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Examining factorial validity and internal consistency of Professional Quality of Life (ProQoL-9) among care aides working in Long-term Care (LTC)

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Abstract

Background The ProQoL (30 items) is a widely used instrument of work-related quality of life for health care workers. Recently, a shorter 9-item version of the ProQoL was developed and validated among palliative care workers. The ProQoL-9 consists of three subscales: compassion satisfaction (CS), burnout (BO), and compassion fatigue (CF). Care aides (personal support workers, nursing assistants) are an understudied population in terms of their professional quality of life. It is critical to use validated instruments to measure their experiences. The purpose of this study was to examine the internal consistency and factorial structure of the ProQoL-9 among care aides working in LTC.

Methods We used surveys collected by the Translating Research in Elder Care (TREC), a pan-Canadian program that collects longitudinal surveys from the healthcare workforce in the LTC. We used TREC surveys containing information on demographics, characteristics of LTC homes (e.g., ownership model), and the ProQoL-9. Our sample included all care aides who completed TREC surveys in the province of Alberta, Canada, from 2020–2021. We examined internal consistency via alpha and omega coefficients. To examine the factorial structure, we conducted confirmatory factor analysis (CFA) testing one factor, two factors (CF and BO together & CS), and three factor models (CF, BO, and CS).

Results $N = 760$ care aides completed the surveys in Alberta. The majority were female (90.79%) and worked in general LTC units (55.29%). The Cronbach's alpha results showed an overall $\alpha = 0.56$ for the whole scale and adequate reliability of the subscales ($\alpha = 0.73$ for CS, $\alpha = 0.68$ for CF, and $\alpha = 0.75$ for BO). The omega reliability results for all the subscales were ≥ 0.70, reflecting good internal consistency (BO = 0.77, CS = 0.73, and CF = 0.70). The three-factor model had the best goodness of fit values, reflecting an adequate goodness of fit ($X2 = 165.82$, $DF = 24$, $X^2/DF = 6.9$, $P < .0001$, RMSEA = 0.08, CFI = 0.92, TLI = 0.89).

Conclusions The ProQoL-9 is a valid and reliable instrument among care aides in LTC. The factorial structure shows that this shorter version of the ProQoL is rigorously designed and can be utilized by health service researchers in LTC.

Keywords ProQ0L-9, Care aides, Factorial structure

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Background

Job related burnout has gained the attention of researchers in recent years, particularly since the COVID-19 pandemic [1]. Care aides, sometimes referred to as nursing assistants (personal support workers), are unregulated health care workers that make up the majority of the workforce in Long-Term Care (LTC). Care aides are prone to many stressors and are at risk of job burnout [2]. The Professional Quality of Life (ProQoL) instrument is often used by researchers to measure burnout and other measures of the quality of life for individuals employed in helping professions such as nurses and care aides. The original ProQoL was first developed by Stamm (30 items) and argued to have two subscales: Compassion Fatigue (CF) and Compassion Satisfaction (CS). The CF sub scale was argued to further be composed of sub scales Burnout (BO) and secondary traumatic stress. Higher score on CS reflects a better sense of satisfaction from working as a care aide. Higher CF and BO scores reflect higher risk for fatigue due to care giving and higher risk of BO, respectively [3].

While the ProQoL (30 items) has been widely used in various studies, it has been under scrutiny since it was developed. Researchers argued that items are not well constructed. In particular, the factor structure of the ProQoL has been under question [4]. A recent meta-analysis conducted on the factorial structure of the ProQoL using the results of 27 international studies encouraged researchers to use a parsimonious version of the ProQoL [5]. The ProQoL-9 was developed to address the need for a shorter tool that is theoretically and psychometrically sound. The shorter version of the ProQoL (ProQoL-9) consists of 9 items which has three subscales—CS, CF, and BO—and became available in 2020. The ProQoL-9 was initially validated among Spanish palliative care providers. The goal of the ProQoL-9 was to provide a shorter version while retaining items that adequately represent the ProQoL subscales [6]. To date, no study (other than the developers of the ProQoL-9) has examined the factorial structure of the ProQoL-9. A few studies have examined the reliability of the ProQOL-9, which was found to be adequate [6, 7]. One such study assessed the impact of COVID-19 on healthcare workers in the ICU. The reliability analysis revealed good alpha values for CS ($\alpha = 0.84$), CF ($\alpha = 0.84$), and BO ($\alpha = 0.68$) [7].

To build psychometric evidence for the ProQoL-9, variation that exists within different health systems and healthcare workers should be captured [8]. However, no psychometric evidence of the ProQoL-9 has been reported for care aides working in LTC settings. While the ProQoL-9 developers hypothesize a 3-factor solution, because there has been only one study using the ProQoL-9 reporting psychometric properties, we proposed to examine the reliability and find the best model fit for the ProQoL-9 among care aides working in LTC for 3 models. The research aims were to examine:

1)A one-factor model in which all the items are loaded into a single factor representing the ProQoL-9.
2)A two-factor model consisting of a joint CF and BO factor as well as an independent CS factor.
3)Three-factor model consisting of CF, CS, and BO.

Methods

We used data from the Translating Research in Elder Care (TREC) program in this retrospective study. TREC is a pan-Canadian health service research program that has collected longitudinal data from regulated and unregulated healthcare workers in LTC since 2008. The goal of TREC is to improve the quality of care for residents and healthcare professionals working in LTC [9]. To date, TREC has completed seven waves of data collection. For this study, we used Wave-6 data collected during the COVID-19 pandemic (2021–2022) from care aides. Our participants included care aides in the province of Alberta, Canada. Eligibility criteria was to have worked in the same unit in the LTC home for ≥ 3 months with at least 6 shifts monthly [9]. We had conducted cognitive interviewing prior to administering the ProQoL-9 surveys to ensure that care aides understand the complex wording of items. We invited five care aides with ESL for the interviews. Results showed that care aides understood the items well. Only after concluding that care aides understood the items sufficiently, we use the ProQoL-9 for our study. This study was approved by the Ethics Board at the University of Alberta Pro00037937.

Statistical analysis

We used descriptive statistics, including means, standard deviations, and ranges for continuous variables and frequencies and percentages for categorical variables.

Internal consistency

We assessed internal consistency using Cronbach's alpha and omega. We considered Cronbach's alpha [10] and omega values ≥ 0.70 as acceptable [11]. We computed both Cronbach's alpha and omega reliability testing because α is concerned with correlation between items, whereas omega [11] better reflects the true population estimate [12]. We calculated the item–total correlation to determine the degree to which each survey item contributes to the consistency of the ProQoL-9 [13]. We also computed inter-item correlation to assess how each ProQoL item score is related to all other items in the

ProQoL-9. This was done to examine whether the items are capturing the same content [14].

Factorial structure

To examine the factorial structure, we conducted confirmatory factor analysis (CFA) using three a-priori factor structures outlined in the aims. CFA allows the examination of internal structural validity [15]. To determine goodness of fit, we used a variety of indices including chi-square, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Tucker–Lewis Index (TLI). A CFI and TLI cutoff value closer to 0.95 will lead to lower levels of type II error [16]. Therefore, to assess the model fit, we followed these criteria: CFI > 0.90 and TLI > 0.90 to reflect adequate fit and CFI > 0.95, TLI > 0.95 to reflect good fit [17]; RMSEA closer to 0.053 to demonstrate good fit [18]. We used SAS Enterprise Guide version 8.4 for all the analyses.

Results

Care aides' characteristics

The total sample was 760 care aides from the province of Alberta, Canada. The majority of the care aides were female (90.79%), were ≥ 40 years old (74.61%), had English as their second language (75.23%), and worked in the general LTC unit (55.29%). The care aides had high levels of compassion satisfaction (12.98 ± 2.02), medium levels of burnout (6.93 ± 2.73) and low levels of compassion fatigue (5.51 ± 2.25). The demographic characteristics of the care aides and the LTC home characteristics are presented in Table 1.

Table 1 Characteristics of care aides in our sample (*N* = 760)

Variable				
Care aides' characteristics	N	%		
Age				
< 30	51	6.71		
30–39	142	18.68		
40–49	253	33.29		
50–59	203	26.71		
> = 60	111	14.61		
Gender				
Male	68	8.95		
Female	690	90.79		
Other/missing	2	0.26		
English as the first language				
Yes	188	24.77		
No	571	75.23		
	M	SD	Min	Max
Years of experience	11.98	8.75	0	43
ProQoL subscales (possible range 1–15)				
Burnout	6.93	2.73	1	15
Compassion Fatigue	5.51	2.25	3	14
Compassion satisfaction	12.98	2.02	4	15
	N	%		
LTC home characteristics				
Zone				
Edmonton	460	60.53		
Calgary	300	39.47		
Size				
Large > 120 beds	556	73.16		
Medium (80–120 beds)	126	16.58		
Small (< 80 beds)	78	10.26		
Ownership model				
Private for profit	222	29.21		
Public not for profit	144	18.95		
Voluntary not for profit	394	51.84		
Unit type				
General LTC	418	55.29		
Non-secure dementia	56	7.41		
Secure dementia	157	20.77		
Secure mental health/psychiatric	19	2.51		
Other	106	14.02		

Internal consistency

The Cronbach's alpha for the whole scale of the ProQoL-9 was 0.56. For the subscales, Cronbach's alpha was 0.68 for CF, 0.73 for CS, and 0.75 for BO. The omega coefficient value was 0.77 for BO, 0.73 for CS, and 0.70 for CF. Item characteristics are summarized in Table 2.

Confirmatory factor analysis

We tested one, two, and three-factor models using CFA. The one-factor model represented all 9-items loaded together showing poor goodness of fit indices (RMSEA = 0.16, CFI = 0.74, TLI = 0.64). The two-factor model also did not show adequate fit (RMSEA = 0.10, CFI = 0.89, TLI = 0.85). While the model fit improved in the two-factor model, it was still not within the acceptable cutoff. The three-factor model had the best goodness of fit indices among the three models and overall showed adequate fit indices (RMSEA = 0.08, CFI = 0.92, TLI = 0.89) based on the criteria we had initially set out (CFI > 0.90 and TLI > 0.90). The model fit indices are presented in Table 3. We also present diagrams for the three tested models in Fig. 1.

Discussion

This is the first study, of which we are aware, to investigate the factorial structure of the ProQoL-9 in care aides (or any group) working in LTC settings. The majority of the participants were female with ESL and

Table 2 Item characters and reliability of ProQoL-9

Variable	Item (range 1–5)	α[1]	CITCR[2]	MICC[3]
CF1	I think I have been affected by the traumatic stress of my residents (CF)	0.38	0.50	2.03
BO1	I feel trapped by my job as a care aide (BO)	0.44	0.33	1.69
CS1	I like my work as a care aide (CS)	0.56	−0.03	4.43
CF2	I feel depressed because of the traumatic experience of my residents (CF)	0.41	0.41	1.85
CS2	My work makes me feel satisfied (CS)	0.59	−0.14	4.17
BO2	I feel worn out because of my work as a care aide (BO)	0.42	0.40	2.52
BO3	I feel overwhelmed because my workload seems endless (BO)	0.41	0.41	2.72
CF3	As a result of my work, I have frightening intrusive thoughts (CF)	0.44	0.34	1.63
CS3	I am happy that I chose to do this work (CS)	0.57	−0.07	4.37

[1] α Cronbach's α coefficient with deleted variables, [2]*CITCR* Corrected item-total correlation, [3]*MIIC* Mean Inter-Item Correlations

Table 3 Model fit indices from the confirmatory factor analysis of three models

Model	X^2	DF	X^2/DF	*P*	CFI	TLI	RMSEA	90%CL
One factor	537.38	26	20.66	< .0001	0.74	0.64	0.16	0.15–0.17
Two-factor	229.25	26	8.81	< .0001	0.89	0.85	0.10	0.09–0.11
Three-factor	165.82	24	6.9	< .0001	0.92	0.89	0.08	0.07–0.10

worked in large size LTC home. Since in countries such as Canada, the majority of care aides working in LTC are immigrants and have English as their second language [19], the results generated from this study may be applicable to other regions and countries with similar composition of care aide workforce working in LTC settings.

The Cronbach's alpha for the ProQoL-9 as a whole scale did not meet the threshold that we had set for adequate internal consistency (≥ 0.70). However, all the ProQoL-9 subscales showed good internal consistency, as evidenced by the alpha and omega coefficients. While Cronbach's alpha is inadequate for estimating reliability, we used it in this study because health care researchers often use and expect this reliability index in psychometric studies. Cronbach's alpha should be interpreted with caution, as the omega coefficient provides a better estimate of reliability [20].

Our results confirm that the three-factor ProQol-9 consisting of subscales of CF, CS, and BO had the best factorial structure compared to the one and two-factor models. The only psychometric study on the ProQoL-9 factorial structure was conducted with palliative care health care workers. The results of this study revealed an adequate factor structure (3-factor model) among the Spanish speaking palliative care professionals in Brazil, Argentina, and Spain (CFI = 0.92), with good internal consistency (all of the subscales had $\alpha > 0.70$). The other factorial structure studies have been conducted on the longer versions of the ProQoL. These studies support a three-factor model factorial structure consisting of CS, BO, and secondary traumatic stress [21, 22].

Validation studies on the factorial structure of the ProQoL are valuable. The ProQoL, published by Stamm, has information on only Cronbach's alpha, reflecting its reliability, without providing any information on validity, especially the factorial structure of the ProQoL [1]. Because care aides are not well-studied and there is a growing interest in understanding the quality of life among health care professionals, this study provides an opportunity for researchers to use the ProQoL-9 with emerging evidence of factorial validity as well as reliability. We recommend that future researchers validate the ProQoL-9 in other settings in which care aides typically work, such as acute and hospice care. Managers and directors of care in LTC homes may benefit from this validation study and be interested to use the ProQoL-9 as a management tool to gain insight into staff work-related quality of life.

Strenghts and Limitations

A strength of our study is our large sample size, a novel participant group and setting, and both reliability and validity assessment. The care aides in our sample also had diverse backgrounds (e.g., age and English as the first language). We investigated reliability indices via the omega coefficient, which adds to the strength of our psychometric analysis. Our study has some limitations. The majority of our participants were women. Therefore,

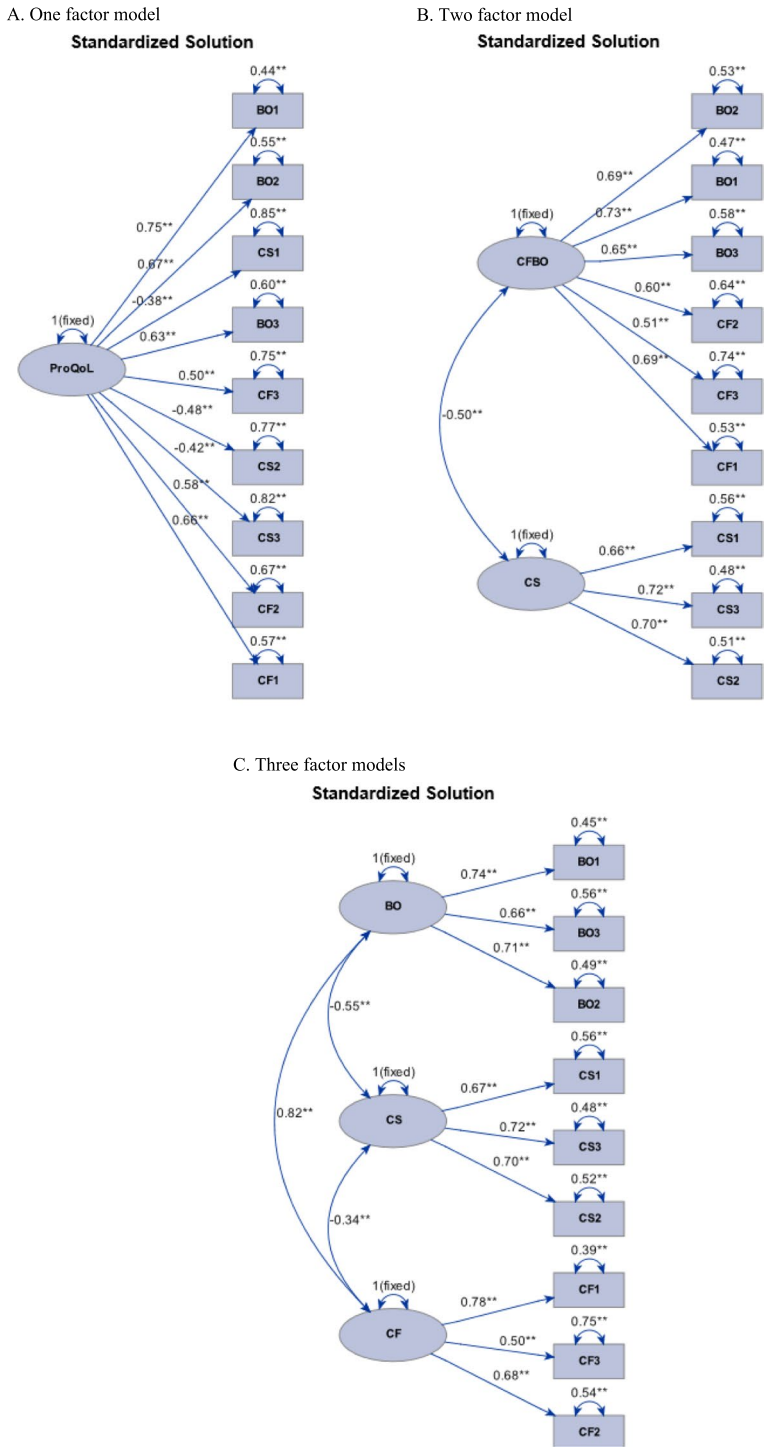

Fig. 1 Graphical summary of one-factor, two-factor and three-factor models. **A** One factor model. **B** Two factor model. **C** Three factor models

the results may not be applicable for health care occupations with other gender identities. We conducted this analysis in Alberta LTC homes, where contextual factors influencing professional quality of life may differ from those in other provinces or jurisdictions.

In this manuscript, we did not investigate the influence of demographics on response differences and factorial structure of ProQoL-9, thus it is possible that demographic characteristics such as age and length of service may influence the results.

Conclusion

The internal consistency assessment showed acceptable levels for the ProQoL-9 subscales. The three-factor model of ProQoL-9 with subscales of CF, CS, and BO demonstrated adequate fit. This validation study is an important step towards using the ProQoL-9 in LTC research.

Authors' contributions

All authors contributed to the concept and design of the study. SS conducted the analysis based on AW recommendations and expertise. All authors reviewed analysis and contributed to the draft of the manuscript.

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Data availability

The data used for this article are housed in the Health Research Data Repository (HRDR) in the Faculty of Nursing at the University of Alberta, in accordance with (a) the health privacy legislation of participating TREC jurisdictions and (b) ethics approvals of universities and institutions participating in TREC. The data were provided under specific data sharing agreements only for approved use by TREC within the HRDR. Where necessary, access to the HRDR in order to review the original source data may be granted to those who meet pre-specified criteria for confidential access, available from data unit in TREC.

Declarations

Ethics approval and consent to participate

We conducted our study in alignment with the Declaration of Helsinki. We obtained ethics approval from the Ethics Board at the University of Alberta (#Pro00037937). We explained the study purpose, risks and benefits to the participants using the informed consent form approved by ethics board at the University of Alberta. We clarified that participation is voluntary prior to obtaining consent. We obtained informed consent from all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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