



Nurses' Job Satisfaction – the Factor Structure of the Minnesota Satisfaction Questionnaire

Dariusz Walkowiak¹

<https://orcid.org/0000-0001-8874-2401>

Rafał Staszewski²

<https://orcid.org/0000-0001-9062-0737>

¹ Department of Medical Law, Organization and Management in Health Care, Poznan
University of Medical Sciences, Poznan, Poland

² Department of Hypertension, Angiology and Internal Medicine,
Poznan University of Medical Sciences, Poznan, Poland

Address for correspondence:

Dariusz Walkowiak
Department of Medical Law, Organization and Management in Health Care
Poznan
University of Medical Sciences, 39 Przybyszewskiego Str.
60-356 Poznan, Poland
e-mail: dariuszwalkowiak@ump.edu.pl

Abstract

Introduction: There is a consensus that it is employees who have a decisive influence on the success of the organization in which they work. The problem of professional satisfaction of the personnel of health care system units, nurses in particular, seems to be one of the key issues. Of course, the most important is the amount of expenditure on the health service and the size of the contract with the National Health Fund (NFZ), but the managers of health care units have, at most, limited influence on them. Despite limited expenditure on health care, it is still possible to motivate employees and influence their satisfaction with their work.

Materials and methods: A study of job satisfaction among nurses has been conducted in two large public hospitals using the Minnesota Satisfaction Questionnaire (MSQ). Exploratory factor analysis (EFA) has been conducted.

Results: A total of 292 nurses completed the MSQ questionnaire (response rate 77.9%). Only questionnaires with all 20 questions answered have been analyzed (64.3% of all distributed). It seems that job satisfaction of nurses is influenced by four main factors. The first of the factors may be named "Satisfaction with supervision", the second – "Satisfaction with the consistence with self and chances of promotion", the third – "Satisfaction with remuneration and working conditions" and the fourth – "Satisfaction with usefulness and accomplishment".

Conclusions: Our results suggest that the job satisfaction of nurses from our study group cannot be measured as intrinsic and extrinsic satisfaction only. The results we obtained suggest that perhaps both intrinsic and extrinsic factors are more complex structures and seen in such a perspective will allow for better use in managing job satisfaction.

Key words: nurses, job satisfaction, MSQ, exploratory factor analysis

Introduction

The Minnesota Satisfaction Questionnaire (MSQ) is a commonly used measure of job satisfaction, widely used in different industrial branches as well as in services. MSQ was developed “to make feasible to obtain a more individualized picture of worker satisfaction than it was possible using gross or more general measures of satisfaction with job as a whole. The individualized measurement is useful because two individuals may express the same amount of general satisfaction with their work but for entirely different reasons” [1]. The team working on MSQ constructed a questionnaire to be scored on three scales: intrinsic satisfaction, extrinsic satisfaction and general satisfaction. This division of satisfaction resulted from factor analysis carried out by Weiss and colleagues on the material gathered during studies on different professions, including nurses. Although MSQ was based on the theory of work adjustment [2, 3], later MSQ was usually considered to refer to Herzberg’s two-factor (motivators and hygies, M-H) theory [4]. Some researchers claim that Herzberg’s theory influenced not only MSQ but also other measurement tools measuring worker satisfaction with both intrinsic and extrinsic factors [5, 6]. Empirical research conducted in various sectors has shown that factor loadings from MSQ scores strongly confirm Herzberg’s theory of motivators and hygies and were almost perfectly divided between intrinsic and extrinsic items proposed by Weiss and colleagues [7, 8, 9]. Nevertheless, some of the researchers using MSQ have claimed that the originally proposed subscales are confounded and therefore inadequate, with suggestions to change them [10]. Some found no important revision to be necessary [11].

In 2016 [12] Locke overviewed his own 1976 article in the Handbook of Industrial and Organizational Psychology [13] and wrote that Herzberg’s theory was no longer considered valid, as both so-called M and H lead to satisfaction and dissatisfaction as well. Doubts arose decades earlier: as early as 1977 Gardner wrote “Results do not always support Herzberg; in fact, only about one in three do so. Donald Hebb once said that when it is a question of survival, theories are like women – fecundity

is more important than purity. M-H theory has certainly been very fertile – more so perhaps than any other theory in applied social psychology. Many industrial psychologists have not only survived but indeed thrived on the theory. The fecundity of the theory is not in doubt, but its purity certainly is highly suspect” [14].

The purpose of the present study has been to examine the factor structure of the MSQ for hospital nurses, and confirm or reject its two-factor (intrinsic and extrinsic) character.

Materials and methods

A study on job satisfaction among nurses was conducted in two large public hospitals in western Poland. During the study, 375 questionnaires were distributed among nurses in the hospital (all of them, except for those on long-term sick leave or holidays at the time of data collection), 292 of whom were completed. Participation in the study was fully voluntary. The study was conducted using the Minnesota Satisfaction Questionnaire (MSQ) in a shortened version (20 questions). The questionnaire was constructed on the basis of Likert's 5-point scale. MSQ was supplemented by short information about respondent, containing questions about gender, age and professional experience. The questionnaires were administered in such a way as to ensure full objectivity of the evaluations and complete anonymity when answering questions. The data collected in the questionnaires were verified and checked for completeness, quality and consistency. We received 241 questionnaires with all 20 questions answered, while in 51 questionnaires 1 or 2 answers were missing. Consequently, only the fully completed questionnaires were included in the study. They were then coded and analysed using the STATISTICA 12.5 statistical package (StatSoft Inc., Tulsa, USA). The Cronbach alpha coefficient for the variables forming the MSQ was 0.892, which indicates good internal consistency of scores from the total scale. Exploratory factor analysis (EFA) was conducted using FACTOR 10.5.03. An attempt to determine the number of dimensions with optimal implementation of Parallel Analysis (PA) was not fully satisfac-

tory. Polychoric correlations were used to determine dispersion matrix. Minimum Rank Factor Analysis (MRFA) was used for factor extraction. Principal axis factoring with oblique (direct Oblimin) and orthogonal (Varimax) rotation produced similar results when determining the underlying factor structure of the MSQ. Results from the Varimax rotation were reported for simplicity of interpretation. Raw Varimax was used for rotation to achieve factor simplicity and weighted Varimax was used for clever rotation starts.

Results

An analysis of the Mardia's multivariate asymmetry skewness and kurtosis was conducted. We computed the polychoric correlation matrix between 20 items from the MSQ. Polychoric correlation is advised when the univariate distributions of ordinal items are asymmetric or with excess of kurtosis. The results of comparisons show that the solutions obtained using polychoric correlations provide a more accurate reproduction of the measurement model used to generate the data than using Pearson correlation [15, 16]. Standardized variance matrix was calculated using polychoric algorithm (Bayes modal estimation). Then adequacy of the polychoric correlation matrix was checked and KMO value was 0.869 (meritorious), which indicated that the items were meaningful to be factorised. The Bartlett test of sphericity was significant ($p=0.00001$), which indicated correlation among the items [17].

Then parallel analysis (PA) based on minimum rank factor analysis was conducted and eigenvalues of the reduced correlation matrix were calculated. Random correlation matrices were obtained using permutation of the raw data. PA is based on comparing each eigenvalue to random eigenvalues: the aim is to retain only those factors which are related to an amount of variance larger than the amount of variance of random factors. The results suggested a one factor structure. The Keyser criterion (eigenvalue over 1.00) suggested a five-factor structure. Since the fifth factor contained only one loading, also this hypothesis was rejected. Finally, a four-factor solution was obtained (see table 2 and table 3).

Root Mean Square of Residuals (RMSR) = 0.0561. Expected mean value of RMSR for an acceptable model = 0.0645 (Kelley's criterion). RMSR represents a quantitative index which describes the average size of residual correlations once predicted response frequencies have been fitted to correspond with observed response frequencies.

Table 1. Explained variance based on eigenvalues

Variable	Eigenvalue	Proportion of variance	Cumulative proportion of variance
1	7.81999	0.39100	0.39100
2	1.66363	0.08318	0.47418
3	1.30762	0.06538	0.53956
4	1.18481	0.05924	0.59880
5	1.04000	0.05200	0.65080
6	0.95141	0.04757	
7	0.79888	0.03994	
8	0.75413	0.03771	
9	0.65228	0.03261	
10	0.59818	0.02991	
11	0.51809	0.02590	
12	0.47161	0.02358	
13	0.42140	0.02107	
14	0.40678	0.02034	
15	0.33565	0.01678	
16	0.30739	0.01537	
17	0.26816	0.01341	
18	0.23304	0.01165	
19	0.16104	0.00805	
20	0.10591	0.00530	

Table 2. Unrotated loading matrix

Variable	F 1	F 2	F 3	F 4	Communality
1	0.648	0.271	-0.063	-0.367	0.788
2	0.682	0.281	0.204	-0.107	1.000
3	0.686	0.383	0.055	-0.154	0.725
4	0.690	0.224	-0.047	-0.045	0.777
5	0.658	-0.272	-0.444	-0.143	0.833
6	0.646	-0.406	-0.364	-0.265	0.890
7	0.593	0.125	0.055	0.318	0.701
8	0.366	0.041	0.149	0.130	0.490
9	0.561	0.333	0.317	-0.298	1.000
10	0.419	0.203	-0.049	0.426	0.551
11	0.756	0.288	0.023	0.104	0.878
12	0.696	-0.350	0.126	-0.123	0.959
13	0.395	-0.618	0.585	-0.067	1.000
14	0.704	-0.002	0.094	0.138	0.588
15	0.718	-0.083	-0.299	0.235	0.933
16	0.634	-0.050	-0.036	0.336	0.739
17	0.484	-0.365	0.291	0.187	0.633
18	0.468	-0.056	-0.162	0.063	0.577
19	0.650	-0.182	-0.254	-0.062	1.000
20	0.694	-0.029	0.163	-0.086	0.872

Table 3. Rotated loading matrix (loadings lower than absolute 0.4 omitted)

Variable	F 1	F 2	F 3	F 4
1				0.699
2				0.693
3				0.735
4				0.567
5	0.811			
6	0.843			
7		0.568		
8				
9				0.760
10		0.599		
11		0.484		0.604
12	0.484		0.537	
13			0.931	
14		0.443		0.401
15	0.565	0.545		
16		0.583		
17			0.589	
18				
19	0.620			
20				0.491

Discussion

This study provides insights into some of the factors that have an important effect in explaining the variation in describing job satisfaction of nurses in Poland. It seems that job satisfaction of nurses is influenced by four main factors. In each of them 3 to 8 variables are included. The first of the factors may be named "Satisfaction with supervision", the second – "Satisfaction with the consistence with self and chances of promotion", the third – "Satisfaction with remuneration and working conditions" and the fourth – "Satisfaction with usefulness and accomplishment." Our results did not confirm the factor structure of MSQ proposed by Weiss and colleagues

[1], neither the follow-up developed by Schriesheim et al. [10]. Reviewing works on the subject of MSQ factor structure we found major differences among them. Koelbel et al. [8] obtained a two-factor structure in the group of 132 nurse practitioners and midwives, and found results to be consistent with the predictions of Herzberg's theory: intrinsic factors served as sources of job satisfaction, while extrinsic factors were the primary source of job dissatisfaction. In 1994 in her doctoral thesis [7] Kem confirmed three factors in MSQ in a group of 202 academic librarians in Florida. Tan and Hawkins [4] obtained three factors in the group of 87 participants of vocational rehabilitation. In 2004 Hancer and George [18] identified a four-factor structure in the group of 924 restaurant employees. In a group of 136 participants Ferreira [19] identified two factors. Similarly, a two-factor structure was found by Martins and Proença in the group of 140 hospital workers in Portugal [20]. Ingram and Głód obtained five factors in the group of 75 hospital workers in Poland [21]. Buitendach and Rothman found a two-factor structure in the group of 474 industrial employees in South Africa [22]. Frye obtained a four-factor structure in the group of 135 American hotel front office managers [23]. BegümÖtken and Okan identified a three-factor structure among 399 blue collar workers in Turkey [24]. Issa obtained a six-factor structure among 325 Jordanian hospital employees [25].

Naturally, at least some of these differences can be explained on the basis of contemporary knowledge. Job satisfaction levels have not been found to be the same in different countries [26, 27]. As Argyle concludes in his book about psychology of happiness [28], in prosperous countries '[m]aking individuals or countries richer has very little effect on their subjective well-being'. Because factor structure was studied in different countries, some part of the differences in the results may be traced to differences in the collective mental programming of people in one country that made them distinct from the people from other countries [29]. This can be expressed in employee motivation, management style, and organizational structures of companies, which finally may influence job satisfaction [30]. We should also consider another explanation for the

differences observed by various researchers: at upper levels of organisations, satisfaction and performance may be manifested differently than at lower levels [31]. A decrease in job satisfaction in consecutive years has also been described for various countries [32, 33].

It seems that difficulties in standardising the factor structure of job satisfaction in health care might be due to various additional circumstances. Mottaz suggested that “the level of work satisfaction among nurses tends to be somewhat lower than levels found in other professional occupations groups” [34]. Czerw and Borkowska writing about professions with a social mission speculated that work commitment largely determines job satisfaction, as well as work performance and satisfaction with the decision to choose such a profession [35]. Research conducted by Tellez on California nurses [36] suggests that influence of important improvements in the working conditions of nurses, such as increasing nurse-to-patient ratios, significantly increased nurse job satisfaction only in the mid-term, post-implementation period, whereas long-term effects were less clearly characterized. A major job satisfaction gap was observed between private and public healthcare sector employees. Differences were found not only in salaries [37, 38, 39]. Marković and colleagues found significant differences in job satisfaction between healthcare personnel working on primary level and working on secondary and tertiary level – not only in general results but also on the subscales characterizing different aspects of job [40]. Aiken et al. found major differences in job satisfaction among nurses in 12 European countries [41]. Therefore, considering circumstances mentioned above, any research on job satisfaction of nurses may result in a different picture of job satisfaction.

There is no one proper procedure for the appropriate use of EFA, or no clear recommendations on how to reach a decision during conducting EFA. Moreover, some of the recommendations seem to be contradictory with others. However, we would like to emphasize the importance of some of them. First, as Howard [42] wrote, analysing the EFA conducted by various researchers, “a surprising number of authors did not even mention their factor analytic method, and only stated that they perfor-

med 'factor analysis'. This is extremely problematic, as readers cannot be certain of the validity of results and replication becomes impossible." Second, the sample size and the number of variables selected when conducting EFA was widely discussed [43, 44, 45]. There is no sample size limit to conduct EFA, because the demands are modulated by the communalities of the variables, the correlations among factors, and the number of variables that define each factor [46]. However, most authors agree that in some circumstances too small sample size may lead to inadequate constitution of the scale. Third, the level of the total item variance that is explained is important. Too low level of explained variance may lead to significant measurement error, with important part of variance not explained. Nunnally and Bernstein [47] stated that "initial factors are usually difficult to interpret; the goal [of a FA] is to explain the most variance (or related property) with the smallest number of factors." Finally, it is not recommended as a basic rule to retain factors with eigenvalues higher than 1 (Kaiser's rule), as it is usually recommended to retain an excessive number of factors [48]. It seems that in some of MSQ factor analyses mentioned above, these recommendations were not fully followed and probably not all MSQ factor analyses may be compared.

An analysis of our four-factor dimension structure led us to propose a two-factor solution, in which each of the two factors (intrinsic satisfaction – I and extrinsic satisfaction – E) consists of two out of four factors obtained in factor analysis (see table 4). Factor E consists of F1 and F3 (see table 3), and factor I – of F2 and F4.

The results of our two-factor structure shown above gave results similar to those received directly as two-factor by Weiss et al. [1] and also by Schriesheim et al. [10]. It is worth mentioning that we also tested in our loading matrix a two-factor structure; however, the RMSR of the two-factor structure was higher (0.0761) than the expected mean value of RMSR for an acceptable model. As RMSR was larger than Kelley's criterion value, the direct two factor model cannot be considered as good. Although the results obtained using this method gave a structure similar to the original extrinsic/intrinsic/general job satisfaction, it is worth men-

tioning that the two-step procedure with four factor extraction matches better the original Weiss structure. However, it seems that a four-factor structure finally may fit MSQ model better and probably better describes job satisfaction in our study group.

Problems with duplicating original factor structure are quite common in job satisfaction research. McCloskey/Mueller Satisfaction Scale (MMSS) was originally developed for use with hospital staff nurses and planned as eight factors [49]. Tourangeau et al. [50] were unable to replicate original eight factors using confirmatory factor analysis and finally obtained 7 factors using EFA. Lee et al. [51] came to a 5-factor solution. In the Czech Republic Gurkova et al. [52] obtained a 6-factor solution. In Slovenia Prosen and Piskar [53] found 7 factors in the conducted MMSS. It may also be that the FA of job satisfaction leads to different results depending on a whole range of factors within and outside the organization. And the results obtained may differ from each other.

Conclusion

Our results suggest that the job satisfaction of nurses from our study group cannot be measured as intrinsic and extrinsic satisfaction only. Job satisfaction seems to include four factors; arriving at a two-factor structure is possible, but only as a result of combining factors obtained in EFA. The results we obtained suggest that perhaps both intrinsic and extrinsic factors are more complex structures and seen in such a perspective will allow for better use in managing job satisfaction.

Table 4. Two factor MSQ structure compared with Weiss and Schriesheim structures

Variable	Our results	MSQ Weiss [1]	MSQ Schriesheim [10]
1. Being able to keep busy all the time.	I	I	I
2. The chance to work alone on the job.	I	I	I
3. The chance to do different things from time to time.	I	I	I
4. The chance to be "somebody" in the community.	I	I	G
5. The way my boss handles his/her workers.	E	E	E
6. The competence of my supervisor in making decisions.	E	E	E
7. Being able to do things that don't go against my conscience.	I	I	I
8. The way my job provides for steady employment.	(I)	I	E
9. The chance to do things for other people.	I	I	I
10. The chance to tell people what to do.	I	I	I
11. The chance to do something that makes use of my abilities.	I	I	I
12. The way company policies are put into practice.	E	E	E
13. My pay and the amount of work I do.	E	E	G
14. The chances for advancement on this job.	I	E	G
15. The freedom to use my own judgement.	I/E	I	I
16. The chance to try my own methods of doing the job.	I	I	I
17. The working conditions.	E	G	E
18. The way my co-workers get along with each other.	(E)	G	E
19. The praise I get for doing a good job.	E	E	G
20. The feeling of accomplishment I get from the job.	I	I	I

Values in parentheses show the highest loading for each factor between 0.3 and 0.4. In the case when two factors have the loading higher than 0.3, two factors are given, separated by a slash, with the higher-loading factor first.

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