

Original Research Article

Development and validation of a questionnaire measuring teaching faculties motivation from medical and medical allied universities in Myanmar

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ABSTRACT

Background: Motivation status of teaching faculties in medical field can influence the students' academic achievement, therefore, developing the tools to measure of it is essential. The study was conducted to develop and validate the questionnaire that can assess the motivation status of teaching faculties from medical and allied universities.

Methods: An exploratory sequential mixed-methods study was used. The qualitative part developed a questionnaire by two rounds of Delphi expert panels. The quantitative part validated the questionnaire using both exploratory (EFA) and confirmatory factor analysis (CFA). Purposive sampling method was used for Delphi and total (661) participants for quantitative portion was selected randomly from medical and allied universities. First, 78-item questionnaire was generated based on Maslow's hierarchy of needs theory model. Two expert panels ensured the questionnaire's content validity and finally, developed a 68-item questionnaire. Factor analysis was conducted to validate the questionnaire with separate samples for EFA (n=331) and CFA (n=330).

Results: EFA supported the four factors structure with 35 high loading items and which extracted 54% of the variance. Cronbach's alpha coefficient and reliability values received (more than 0.7) for all constructs. The CFA further confirmed the construct, convergent and discriminant validity of the questionnaire measuring motivation status with RMSEA=0.059, CFI=0.924, TLI=0.914, SRMR=0.057.

Conclusions: The final question set consisted of 35 items; communication (11 items), support (11 items), self-actualizations (9 items) and basic needs (4 items) which was shown to be a reliable and valid tool to be measure the motivation status among teaching faculties from medical and allied universities in Myanmar.

Keywords: Confirmatory factor analysis, Exploratory factor analysis, Motivation, Questionnaire, Teaching faculties

INTRODUCTION

Motivation is defined as "individual's degree of willingness to exert and maintain an effort towards attaining organizational goals".¹ The motivated employees can take the organizational achievement and demotivated employees can diminish the ongoing functions and achievement of the organization.² Therefore, policy makers should address and assess

influencing factors of health service providers' motivation and set the management strategies.³ In the educational organization, the university administrators should focus on teaching faculties' motivation because the teaching performance is mainly influenced by motivation status of teaching faculties.⁴ As the quality of services and performance of health professionals depend on their personal motivation, policy makers and administrators should be concentrated on that issue.^{5,6}

The world health report 2006 stated that there were more than 59 million health workforce in worldwide situation, however, there was still facing with human resource shortage for about 4.3 million, so, national and international policy makers should be managed by using the evidence based strategic plan to solve the human resource crisis.⁷ Not only the health workforce shortage but also the remaining health workforces' motivation is important and there are so many factors like facilities supply, co-worker relationship, salary, job-related opportunities influencing on motivation which in turn influenced on quality of their performance.^{8,9} The physical working environment conditions, security, incomes are also the influencing factors on motivation.¹⁰

In Myanmar, all categories of health care professionals for health workforce of the country are produced from medical and medical allied universities. The teaching faculties from these universities take a role of training to their students to become a qualified health care professional.

Moreover, the motivation status of teaching faculties is essential as the baseline data for Ministry of Health for future planning and strategies for human resource management in order to maintain the well-functioning medical education system. In addition, there is no standardized and validated questionnaire specific to our country context to assess the motivation status of teaching faculties. Therefore, this study was carried out to fulfill this gap in some extent.

METHODS

The exploratory sequential mixed-methods study was conducted using both qualitative and quantitative approaches of questionnaire development and validation. The study was conducted during the period of 2022 to 2014 and total 16 medical and medical allied universities under the Ministry of Health were included in this study.

Questionnaire development (Qualitative approach)

Conceptualization of constructs

We conceptualized the motivational factors of teaching faculties based on Maslow's hierarchy of needs theory, a famous, simple and widely used motivation model. Maslow stated that physiological needs, safety needs, belongingness and love needs, esteem needs and self-actualization needs.^{11,12,13}

Item generation and modification of questionnaire by expert panels (Delphi method) to get content validity

After doing thorough literature review, initial question item pool was developed based on five constructs – physiological, safety, love and belonging, esteem and self-actualization needs. The questionnaire's content validity was assessed using Delphi method and seven

experts (one teaching administrative staff, two teaching faculties from medical and medical allied universities, two administrative staff, two researchers who had experienced in motivation studies) were purposively selected depending on their experience.

Two rounds of Delphi expert panels were conducted and experts checked the items whether those items should be included or not in the question pool and they can add the items that should be included in the pool. Then, consensus was taken from experts by rating each of the question item as “not at all representative”, “somewhat representative”, or “clearly representative” for the assessment of the motivation status. The item content validity index (I-CVI) was calculated and removed the items with I-CVI less than 0.7.¹⁴

As for the second round, the first-round results were sent to the same experts for taking consensus again which items should be included in the questionnaire and had been asked for checking the correctness of domain membership, wording and sequencing of the items. Five points Likert scale was used for each selected item in the questionnaire.

The questionnaire also included a socio-demographic characteristic of participants and questions relating the factors affecting on motivation concerned with working environment, benefit-related factors, job-related factors, and related factors with immediate superior.

Pre-testing of the questionnaire to obtain face validity

Pre-testing was conducted among 10 teaching faculties from nursing and midwifery school, Naypyitaw who have at least one year teaching experience and 10 clinical staff from 1000-bedded General Hospital, Naypyitaw who have at least one year service to ensure questionnaire's comprehensibility and readability.

Questionnaire validation (Quantitative approach)

Data collection and items purification by exploratory factor analysis

After Delphi method, 68 items were generated. Therefore, minimum required sample size for this study was 340 (at least 5 participants per 1 item) and another study suggested that 500 sample size is very good for factor analysis.^{15,16} So, total sample size 661 was obtained in this study.

The teaching staff who had met the inclusion criteria of having one year teaching service and above were selected proportionately from each medical and medical allied universities under Ministry of Health, Myanmar, based on total faculty's proportion. After receiving the approval from the respective authorities and informed consent from the participants, the data was collected using the pre-

tested self-administered questionnaires via online with KoboCollect application.

Regarding data analysis, total sample (661 participants) were divided into two; (331 participants) for exploratory factor analysis (EFA) and (330 participants) for confirmatory factor analysis (CFA). Before conducting EFA, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity (Observed correlation matrix was an identical matrix) assumptions were tested.

After that, EFA was done by using the principal axis factoring extraction method with Promax rotation, it was a most common and widely used multivariate statistical method for determining the factorial structure of questionnaires, validation of the theories and exploring the theoretical constructs. The optimum number of factors to be extracted was checked by scree plot.

The item loadings were assessed to determine the items that collectively and highly correlated to the specific underlying constructs/factors. The inter-factors correlation was also assessed, if the items correlated with both factors were removed to increase discriminant validity. The items were extracted based on both factor loading and interpretability of the factors. The items with low factor loading which is <0.4 were removed at each step of the iteration.^{17,18}

The internal consistency and reliability of all sections of the questionnaire were tested by Cronbach's alpha coefficient, the alpha value <0.67 (poor), $0.67-0.80$ (fair), $0.81-0.90$ (good), $0.91-0.94$ (very good) and >0.94 (excellent), generally ≥ 0.7 will be the good reliability indicator of the specific factor.¹⁹ The items were removed that negatively affected the reliability of latent factors to improve constructs' reliabilities.²⁰ After excluding the items for reliability reasons, EFA was conducted again.

Confirmatory factor analysis to check constructs validity

The proposed EFA model fitness was checked statistically by confirmatory factor analysis (CFA). Since, the targeted sample was already divided into two groups for EFA and CFA, CFA conducted with another subsample. The structural equation modeling (SEM) technique was used to assess model fit and root mean square error of approximation (RMSEA <0.08) with 95% confidence interval, standardized root mean residual (SRMR ≤ 0.08), coefficient of determination (CD1.000), comparative fit index (CFI >0.92), and Tucker Lewis index (TLI >0.92) were used as the model fit indices.¹⁷

The convergent validity of the developed questionnaire was tested by average variance extracted (AVE) for each latent construct and discriminant validity was assessed by composite reliability (CR) and square correlation (SC) among latent variables. If the AVE value is ≥ 0.5 , was regarded as convergent validity is satisfied and if the SC

values of one construct with other construct are less than the AVE value of specific construct, was regarded as discriminant validity is satisfied.^{20,21}

RESULTS

Questionnaire development

After conceptualization on the basic constructs of Maslow's hierarchy of needs theory, the questions items used in 1st round Delphi were 78, after calculating I-CVI, 69 items received I-CVI score >0.83 , 9 items received I-CVI score <0.83 . Among 9 items which received I-CVI score <0.83 , 7 items were deleted. The expert panel discussion was conducted with Zoom application and the remaining 2 items (item no.16 "Relevant policies, guidelines and curriculum for teachers easily access at this university" and item no. 53 "It is not important for me to make my contribution to students becoming good and competent health care providers in the future") were proposed for saving. Those 2 items received agreement to save from experts, therefore, total 71 items were left in the question.

These 71 question items were sent to the same experts as 2nd round Delphi for checking the correctness of domain membership, wording and sequencing of the items (16 items in physiological needs, 2 items in safety needs, 8 items in love and belonging needs, 15 items in esteem needs, 30 items in self-actualization needs). Some experts proposed 12 new items which should be included in the questions according to the theoretical concept; 6 items in safety needs, 2 items in love and belonging needs, 2 items in esteem needs, 2 items in self-actualization needs. The final consensus meeting was held and experts intensively discussed about the correctness of domain membership, wording and sequencing of the items based on 83 items.

The expert panel noticed that some items had a similar meaning, some had not directly concerned with this study, and they removed 15 items. The revised questionnaire with 68 items has been sent to the same Delphi experts via e-mail for taking consensus again confidentially. All of the Delphi experts strongly agreed to all of 68 items; 68-item questionnaire (15 items in physiological needs, 15 items in safety needs, 9 items in love and belonging needs, 14 items in esteem needs, 15 items in self-actualization needs) as final questionnaire. Then, they reviewed the selected items again to ensure the correctness of domain membership and items' wording and sequencing.

Questionnaire validation

Exploratory factor analysis

The univariate item analysis was conducted on sample of (331) participants and all the question items' mean score ranged from 1.98 to 4.32, and standard deviations were from 0.44 to 1.12. The Kaiser-Meyer-Olkin (KMO) value

was 0.88 and which measures the confirmed sampling adequacy. The Barlett's Test of Sphericity also rejected the null hypothesis of correlation matrix was identical. Although the initial questionnaire was developed based on five constructs Maslow's hierarchy of needs theory model, after EFA using principal axis factoring method with promax rotation with Kaiser Normalization which forced to extract four factors from the data according to

the scree plot. The first EFA output showed that among total 68 items; (19 items) loaded in factor 1, (21 items) in factor 2, (16 items) in factor 3, (12 items) in factor 4. To get clean and theoretical meaningful results, eight cross-loading items were removed and EFA was rerun again. After removal of them, there was no more cross-loading items.

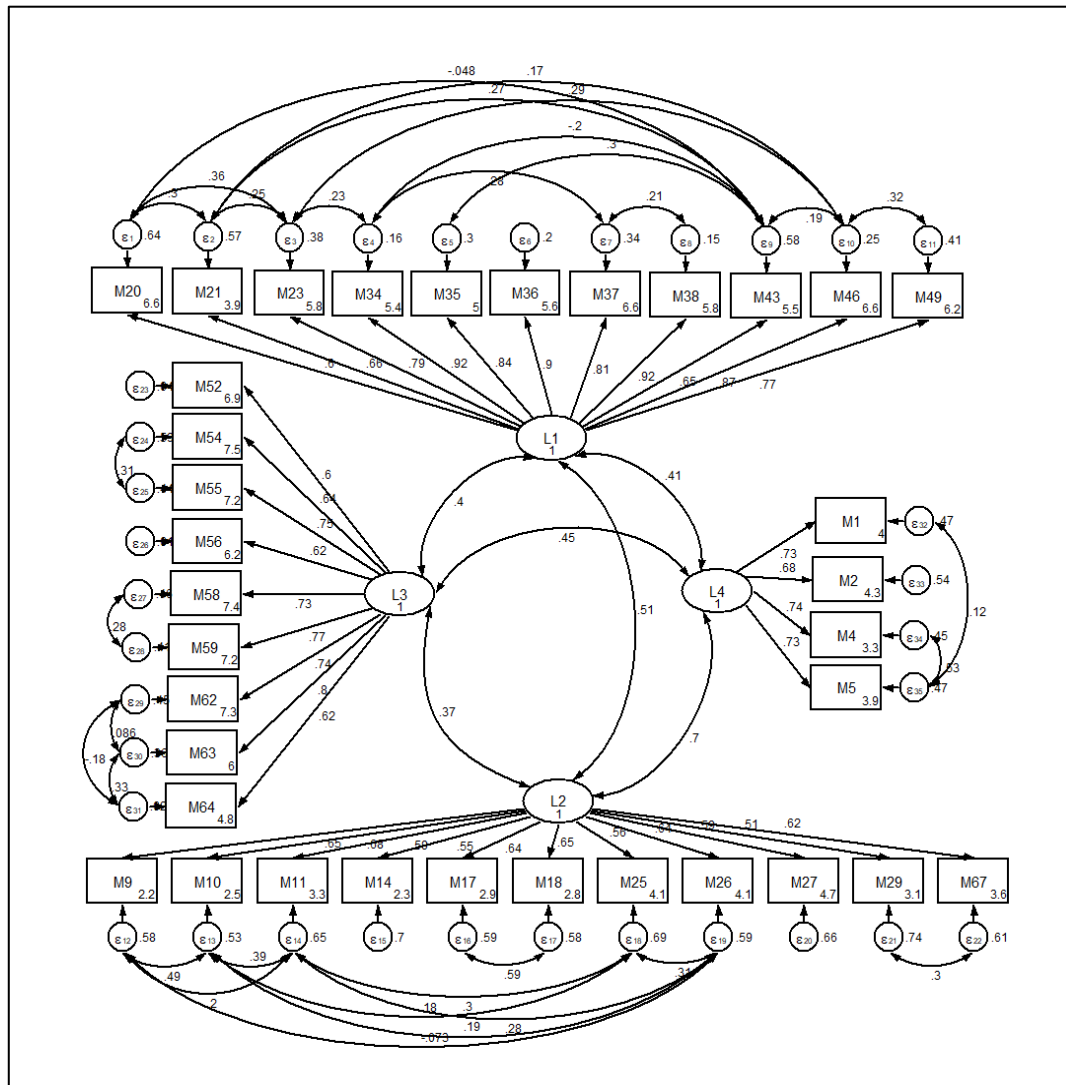


Figure 1: CFA final model for assessing the motivation status of teaching faculties (n=330).

The internal consistency and reliability of each factor was tested by Cronbach's alpha coefficient. The items which were removed to increase the reliability affects the factors loading, therefore, EFA was done again and again for removal of every item for reliability reasons. After that Cronbach's alpha value become 0.949 with 15 items, 0.918 with 14 items, 0.898 with 14 items and 0.815 with 7 items for factor 1, 2, 3 and 4 respectively, the results showed no more items were needed to remove for reliability issues.

Factors were named according to loading items that is Communication (Comm) for factor 1, Support (Sup) for

factor 2, self-actualization needs (self-act) for factor 3 and basic needs (Basic-need) for factor 4. The convergent validity and reliability of each factor was satisfactory in proposed EFA model (Table 1). Factor correlation matrix pointed that no discriminant validity issues in questionnaire developed by EFA because there was no correlation coefficient that exceeded the upper limit of 0.7 (Table 2).¹⁷

Confirmatory factor analysis

There was four factor model with 50-items questionnaire was proposed by EFA to assess the motivation status of teaching faculties. These 4 factors have sufficient

convergent validity and discriminant validity to conduct CFA and also adequate reliability. CFA was conducted with another subsample (n=330).

When conducting the CFA, 11 items were loaded to communication factor, 11 items were loaded to support factor, 9 items were loaded to self-actualization factor, only 5 items were loaded to basic needs factor. The covariance among the latent factors were also assessed and found that positive correlations occur between basic needs factor and support factor and also between communication and self-actualization factors. The CFA initial model was checked the model fit indices (RMSEA-0.059 (95% CI-0.055, 0.064), CFI-0.919, TLI-0.908, SRMR-0.059, CD-1.000, likelihood ratio chi-square p value <0.001) and it showed that CFA initial model was satisfied with model fit.

There were 14 items which were removed during conducting CFA, hence, the initial CFA model was reconfirmed by conducting EFA using principal axis factoring method with promax rotation with 4 factors in EFA dataset (n=331). There was no more cross-loading items and specific items loaded to respective latent factor.

Cronbach's alpha value was 0.940 using 11 items for communication factor, 0.899 with 11 items for support factor and 0.873 with 9 items for self-actualization factor, the results showed no more items were needed to remove for reliability issues. As for basic needs factor, alpha value was 0.799 with 5 items, and basic need 6 was removed in order to increase reliability and also, its factor loading was <0.4. The EFA was reanalyzed again, the results showed that there were no more factor loading and cross-loading issues.

The basic-need 6 item was also removed at initial CFA model and reassessed the model fit indices; RMSEA was 0.059 (95% CI-0.054, 0.063), SRMR was 0.057, CD was 1.000, CFI was 0.924, TLI was 0.914 and Likelihood ratio chi-square p value for the model was <0.001. It showed that all the indices were acceptable for goodness of fit level and CFI, TLI were increased compared with CFA initial model. Therefore, four factors CFA final model with 35-item questionnaire was valid to assess the motivation status of teaching faculties (Figure 1).

CFA final model has good construct reliability and also no issues for discriminant validity because all of the square correlation values were lower than AVE values of their respective factors. While the support factor's AVE value was below 0.5, the remaining factors' AVE values satisfied with convergent validity. Although its AVE value was lower than 0.5, the convergent validity of support factor was acceptable because all factor loading of each item to specific latent factor were more than 0.5 (Table 3).

The final CFA output was final confirmed by conducting EFA, using principal axis factoring method with promax rotation with four factors in EFA dataset (n=331). There were specific items strongly loaded to respective latent factor and average factor loading for each factor was ≥ 0.64 and showed that convergent validity of each factor was satisfactory. All of the reliability coefficients Cronbach's alpha were ≥ 0.83 , the internal consistency and reliability of each factor was satisfied (Table 4). There was no correlation coefficient that exceeded the upper limit of 0.7 pointed that no discriminant validity issue.²²

Table 1: Factor loading results from proposed exploratory factor analysis (50 items) and internal reliability of the factors (n=331).

Item	Factor			
	Communication	Support	Self-actualization	Basic needs
Comm_38	0.951			
Comm_23	0.945			
Comm_34	0.923			
Comm_37	0.912			
Comm_46	0.878			
Comm_49	0.777			
Comm_35	0.767			
Comm_44	0.760			
Comm_20	0.726			
Comm_36	0.684			
Comm_43	0.598			
Comm_21	0.574			
Comm_19	0.567			
Comm_41	0.539			
Comm_48	0.532			
Sup_10		0.921		
Sup_9		0.787		
Sup_26		0.769		

Continued.

Item	Factor			
	Communication	Support	Self-actualization	Basic needs
Sup_28		0.735		
Sup_11		0.726		
Sup_30		0.678		
Sup_27		0.668		
Sup_14		0.629		
Sup_29		0.610		
Sup_18		0.576		
Sup_15		0.522		
Sup_17		0.515		
Sup_25		0.507		
Sup_67		0.420		
Self_act_59			0.817	
Self_act_63			0.776	
Self_act_55			0.769	
Self_act_62			0.717	
Self_act_58			0.694	
Self_act_47			0.610	
Self_act_56			0.596	
Self_act_39			0.594	
Self_act_54			0.582	
Self_act_52			0.573	
Self_act_64			0.560	
Self_act_60			0.547	
Self_act_33			0.487	
Self_act_32			0.459	
Basic_need_4				0.746
Basic_need_5				0.732
Basic_need_7				0.617
Basic_need_6				0.605
Basic_need_2				0.496
Basic_need_1				0.453
Basic_need_8				0.429
Cronbach's α	0.949	0.918	0.898	0.815
% of variance	27.245	10.465	6.807	3.867
Cumulative %	27.245	37.710	44.517	48.384

Table 2: Factor correlation matrix after exploratory factor analysis (n=331).

Factor	Communication	Support	Self-actualization	Basic needs
Communication	1.000			
Support	0.546	1.000		
Self-actualization	0.244	0.203	1.000	
Basic needs	0.394	0.465	0.256	1.000

Table 3: Convergent validity, discriminant validity and construct reliability assessment of CFA final model with four latent factors (n=330).

Constructs	CR	AVE	Squared correlations (SC) among latent variables			
			Communication	Support	Self-actualization	Basic needs
Communication	0.95	0.64	0.64			
Support	0.87	0.37	0.26	0.37		
Self-actualization	0.90	0.49	0.16	0.14	0.49	
Basic needs	0.81	0.52	0.17	0.49	0.20	0.52

Table 4: Factor loading results from final exploratory factor analysis (35 items) and internal reliability of the factors (n=331).

Item	Questions	Factor			
		Communication	Support	Self-actualization	Basic needs
Comm_38	I am satisfied with trusty co-worker relationship	0.944			
Comm_23	I feel motivated if colleagues help each other	0.928			
Comm_37	I am satisfied with the team work around me during work	0.899			
Comm_34	I am satisfied with family-like warmth between the colleagues both inside and outside of work	0.890			
Comm_46	I feel motivated if colleagues respect each other	0.854			
Comm_35	I am satisfied with I can speak openly to my immediate superior faculties about how things are really going at work	0.746			
Comm_49	I feel motivated with the personal support I get from my colleagues when required	0.732			
Comm_20	I am satisfied with there is no physiological harassment at work	0.690			
Comm_36	I feel motivated with good relationship between the colleagues	0.643			
Comm_43	I feel motivated with I get recognition and appreciation concern with my teaching performance from immediate superior faculties	0.552			
Comm_21	I am satisfied with there is no emotional and psychological harm at work	0.549			
Sup_10	I am satisfied with increments in my salary		0.924		
Sup_26	I am satisfied with the special allowances I get		0.835		
Sup_9	I feel my income is in accordance to my education, skills and knowledge		0.736		
Sup_11	I am satisfied with allowance for the uniform and house renting		0.703		
Sup_27	I am satisfied with the opportunities for taking adequate leaves		0.672		
Sup_25	I am satisfied with the pension planned for me		0.615		
Sup_14	I am satisfied with the number of faculties present at work is in accordance with the workload		0.601		
Sup_17	I am satisfied with the presence of social welfare fund to support in some extent if my family or me hospitalized		0.554		
Sup_18	I am satisfied with the presence of health care arrangement for me and, or my family members if facing with health problems		0.517		

Continued.

Item	Questions	Factor			
		Communication	Support	Self-actualization	Basic needs
Sup_29	I feel motivated with the opportunities for promotion available to me		0.493		
Sup_67	I feel motivated with the opportunities for fulfillment of the requirements of my ambition		0.400		
Self_act_59	I take pride in doing my job as well as I can			0.804	
Self_act_63	I feel motivated to be a dependable and reliable teacher			0.772	
Self_act_55	I always prepared to teach well for my next teaching units			0.764	
Self_act_62	I accept that it is important for me to make continuing professional development to teach better			0.723	
Self_act_58	I feel motivated being able to work ethically			0.704	
Self_act_56	I feel motivated the new tasks assigned to me			0.599	
Self_act_64	I accept that I have enough teaching experiences			0.559	
Self_act_54	During teaching, I am completely in my elements			0.549	
Self_act_52	I take my work as a source of social respect			0.537	
Basic_need_5	I am satisfied with availability of adequate number of hand-washing facilities in workplace				0.859
Basic_need_4	I am satisfied with availability of clean and adequate number of toilets in workplace				0.839
Basic_need_2	I am satisfied with the presence of canteen in workplace				0.629
Basic_need_1	I am satisfied with availability of clean and adequate drinking water at work				0.612
Cronbach's α		0.940	0.899	0.873	0.830
% of variance		29.251	11.724	8.695	4.516
Cumulative %		29.251	40.974	49.669	54.185

DISCUSSION

This study intended to develop and validate a questionnaire that can assess the motivation status of teaching faculties from medical and medical allied universities from Myanmar. As for the questionnaire development, this study based on Maslow's hierarchy of needs theory model to assess the motivation status of teaching faculties among various motivation theories because it is the most fundamental, applicable and most widely used theory which can be found in some studies concern with motivation.^{13,23} The questionnaire development steps in this study were carried out according to the best practices for new, valid and reliable scales development in the field of health, social and

behavioral research, which were nine steps in three phases; generation of items and content validity as item development, doing the pre-test, sampling procedure, item reduction and factor extraction as scale development, testing dimensions, checking the reliability and validity testing as scale evaluation.²⁴

Although there are five factors in Maslow's theory, finally, this study was model fit with only four factor model which are communication, support, self-actualization and basic needs. The study findings still consistence with Maslow's theory because some items concern with safety needs, love and belonging needs strongly correlated and loaded to one factor as a communication factor. The study findings which were

co-worker relationship, recognition from supervisor, job related safety, personal values, self-esteem and facilities present at work strongly consistent with the findings of other study which was also intended to develop a validated tool by conducting the factor analysis to assess the motivation status among the clinicians.²⁵ In the present study 35 items covered four factors and self-esteem and self-actualization which was reported as one of the latent constructs for motivation status of teaching faculties. Consistent finding was reported in a study from Kenya, aimed to develop a measurement tool for assessing motivation, whereas ten items covered three factors of organizational commitment, job satisfaction and conscientiousness after conducting factor analysis.²⁶ Another study of mixed-method design study conducted in Vietnam, also explored job satisfaction, worker interaction as factors among six factors after doing factor analysis.²⁷ The reason for the consistent of the results of this study with other studies because the study population are more or less the same based on the health care professionals.

Many national and international motivation surveys emphasized on primary health care workers and clinicians who are serving as frontline workers in the health care system and on the other hand, the studies relating with the motivation status of teaching faculties were limited, although they are a crucial point of qualified human resource production. Moreover, there is no standardized and validated questionnaire specific to our country context. This study has provided a standardized and validated question tool to measure the motivation status of teaching faculties. The findings from this study will be useful in policy making process and create the supporting measures to retain the human resource of faculties.

The strength of the present study is that being the first study which can develop and validate a questionnaire for assessing the motivation status of teaching faculties from medical and medical allied universities in Myanmar. In addition, as the study involved the participants from all medical and allied medical universities in Ministry of Health, the study results could be generalized to all the teaching staff in medical field in Myanmar.

CONCLUSION

The study provided that a validated 35-item questionnaire with four specific constructs (communication, support, self-actualization and basic needs) of motivation status among teaching faculties from medical and medical allied universities in Myanmar.

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