undertaking in-service training in Master's degree programs were qualified for the study, and complete data sets were obtained from 329 students (response rate 50.38%). With this sample size and the number of public health specialists in Master's degree programs in Poland (N = 1362), the error margin was 3.17% (95% confidence level).

Educational Context

Founded in 1991, The School of Public Health in Cracow was the first institution in Poland to offer education in the field of public health. In 1997, it enrolled students into two-year second-cycle studies at the faculty of public health for the first time [15].

Education in Poland is conducted in line with the Bologna Process. Higher education programs are divided into: Bachelor's degree studies (first-cycle studies), Master's degree studies (second-cycle studies) and doctoral studies (third-cycle studies). These programs are conducted independently of each other and universities have the ability to organize these cycles [16].

Currently, 46 universities in Poland, both public and private, conduct studies in the field of public health, and 22 of them offer second-cycle studies [17].

Pursuant to the Law on Higher Education and Science, second-cycle programs last from three to five terms [18]. Due to the fact that the faculties of public health do not educate for a regulated profession, each institution is free to determine the duration of the course of studies.

During second-cycle study programs students need to achieve specific learning outcomes in terms of knowledge, skills and social competences. Having completed a second-cycle study program, the graduate attains the 7th level of the European Qualifications Framework and obtains the professional title of Master of Public Health [19].

In line with the Bologna Process, the European Credit Transfer and Accumulation System (ECTS) was implemented in Poland in January 2007. It is a system for recognizing student's qualifications in various study programs. One ECTS credit point corresponds to the learning outcomes obtained within 25-30 hours. ECTS credit points are awarded for completing each subject and internship in the curriculum, preparation for the diploma examination and preparation of the diploma dissertation. In order to complete second-cycle studies, it is necessary to obtain 90-120 ECTS credit points [20].

During the second-cycle studies, students can choose a major (specialization path) most interesting for them. Due to the non-regulated nature of study programs at the faculty of public health, each university determines the curriculum and the specialization offer itself. In Poland, there is a wide range of specialization paths, e.g.

health education and social marketing, healthcare analytics, clinical research and health technology assessment or epidemiology with health promotion elements [21]; or European public health, lifestyle medicine and management in healthcare [22].

Measures

Four research tools were used in the study:

The Authentic Leadership Self-Assessment Questionnaire (ALSAQ) developed by Walumbwa et al. [7] and recommended by Northouse [23] for performing self-assessment. The Polish version of the ALSAQ, developed by Panczyk et al. [13], includes 16 items and allows to measure the global indicator of Authentic Leadership skills and its three components: moral processing, self-awareness and relational transparency. The Polish version of the ALSAQ has a good internal consistency (Cronbach's alpha 0.84) and a test-retest analysis confirmed the stability of the measurement for the subscales and particular items. In our study, we analyzed only the global level of authentic leadership skills, i.e. the sum of the points from the three subscales listed above. We chose not to analyze these subscales separately because they correlate with each other.

The Moral Foundations Questionnaire (MFQ) was developed by Graham et al. [24]. The MFQ measures five universal moral foundations of harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity. The codes provide the basis for the evaluation of one's behaviour for mortality [24]. We used the Polish version of the MFQ-PL questionnaire which has good validity and reliability [25]. In order to ensure the validity of the psychological test, the participants of the study provided answers to all the questions in the MFQ-PL questionnaire. However, based on the literature review, we took into account the results only from two subscales, i.e. harm/care and fairness/reciprocity. The harm/care (KODT) subscale refers to empathy and compassion; and thus, the principle of not hurting other people, helping the weaker and people in need [26]. This subscale was selected for the study because it reflects an empathic attitude that is a key aspect of authentic leadership [6]. The fairness/reciprocity (KODS) subscale refers to reciprocity for help given and helping others, which is opposed to taking advantage of other people and only feigned involvement in action [26]. This subscale was chosen for the study because it is consistent with the general concept of authentic leadership, which involves treating others equally, providing equal opportunities and acting for the benefit of the group [6].

The General Self-Efficacy Scale (GSES) was originally developed by Matthias Jerusalem and Ralf Schwarzer in 1981 and designed to assess optimistic self-beliefs and the ability to cope with a variety of difficult situations in life. It is a short 10-item psychometric scale [9]. The scale is one-dimensional and enables a global self-efficacy measurement. We used the Polish version of the GSES which has good validity and reliability [27].

The Youth Leadership Life Skills Development (YLLSD) scale was developed by Seevers et al. based on Miller's concept of leadership life skills development [8]. The YLLSD scale contains 30 items from seven domains (Communication Skills, Decision-making Skills, Skills in getting along with others, Learning Skills, Management Skills, Skills in understanding yourself, Skills in working with groups) which together form a complete picture of leadership skills. The final summated scale of 30 indicators had a Cronbach's alpha reliability coefficient of .98. In our study, we chose to analyze only decision-making skills as these skills appear to be crucial in public health specialists [1].

Additionally, the research tool included a question about the declared participation in social skills training. For this purpose, the following yes/no question was asked: Have you participated in training/workshops on soft skills (e.g. leadership, communication, social competences, etc.)? Based on the answers to this question, the study group was divided into two subgroups. The first group comprised students who declared participation in at least one social skills training (extra SST group), while the second group comprised students who did not declare participation in such training (no extra SST group).

Model assumptions

Based on the formulated hypotheses (H1a-H1c), a theoretical model was developed (Figure 1) assuming the impact of self-efficacy (GSES) and fairness in group cooperation (F) on decision-making skills (DMS). Moreover, DMS influence the development of authentic leadership skills (ALS). Empathic attitudes (C/E) are an important addition to this model as they directly affect ALS and interact with F.

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness,

H - hypothesis

Fig. 1. A theoretical model of the relationship between variables

Data Collection

The data were collected by means of a paper questionnaire distributed among a group of students staying in one room at the end of regular university classes. Trained interviewers limited themselves to stating the aim of the study and informing the participants how to fill in the questionnaire. They were also responsible for collecting the completed questionnaires and securing them prior to sending them to the central unit coordinating the study. ABBYY® FlexiCapture version 9.0 software was used to digitize the paper questionnaire data. Questionnaires with missing data were rejected and were not included in the analysis.

Data analysis

In order to analyze the variables collected in the study, we used descriptive statistics (mean, standard deviation) and structure coefficients (numbers and frequency). The chi-square independence test and Student's t test were used to compare the two subgroups (extra SST group vs. no extra SST group) in terms of the examined characteristics, depending on the type of variable (categorical or continuous variables, respectively). The calculations were performed with the use of STATISTICA package, version 13.3 (Tibco Software Inc., Palo Alto, CA, United States). A 5% level of significance was set.

All analyses were carried out using the structural equation modelling software program Mplus version 7.0 [28]. We used a two-group structural equation modelling: extra SST vs. no extra SST group. The aim of this analysis was to determine whether the relationships between the variables assumed theoretically would be confirmed by the collected empirical data. For this purpose, the model parameters (path coefficients, variance and covariance) were estimated and used to build the theoretical variance-covariance matrix of the variables used in the model (Figure 2). We verified whether the calculated model parameters differed in the extra SST vs. no extra SST group. The maximum likelihood estimation with robust standard errors was used to calculate the parameters of the structural model.

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness, eSST - extra social skills training group, no eSST - no extra social skills training group

Fig. 2. The formal form of the structural equation model

The fit of the model was assessed via the following statistics and indices: the chi-square test of model fit (CMIN), normal chi-square (CMIN/DF), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). For the evaluation of the model, the chi-square statistics were expected to be nonsignificant. Both the CFI and TLI evaluate the fit of a user-specified solution in relation to a more restricted nested baseline model, in which the covariance among all input indicators is fixed to zero or no relationship among the variables that are posited; in other words, the number of dependent variables is equal to the number of factors. The TLI additionally imposes a correction for over-parameterization [29]. The expected values of indices recommended were as follows: χ^2 divided by the degrees of freedom (CMIN/DF) ≤ 3.00 ; the RMSEA < 0.080 and the SRMR < 0.050 ; the CFI and the TLI > 0.95 [30].

Results

Participant Characteristics

Two subgroups were identified among the public health specialists in the study: 1) the extra SST group (N = 113), and 2) the no extra SST group (N = 216). Both groups of the study participants did not differ significantly in age (M [SD]: 25.0 [3.89] vs. 25.0 [3.66]; $t = 0.068$, $P = 0.946$) or work experience (M [SD]: 3.4 [4.88] vs. 3.1 [4.32]; $t = 0.630$, $P = 0.529$). In terms of selected features, the groups differed slightly in terms of the year of study and the frequency of studying at another faculty at the same time. On the other hand, clear differences were observed in the case of the respondents' participation in voluntary service. The respondents from the extra SST group declared participation in voluntary activities less frequently than the respondents from the no extra SST group (48.7 vs. 31.9%). Table 1 shows the comparison of selected demographic characteristics of the study participants.

Table 1
Participant characteristics

	Total (n=329)		Extra SST group (N = 113)		No extra SST group (n=216)		χ^2	p- value*
	N	%	N	%`	N	%		
University								
Poznań University of Medical Sciences	35	10.6	12	10.6	23	10.6	11.276	0.127
Czestochowa University of Technology	32	9.7	8	7.1	24	11.1		
Medical University of Silesia	37	11.2	7	6.2	30	13.9		
Medical University of Gdańsk	21	6.4	5	4.4	16	7.4		
Medical University of Łódź	21	6.4	8	7.1	13	6.0		
Pomeranian Medical University	14	4.3	3	2.7	11	5.1		
Wroclaw Medical University	29	8.8	13	11.5	16	7.4		
Medical University of Warsaw	140	42.6	57	50.4	83	38.4		
Year of study								
1	121	36.8	50	44.2	71	32.9	4.130	0.042
2	208	63.2	63	55.8	145	67.1		
Sex								
F	278	84.5	96	85.0	182	84.3	0.027	0.868
M	51	15.5	17	15.0	34	15.7		
Place of residence								
village	58	17.6	17	15.0	41	19.0	5.524	0.137
city up to 100,000 inhabitants	70	21.3	22	19.5	48	22.2		
city 100,000-500,000 inhabitants	72	21.9	20	17.7	52	24.1		
city above 500,000 inhabitants	129	39.2	54	47.8	75	34.7		
Another faculty at the same time								
no	309	93.9	102	90.3	207	95.8	4.028	0.045
yes	20	6.1	11	9.7	9	4.2		
Volunteer work								
* chi-squared test								

	Total (n=329)		Extra SST group (N = 113)		No extra SST group (n=216)		χ^2	p- value*
	N	%	N	%	N	%		
no	205	62.3	58	51.3	147	68.1	8.840	0.003
yes	124	37.7	55	48.7	69	31.9		
Professional activity								
not working	89	27.1	31	27.4	58	26.9	1.643	0.440
yes, work not in a profession related to public health	148	45.0	46	40.7	102	47.2		
yes, work in a profession related to public health	92	28.0	36	31.9	56	25.9		
* chi-squared test								

Variables

All the analyzed variables were tested for skewness and kurtosis, which showed they were left-skewed and did not show compliance with the normal distribution. The deviations in terms of compliance with the normal distribution were not very large, as skewness and kurtosis ranged from -1.5 to +1.5. All variables included in the structural equation model were also analyzed for the presence of data outliers (Mahalanobis distance).

We also analyzed whether the two groups differed significantly in terms of the examined characteristics. In the case of two variables (SE and AL), we observed that the mean intensity of these features was statistically significantly higher in the extra SST group than in the no extra SST group. The effect size was similar for both variables. Detailed results are shown in Table 2.

Table 2
Comparison of two study groups in terms of variables

Variable	Extra SST		No extra SST		$t_{(df = 327)}$	p-value*	d** (95%CI)
	group		group				
	M	SD	M	SD			
Care/Empathy	30.02	3.88	29.98	4.11	0.077	0.938	-
Fairness	28.33	3.97	28.86	3.72	-1.197	0.232	-
Self-efficacy	32.35	4.83	30.38	4.28	3.799	0.000	0.44 (0.21; 0.67)
Decision making skills	11.48	2.76	11.20	2.46	0.935	0.350	-
Authentic leadership	61.98	6.60	59.35	5.99	3.659	0.000	0.42 (0.19; 0.65)
M - mean, SD - standard deviation, CI - confidence interval							
* Student's t test							
** Cohen's d coefficient							

Measurement model

Both calculated measures (CMIN = 15.020, df = 8 and CMIN/DF = 1.88) point to the empirical confirmation of the model. CMIN contributions from each group were 7.060 (CMIN/DF = 0.88) for the extra SST group and 7.960 (CMIN/DF = 1.00) for the no extra SST group. Moreover, based on the obtained test probability value (P = 0.059) we assumed the hypothesis about the lack of differences between the theoretical and empirical variance-covariance matrix to be very probable. The measurement of test invariance across groups indicated that the model did not differ statistically in pathway coefficients between the two study groups (CMIN = 7.404, df = 5, P = 0.192).

Since the purpose of testing the model was not only to assess its fit to empirical data from the studied sample, but also in relation to the entire population, we calculated the value of the discrepancy function F0 and the value of the RMSEA index adjusted by the number of degrees of freedom. The RMSEA value (0.073, 90% CI [0.001; 0.129], P = 0.219) indicated the equality of the two matrices. Also the SRMR value was below the assumed threshold and amounted to 0.046. These results confirmed a good fit of the data to the assumed structural model.

In order to estimate the degree of the fit of the model to the collected data more accurately, fit indexes were determined comparing the tested model with the independent model, i.e. one in which all the variables in the model are uncorrelated. The CFI value (0.967) and its adjusted value, i.e. TLI (0.942) were estimated. These results indicate that nearly 100% of the variability of the dependent variable is explained by the tested model.

Associations Between Factors and Attitude of Authentic Leadership

The analysis of the proposed path model showed all relationships to be positive. We have observed significant direct effects of the following variables on the output variable (AL): SE and C/E. For these variables, in the extra SST group, the standardized regression weights amounted to 0.489 and 0.240, respectively. Whereas in the no extra SST group the values of these parameters were 0.338 and 0.336, respectively. As regards the DMS variable, we observed it to significantly influence AL in the first group (0.236, $P = 0.002$), but not in the second group (0.120, $P = 0.065$). As regards the above parameters, the results of test invariance across groups showed no statistically significant differences.

The analysis of the individual path coefficients also showed a different strength of the impact of the SE variable on the DMS variable. In the first group, the standardized regression weight was only 0.240, whereas in the second group it was 0.404. On the other hand, the impact of the F variable on DMS was similar in both groups (0.269 and 0.277, respectively). As regards the correlation between F and C/E, we did not observe any significant differences between the groups (0.687 and 0.728, respectively). A detailed summary of the results of parameter estimation of the structural equation model together with the comparative group analysis is presented in Table 3.

Table 3
Standardized regression weights and test invariance across groups

Construct	Extra SST group				No extra SST group				CMIN	p-value*
	Estimate	SE	CR	P-value	Estimate	SE	CR	P-value		
SE → AL	.489	.068	7.214	.000	.338	.060	5.621	.000	1.957	.162
C/E → AL	.240	.073	3.298	.001	.336	.058	5.841	.000	.332	.564
DMS → AL	.236	.074	3.173	.002	.120	.065	1.848	.065	1.282	.258
SE → DMS	.240	.088	2.724	.006	.404	.054	7.418	.000	2.543	.111
F → DMS	.269	.087	3.078	.002	.277	.057	4.833	.000	.000	.989
F ↔ C/E	.687	.050	13.806	.000	.728	.032	22.773	.000	.076	.782
SE - standard error, CR - critical ratio										
* test invariance across groups										

Apart from direct effects, we also calculated the value of indirect effects and total effects, for which the influence of the independent variables on the dependent variable is not direct. In this model, indirect effects were present in the F → DMS → AL path (standardized regression weight, in group one and two, respectively: 0.063 and 0.033). Therefore, indirect effects were noticeably weaker in the no extra SST group.

It also worth noting that the variable SE showed both direct and indirect effects in acting on the dependent variable (AL) in the extra SST group. In this group, the direct effects value was 0.489, while the indirect effects value was small and amounted to only 0.004. Therefore, in this case total effects did not differ much from the direct effects. However, in the no extra SST group, there was no statistically significant indirect effect, because no significant relationship was observed between SMS and AL. Figure 3 shows a detailed presentation of the results of parameter estimation of the structural equation model with all direct and indirect effects.

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness

Fig. 3. A pathway diagram for the extra SST group (above) and the no extra SST group (below). Correlations between independent variables are indicated with double-sided arrows. Direct effects are indicated with one-sided arrows. The number above the arrow indicates the value of standardized regression weights. The number next to the arrow shows residual variances.

Discussion

The conducted analyses revealed that in PH specialists, DMS play an important role connecting the attitude (C/E), beliefs about fairness in group cooperation (F) and self-efficacy (SE) with authentic leadership skills. Thus, the presented results emphasize the complex nature of DMS. They also indicate that these skills are important not only in the context of evidence-based practice for public health [31] and evidence informed decision making (EIDM) [32], but they also play a key role in developing other competences necessary in the work of PH specialists. Therefore, it is reasonable to develop DMS in health specialists most effectively. Improving these skills increases one's level of expertise and competence, which, in turn, allows to take better actions to improve PH both on a local as well as global scale. This is in line with ASPHER's statement [1], as well as literature reports emphasizing that management decision-making is an important factor in evidence-based management in Public Health. This translates into improving health care management practices through the use of the evidence-based approach for quality managerial decisions. Moreover, adequate DMS are extremely useful in distinguishing fact from myth/opinion, the latter of which there is a plethora in the field of public health [33]. Moreover, Moodie [34] considers vision and decision making to be key leadership skills in public health.

Our study demonstrated that DMS have a positive impact on developing authentic leadership skills which are widely discussed in the literature with reference to healthcare [35] including public health [36]. The crucial role of these skills in public health is underlined by, e.g. Stander [37], who emphasizes that the implementation of authentic leadership by healthcare managers may lead to greater optimism, trust in the organization and work engagement. Similar conclusions were drawn by Coxen [39], who points to the benefits of encouraging employees to become authentic leaders. In addition, researchers dealing with the topic in question recommend that all healthcare institutions should invest in the continuous evaluation of the level of leadership competences of the managerial staff and in authentic leadership training [39–40]. However, it is worth highlighting that leadership skills training should begin already at university. Czabanowska, Lachance and Konings emphasize the need for public health education programs in Europe to introduce courses that develop and improve leadership competences of future public health specialists [36, 41–42].

It should be noted that a good leader is someone who can listen to other people, even if they have opposing ideas; and is someone who can take criticism and is open to it. As a result, a good leader is able to analyze the situation in detail and make a decision respecting the opinions of other group members [6–7]. Such an approach to authenticity manifests itself in self-awareness and a balanced processing of information (i.e. encouraging critical perspectives), which are the aspects of AL [7]. Such an image of an authentic leader also fits into the definition of DMS [2].

A new approach to leadership is transformational leadership understood as guidance beyond ordinary expectations, conveying a sense of mission, stimulating the learning process and pointing to new ways of thinking [43]. The theory of transformational leadership emphasizes the fact that leadership is the process by which a person interacts with others and is able to create a relationship that results in a high level of trust, which in turn translates into an increase in motivation, both internal and external, occurring on the side of both the leader and followers [44]. The most common model of transformational leadership was proposed by Bass, who was interested in the degree to which a leader influences followers. People follow a leader because of trust, honesty and other qualities and the stronger they are, the greater the loyalty of followers. In turn, the leader transforms followers thanks to these qualities [45].

In our study, we observed a positive correlation between the empathic attitude (C/E) and authentic leadership skills, which is consistent with the findings of other researchers who emphasize that empathy is an important component of leadership skills [6–7]. It should be noted that the empathic attitude associated with openness to one's own and other people's emotions makes up key components of AL such as relational transparency (i.e. being open about one's own ideas and emotions), and an internalized moral perspective (i.e. moral integrity) [7]. Moreover, in their meta-analysis, Miao et al. [46] discuss the relationship between emotional intelligence and authentic leadership. The results of this meta-analysis suggest a positive correlation between these two variables regardless of sex. There are but a few scientific papers dealing with the subject of empathy and emotional intelligence in developing the competences of PH specialists. Czabanowska et al. [36] stress a positive correlation between public health specific competencies and EI attributes. Additionally, it is believed that there exists a relationship between emotional intelligence and the conditions of trust in governmental public health settings; however, there is little research in this field. Despite little research - indirectly related to the topic in question - it may be assumed that these observations are consistent with the obtained results [47]. Interestingly, in our study, the empathic attitude (C/E) had no direct impact on DMS, which may suggest the complex role of empathy in making various health-related decisions and thus a lack of the universality of this parameter across health-related professions. Such an opinion was expressed in an integrative literature review including twenty-three papers. Nonetheless, it should be remembered that this study involved a variety of healthcare professionals (nurses, physicians, occupational therapists, physiotherapists, mixed clinician samples, and unspecified infectious disease experts), but no PH specialists [48]. Therefore, research on the role of emotions (emotional intelligence) in decision-making by PH leaders is necessary, and the obtained results require further supporting evidence.

In our study, we did not observe the beliefs about fairness in group cooperation (F) to have a direct impact on developing leadership skills. However, these beliefs can affect leadership skills indirectly, through the DMS. This may be related to the specificity of DMS. A person's beliefs about fair and equal cooperation in a group affect the need to improve one's own DMS. As a result, a given person may start taking decisions more

accurately and reliably, taking into account not only their own point of view, but also the opinions of other people. This, in turn, may translate into building a good team atmosphere resulting from equal treatment of all its members and their opinions. It seems that beliefs about fairness in group cooperation constitute a specific factor stimulating the need to improve one's own DMS, which, in turn, improves the communication of an individual within a group. Therefore, it remains of key importance to define the methods to evoke this need.

The conducted analyses also point to the important role of self-efficacy in developing DMS and leadership skills. There are many reports suggesting a direct relationship between self-efficacy and leadership skills [6–7] as an important factor in self-development [23]. It should be emphasized that self-efficacy increases self-awareness (awareness of one's strengths and weaknesses) as well as encourages a critical reflection on one's own skills. This is an inner belief that a person may not only achieve the set goal, but also has the motivation for self-improvement [9], which remains consistent with the concept of AL [6–7] and reports by other researchers [49].

Our study did not reveal any differences as regards the developed structural model of factors related to the individual dispositions (F, C/E, self-efficacy) on the development of DMS and authentic leadership skills. The declared participation in extra SST training was not a differentiating variable. The obtained results should be interpreted with caution, because participation in the extra SST was declarative and subjective. We did not verify the type of the extra SST. As far as collecting data from eight Polish universities is concerned, obtaining more detailed qualitative data was difficult for technical reasons. The extra SST offered at these universities is diverse, and a quantitative analysis is impossible for legal reasons. The developed model should be verified in further studies against a more detailed information about SST. It should be noted, however, that these were additional SST courses, and the training offered in the curriculum was not taken into account. However, it should not be assumed that the lack of differences in the analyzed groups (extra SST group vs. no extra SST group) suggests a low effectiveness of extra SST. This would be too much of a simplification and an over-interpretation. It is worth noting that one's attitude is relatively permanent - although it may undergo modifications, similarly to self-efficacy. Change takes time and effort. Therefore, further analyses should include extra SST focused on self-improvement and reflection on one's own strengths and weaknesses. This would be consistent with the suggestions of other researchers [41, 49].

When analyzing the obtained results, it can be observed that the development of leadership skills can take place directly, although this is a very complicated process, or indirectly through strengthening one's self-efficacy, empathic attitudes and the belief of an individual in fair contribution of people making up a given group. Therefore, it seems justified to design appropriate courses/training that would allow PH professionals to acquire these skills. Having analyzed the developed structural model, we may assume that the first step in developing leadership skills in PH specialists should involve improving self-efficacy, namely: identifying one's strengths and weaknesses combined with self-reflection and persistence in pursuing one's goals. This is all the more important in the light of the available sources emphasizing that self-awareness and confidence are factors contributing to the increased exemplary leadership practices and a leadership development framework [41, 50]. The essential role of integrity as a competence in PH leaders is also emphasized by Bayer et al. [49]. Activities aimed at developing moral and empathic attitudes should be undertaken at the same time as those increasing self-awareness and reflection, as they allow to create a friendly work setting and relate to such skills as, for example, teamwork, relationship building, organizational awareness or project management [41]. This is

crucial also with respect to such competences as effective communication skills, networking skills, cultural competency skills or negotiation skills, among others [49]. Later on, training aimed at strengthening DMS should be introduced, as they are considered key competences of PH [41, 49] and are the underpinnings of leadership skills development. This way, a multi-dimensional development of leadership skills among PH leaders can be achieved. It is worth noting that the described actions should be complementary and form a single module that may last throughout the curriculum. However, before these activities are implemented as compulsory in educational programs, they should be additionally validated on a selected group of volunteers.

Limitations

The declarative measurement of participation in extra SST, which could have contributed to noting no differences between the analyzed groups is one of important limitations of the presented study. The empirical validation of the theoretical model, based on the data from cross-sectional studies, is another important limitation. Therefore, the obtained results should be treated with caution and assumptions should not be made about changes in trends over time. We did not collect data on the number of respondents who refused to participate in the study. The size of this group and their sociodemographic status are not known. Therefore, it should be assumed that the individuals who felt insecure about their leadership skills may have refused to participate in the study. We did not analyze the intensity of social approval or the tendency to respond in line with the researcher's expectations. This is especially important as far as research on attitude is concerned.

Conclusions

The development of authentic leadership skills in PH specialists draws on appropriate development of individual dispositions (e.g. self-efficacy, fairness, empathetic attitudes, DMS). Therefore, a course aimed at strengthening these competences should be modular, focus on self-improvement and critical reflection, as well as spread over time so as to enable and encourage each participant to grow and flourish at their own pace.

Declarations

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

In the opinion of the Bioethics Committee of the Medical University of Warsaw 'non-interventional studies do not require the opinion of the Bioethics Committee in accordance with Art. 37a1 Pharmaceutical Law Act (Journal of Laws 2001, No. 126, item 1381)' [51,52]. Nevertheless, the Bioethics Committee was informed about the study protocol, took note of the study procedure and the verbal consent of the study participants. Due to the large number of participants, the type of study (multicentre survey, non-invasive, non-interventional) and its anonymity without collecting respondents' personal data, the participants gave their verbal consent to participate in the study. Before the study, the participants were informed about the principles of anonymity and confidentiality during data collection. Based on the data collected, analyzed statistically, and presented in this article, it is impossible to identify the survey participants.

CONSENT FOR PUBLICATION

Not applicable

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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None.

AUTHOR'S CONTRIBUTIONS

MJ has made substantial contributions to the conception, design of the work, the analysis, interpretation of data, have drafted the work and substantively revised it.

MP has made substantial contributions to the conception, design of the work, the analysis, interpretation of data, have drafted the work and substantively revised it.

IC has made substantial contributions to the conception, design of the work, the acquisition, interpretation of data, have drafted the work and substantively revised it.

AB has made substantial contributions to the conception, the acquisition, have substantively revised it.

KB has made substantial contributions to the conception, the acquisition, have substantively revised it.

JG has made substantial contributions to the conception, the acquisition, have substantively revised it.

MK has made substantial contributions to the conception, the acquisition, have substantively revised it.

MU has made substantial contributions to the conception, the acquisition, have substantively revised it.

MZB has made substantial contributions to the conception, the acquisition, have substantively revised it.

AZ has made substantial contributions to the conception, the acquisition, have substantively revised it.

JG has made substantial contributions to the conception, design of the work, the acquisition, analysis, interpretation of data, have drafted the work and substantively revised it.

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Figures

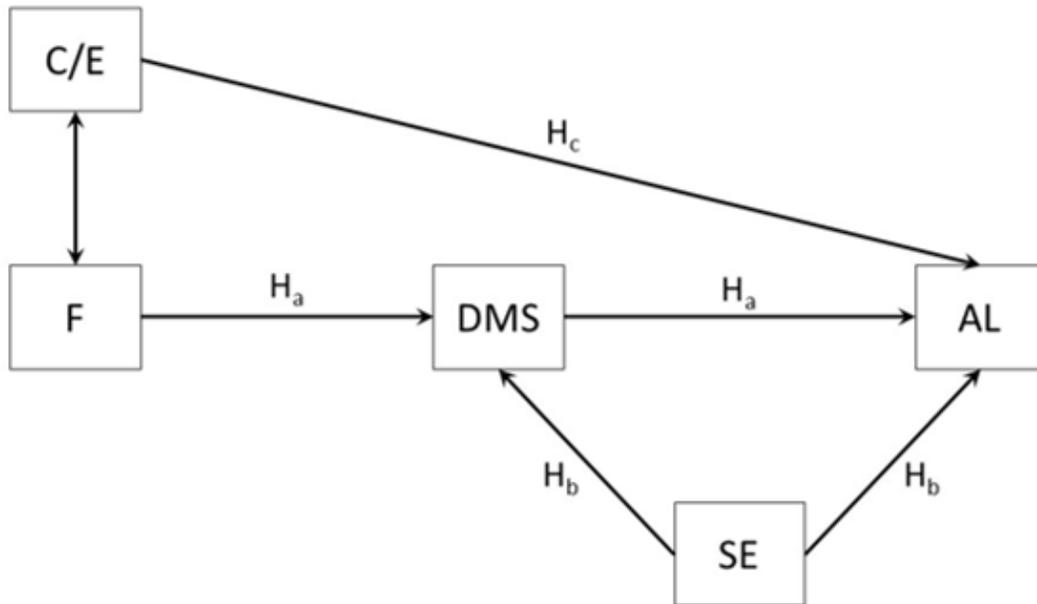


Figure 1

A theoretical model of the relationship between variables

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness,
 H - hypothesis

$$\left[\begin{array}{l}
 AL = \gamma_{11}^{eSST} (C/E)^{eSST} + \gamma_{12}^{eSST} (DMS)^{eSST} + \gamma_{13}^{eSST} (SE)^{eSST} + e_1^{eSST} \\
 DMS = \gamma_{21}^{eSST} (F)^{eSST} + \gamma_{23}^{eSST} (SE)^{eSST} + e_2^{eSST} \\
 Cov(C/E, F)^{eSST} = \phi_{12}^{eSST} \\
 \\
 AL = \gamma_{11}^{no\ eSST} (C/E)^{no\ eSST} + \gamma_{12}^{no\ eSST} (DMS)^{no\ eSST} + \gamma_{13}^{no\ eSST} (SE)^{no\ eSST} + e_1^{no\ eSST} \\
 DMS = \gamma_{21}^{no\ eSST} (F)^{no\ eSST} + \gamma_{23}^{no\ eSST} (SE)^{no\ eSST} + e_2^{no\ eSST} \\
 Cov(C/E, F)^{no\ eSST} = \phi_{12}^{no\ eSST}
 \end{array} \right.$$

Figure 2

The formal form of the structural equation model

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness,

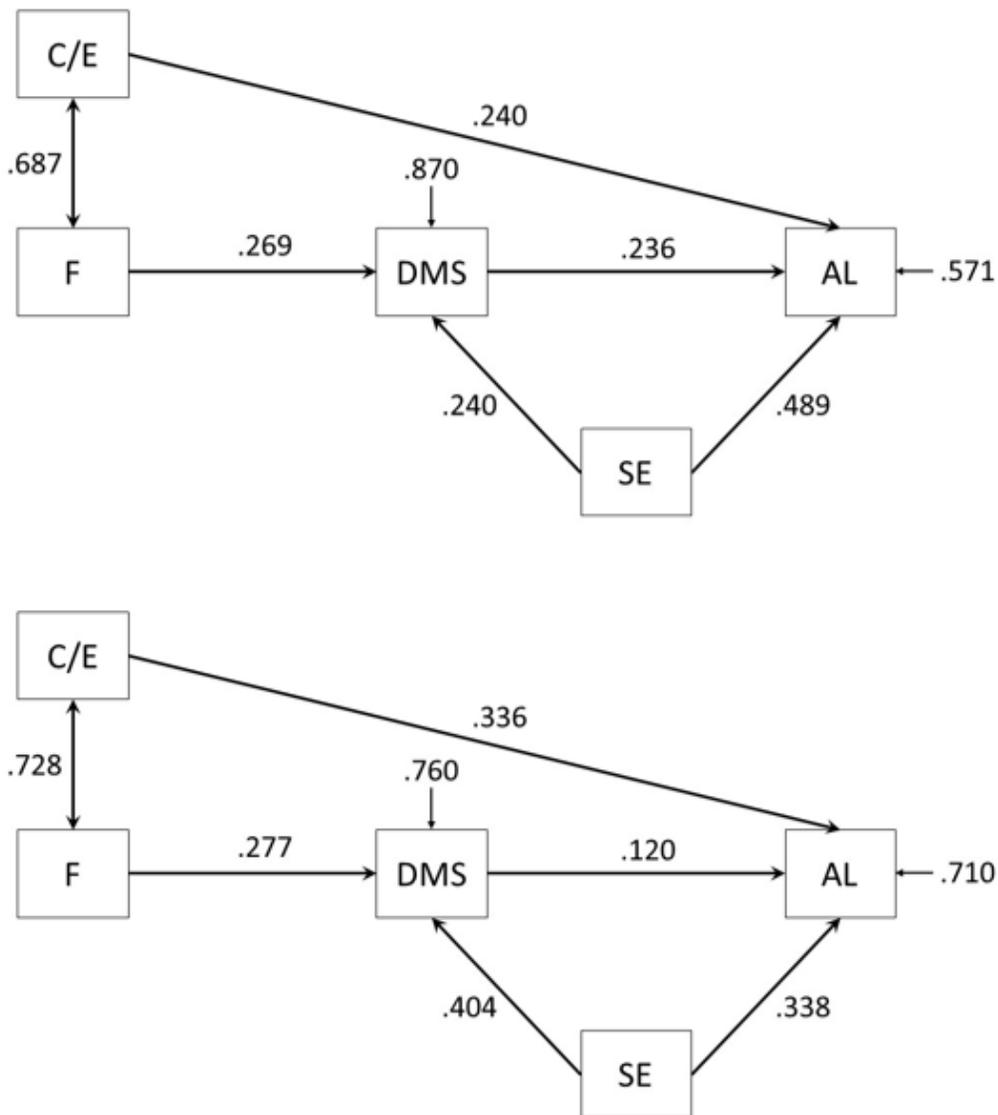


Figure 3

A pathway diagram for the extra SST group (above) and the no extra SST group (below). Correlations between independent variables are indicated with double-sided arrows. Direct effects are indicated with one-sided arrows. The number above the arrow indicates the value of standardized regression weights. The number next to the arrow shows residual variances.

AL - authentic leadership, C/E - care/empathy, DMS - decision-making skills, SE - self-efficacy, F - fairness