Health-related Quality of Life and Determinants of the Mental Dimension Among Tunisian Nurses in Public Hospitals

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Abstract

Background: *The objectives of this study are to evaluate the health-related quality of life (HRQOL) among nurses in Tunisian public hospitals and to identify the determinants of its mental dimension.* **Methods:** *A cross-sectional, bi-centric study was conducted within a representative sample of the 1,179 nurses assigned to 28 departments of two Tunisian public hospitals (n=301). A structured inquiry (socio-professional characteristics, occupational perceived workload) and validated questionnaires (Short-Form 12 Health Survey, Job Content Karasek's Questionnaire, Work Ability Index) have been completed. Statistical analysis was based on the χ^2 test for simple cross-tabulation, whereas multivariate analysis of correlations was based on multiple linear regression.* **Results:** *The response rate was equal to 97.34% (n=301). The mean age of nurses was 42.60±21 years, and nearly half of them (49.07%) had a poor mental quality of life. The multivariate analysis suggested an association between mental HRQOL and female gender (β=-.060), obesity and lack of regular physical activity (β=.0.89), musculoskeletal diseases (β=-.0.41), and poor ability to work (β=.387). This deterioration of the mental HRQOL dimension was also associated with job tenure (p=0.002), perceived workload (p=0.015), conflictual relationships with colleagues (β=.049), feeling of insecurity at work (β=.049), and the intention to leave the profession early (β=-.065).* **Conclusion:** *The results of this study showed that a considerable number of nurses had a poor mental quality of life. This study also identified factors associated with this deterioration. Acting on these determining factors may improve nurses' well-being and global health, as well as their work performance and the quality of care provided.*

1. Introduction

The health-related quality of life (HRQOL) is a multidimensional concept that has been increasingly investigated in the medical sciences and various disciplines [1-3]. It is difficult to assess the HRQOL given the broad range of definitions and the lack of a uniformly accepted and specific one [1-4].

Globally, HRQOL is a multidimensional concept that refers to a person's well-being in the areas of life likely to be affected by physical and psychological health status [4, 5]. Recent studies on nurses' HRQOL have concluded that it may closely affect the care quality, influence patient satisfaction, and affect the population's health at large [2, 4]. The mental dimension of this HRQOL may also

increase the risk of error and endanger patient safety [7].

However, to the best of our knowledge, very few studies have focused on assessing HRQOL among this specific occupational category, in general, especially in northern African countries such as Tunisia [2]. The current study aims to evaluate the HRQOL among nurses in Tunisian public hospitals and identify its mental dimension determinants.

2. Methods

2.1. Study Subjects

A cross-sectional study was conducted with a representative sample of 1,179 nurses practicing in two of the largest public hospitals in central Tunisia. The sample size was calculated with Epi info software (version 06) according to the fixed level of accuracy for the results (n=301). The demographic and general characteristics of the study subjects are summarized in Table 1.

A sample was randomly drawn and matched according to age, gender, and work schedule. Nurses assigned to exclusively administrative tasks, and thus not directly involved in patients' care, were excluded. We also excluded nurses suffering from psychological or neuropsychiatric disorders, such as psychosis and neurodegenerative diseases, based on their occupational Medical records.

Thus, based on including and excluding criteria, the sample matching was based on the proportions of age, class, gender, and work schedule among the 882 performing nursing activities (Figure 1).

In the random sample of 301 nurses, the response rate was equal to 97.34%. The sex ratio (male/female) was 1.06 (men=51.53%), and the mean age (±SD) was 42.60±21years. Nurses aged 45 and over accounted for 53.92%. The mean nurse job tenure (±S.D) was 18.51±12.87 years [1-40 years].

Day workers accounted for 37.91% of nurses, constantly assigned to the night shift 15%, whereas 47.10% of nurses alternated day and night work. The always night work schedule was experienced by 71.33% of nurses during at least one month throughout their career, with mean duration (±SD) equal to 5.63±7.54 years.

Table 1. Sociodemographic, health and occupational characteristics of the sample.

Characteristics	
Sex ratio, male/female	1.06 (51.53%)
Age, years	42.60±2
Shift of work	
Nightshift	209 (71.3%)
Average duration, years	5.6±7.5
BMI*	
Average BMI, kg/m^2	26.5±3.5
Overweight	122 (41.6%)
Obese	61 (20.8%)
Workability index (WAI):	
Excellent or good	177 (60.4%)
Bad	116 (39.6%)
Perceived mental workload	
"Heavy"	133 (45.4%)
"Moderate"	135 (46.1%)
"Mild"	25 (8.5%)
Professional relationships	
Conflictual relationships with colleagues	181 (61.8%)
Conflictual relationships with superiors	166 (55.3%)
Job strain	58 (19.8%)

* *Body Mass Index.*

The mean body mass index (BMI) was 26.51± 3.49 kg/m^2 [17.4-8.3 kg/m^2]. Among subjects, 41.64% were overweight, and 20.82% suffered from obesity without statistical difference between males and females.

2.2. Questionnaires and Data Collection

The Ethics Committee of the University Hospital Taher Sfar of Mahdia approved the study (P03-MT-2017). The inquiry form was completed during almost a half-hour individual and direct interview, the first part of which was dedicated to informing the participants of the study's objectives and collecting their informed consent.

The form investigates the HRQOL within the Short-Form 12 Health Survey, Version 1 (SF-12v1) [8, 9]. This generic HRQOL questionnaire was developed based on the long-Form 36
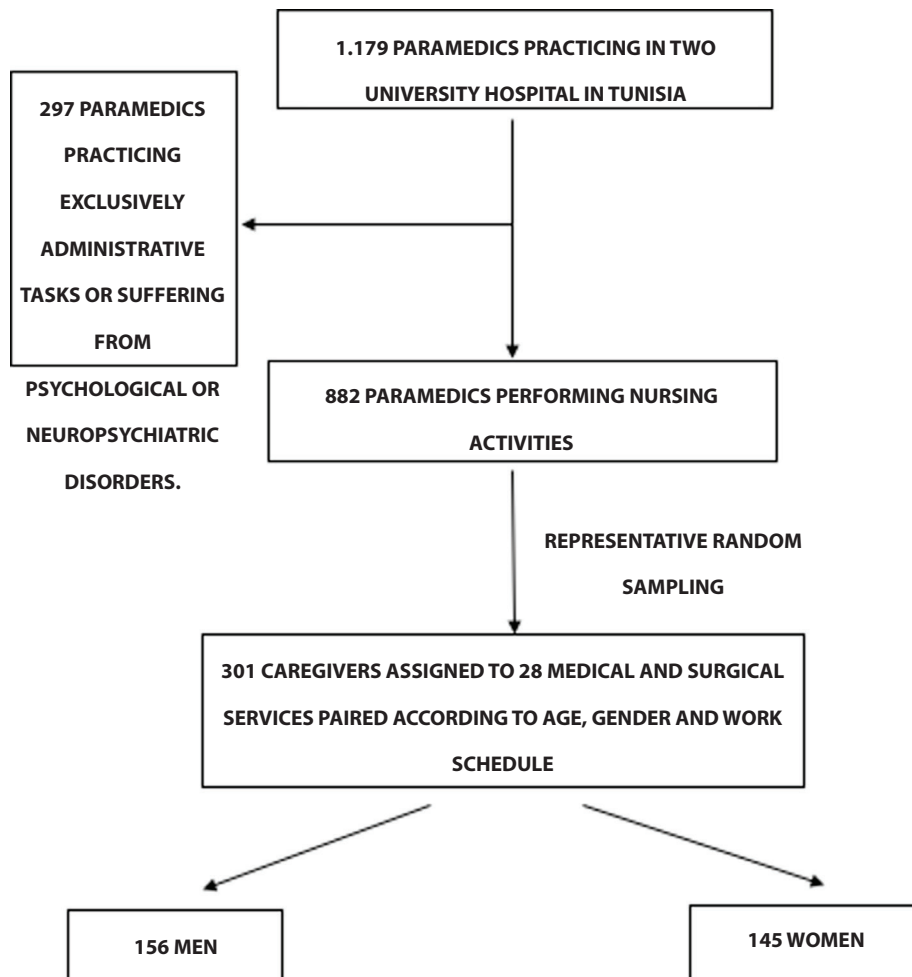
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┌─────────────────────────────────────────┐
│ 1.179 PARAMEDICS PRACTICING IN TWO       │
│ UNIVERSITY HOSPITAL IN TUNISIA           │
└─────────────────────────────────────────┘

┌──────────────────────┐
│ 297 PARAMEDICS        │
│ PRACTICING            │
│ EXCLUSIVELY           │
│ ADMINISTRATIVE        │
│ TASKS OR SUFFERING    │
│ FROM                  │
│ PSYCHOLOGICAL OR      │
│ NEUROPSYCHIATRIC      │
│ DISORDERS.            │
└──────────────────────┘

┌─────────────────────────────────────────┐
│ 882 PARAMEDICS PERFORMING NURSING        │
│ ACTIVITIES                               │
└─────────────────────────────────────────┘

REPRESENTATIVE RANDOM SAMPLING

┌─────────────────────────────────────────┐
│ 301 CAREGIVERS ASSIGNED TO 28 MEDICAL    │
│ AND SURGICAL SERVICES PAIRED ACCORDING   │
│ TO AGE, GENDER AND WORK SCHEDULE         │
└─────────────────────────────────────────┘

┌──────────────┐         ┌──────────────┐
│ 156 MEN      │         │ 145 WOMEN    │
└──────────────┘         └──────────────┘
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Figure 1. Study subjects: Flowchart of the random sampling.

Health Survey (SF-36). This shorter form (12 items) – like the standard version – calculates two scores: the Mental Component Score (MCS) and the Physical Component Score (PCS). These scores, obtained following the "original" scoring methods proposed by Ware et al., range from 0 to 100 [5]. A zero score indicates the lowest level of dimension measured by the scale, and 100 indicates the highest level of the measured dimension of HRQOL. The median score of the study population can be used to classify subjects' HRQOL [5, 7, 10].

This paper focused on the mental component score (MCS), which has shown good sensitivity (S.N.) and specificity (S.P.) [11]. According to the median MCS of the sample, two groups were

identifiable: (i) the group of individuals with a poor mental quality of life, having a score lower than the median value of the population, and (ii) the group of individuals with a good mental quality of life with a score equal or higher than the median value of the population. The inquiry also investigated work constraints and work ability. Indeed, the perceived workload was assessed through a one-dimensional scale. This evaluation consisted in asking the operator to evaluate the workload associated with his / her current activity. Moreover, Karasek's Job Content Questionnaire (JCQ), a widely adopted questionnaire to assess psychological work-related factors, was used in its validated French version. This questionnaire was designed to evaluate psychological

demands and decision latitude and to identify job strain situations defined by a ratio of job demands/ decision latitude >1. Items assessing social support at work were combined to estimate better the psychosocial risks related to work [12, 13].

Work capacity was assessed by the validated French version of the work ability index (WAI). According to this seven-dimensional scale, work ability ranges from 7 to 49 and is classified as: poor, moderate, good, or excellent [13-15].

Nurses were also questioned about back and upper limb Musculo Skeletal Diseases (MSDs) symptoms', during the 12 months preceding the survey.

Moreover, there were additional questions associated with the inquiry form. These questions referred to the job tenure in the health sector, the feeling of uncertainty about continued employment (Job insecurity), and the desired retirement age and its reasons or motivations if nurses express any intention of early departure (before the legal age of retirement: 60 years).

2.3. Statistical Analysis

For data analysis, we calculated the means± standard deviations (S.D.), medians, and ranges of the quantitative variables. The χ^2 test was used for the comparison of two or more variables with statistical significance of Pearson coefficient set at <0.05

In order to investigate the association of HRQOL mental dimension with the sociodemographic, health, and work-related variables, multiple linear regression analysis was used. MSC was used as the dependent variable for the initial model, and a statistical thresholding set at 10% in simple cross-over was used to introduce variables. Analyses were conducted using SPSS statistical software (version 21.0).

3. Results

About one-third (31.68%) of nurses had at least one disease confirmed by a medical diagnosis. Over the 12 month period preceding the survey, 69.62% of them reported Musculo Skeletal Diseases (MSDs) of the back, and 51.20% reported at least one upper limb MSDs.

3.1. Work Constraints and Ability

Among nurses, 119 (54.40%) described their perceived workload as "heavy", 135 (46.10%) felt it was "moderate" and only 25 of them (8.50%) found it "mild".

Moreover, according to the Karasek's questionnaire, 58 nurses (19.79%) were under Job strain. Among them, 39.9% mentioned the absence of support among colleagues and 44.7% among superiors. A feeling of job insecurity was reported by 73.72% of nurses. This feeling was more common among workers who reported a heavy perceived physical load (p=0.001) and those working regular night shifts (p=0.021).

The mean work ability index (WAI) was equal to 40±6.28 [21-49]. According to this index, 60.41% of the subjects felt that their work ability was excellent or good, and 39.59% considered it poor. Among nurses, the WAI decreases with age (p=0.005).

Moreover, 77.48% of nurses expressed the intention of early departure. The mean age of retirement desired was equal to 54.13±4.10 years. The main reasons for nurses' willingness to leave the profession were related to the high job strain and work conditions 34.5% and their health status 25.9%. This intention was more commonly expressed among young workers (age <45 years) (p <10^{-3}) and female gender (54.18% women versus 45.82% men) (p=0.04).

3.2. Quality of Life Assessment and Its Determinants (Table 2)

According to the S.F. 12 scale, the mean component score of physical HRQOL (PCS) was 42.64±3.22 [17.96-63.62]. Nearly half of nurses (47.09%) had a low PCS. This latter deteriorated with age, the prevalence being lower among young workers than in older ones (p<0.001). The prevalence of PCS was lower among nurses with low back pain (p<0.001) and those having upper limbs MSDs (p<0.001). Besides, physical HRQOL deteriorated with a heavier perceived workload (p=0.031) and the intention of early departure (p=0.024).

The mean mental component score of HRQOL (MCS) was equal to 42.57±11.62 (14.83-71.64). Among nurses, 49.8% had a low MCS compared

Table 2. Multivariate analysis of determinants of mental quality of life.

Model	Non-standardized coefficients		Standardized coefficients	
	Beta	S.E.	Beta	p
Female gender	-1.394	8	-.060	.010
Physical regular activity	1.570	7	.089	.027
Professional tenure <15 years	.207	1	.234	.002
Perceived physical load as light	-18	7	-.089	.015
MSDs back	-1.028	1	-.041	.000
MSD upper limb	-.274	4	-.039	.002
WAI	.716	5	.387	.000
Desire of premature leave	-.186	1	-.065	.007
Relationship with colleagues	.983		.049	.006
Job insecurity feeling	.629	7	.049	.034

*** Positive coefficient expresses a positive correlation between the variable and a better mental HRQOL(higher MCS).*

to the sample's median. During the last four weeks preceding the survey, 41.98% of nurses could not complete tasks at work as much as they would like to. During this period, 24.91% felt sad and down, while 83.28% felt confident about the future. Nurses perceiving their mental workload as "heavy" had a lower MCS without a statistical difference (p=0.06). However, the MCS was statistically lower among nurses with low physical component score HRQOL (PSC) (p=0.015). Moreover, the MCS was lower among nurses with back and upper limbs MSDs (p equal to 0.002 and <.001, respectively) and those expressing the intention to leave work in the healthcare sector prematurely (p=0.001).

In the final explanatory model of the multiregression analysis, a better mental HRQOL dimension was related to:

- General characteristics of the individual (male gender, regular physical activity);
- Nurses' health status (the absence of upper limbs and back MSDs, the elevated WAI);
- Professional characteristics (low job tenure);
- Occupational constraints (good relationships with colleagues, absence work in safety feeling, low perceived workload, and the absence of intention to leave prematurely).

This model explains only 35% of the variations of the mental quality of life (R^2=0.35), with interesting model predictive capacities (meaning of variation of F <.001) and low collinearities between the explanatory variables (VIF indices <10).

4. Discussion

A bi-centric cross-sectional study was conducted to evaluate the HRQOL of Tunisian nurses working in public hospitals. This paper focused on mental HRQOL and its determinants. The response rate was higher than that in similar studies in the health care sector [1, 4, 16]. Several scales have been proposed to evaluate the quality of life as a global approach to the individual's health status [2, 17, 18]. The "Short Health Study Questionnaire", commonly known as The Short Form Health Survey derived from the "Medical Outcome Study", is one of the most widely used standardized tests [5, 9, 19]. The Mental Component Summary score of SF-12 (MCS) includes five items and has shown good performance in evaluating mental well-being and impairment related to mental problems [1, 5, 8, 11].

In the current study, the mean MSC score of the SF-12 questionnaire was 42.57±11.62 (14.83-71.64), with poor mental HRQOL noted among half of the surveyed nurses. This score was

lower than that reported in 2014 in a sample of the general Tunisian population (n=3,582) and equal to 47.96 [9]. A survey conducted on 246 nurses who worked at Greece's public and private hospital units concluded a comparable MCS score (45.50±11.18) (20). Similar results were reported by Arslani et al., who concluded that poor mental HRQOL occurred among 41% of Iranian nursing staff (n=520) with the lower mental health of these nurses compared to the average of the general population of Iran [16].

According to the current results, the MSC score was correlated with individual and health characteristics and professional constraints. A literature review of papers published in English or Japanese between 1995 and 2012 and focusing on nurses' HRQOL and its predictors concluded eight categories of factors: personal characteristics, health behaviors, job-related personal characteristics, organizational characteristics, interpersonal relationships, perceived work environment, occupational stress and stress coping [21].

Gender was found to be the only demographic determinant of MCS in nurses. Indeed, lower mental HRQOL was noted among females compared to men. Several authors agree on the impact of gender on the quality of life. Many support that females have a lower mental dimension in the Qol [22-25]. Ruiz-Fernández et al. conducted a study with 1,521 nurses working in healthcare centers in eight Spanish provinces and observed a gender difference in mental HRQOL evaluated by SF12 questionnaires, with lower women's mean MSC scores compared to those of men [26]. Among the forwarded hypotheses, extra-professional burdens partly explain this deterioration (such as work-family conflict) [3, 22-25].

According to our results, advancing age was not a determinant factor of nurses' mental dimension Qol. In contrast, Oyama and Fukahori objectivated that ten studies selected in their literature review established that increased age was related to better mental health [21].

Moreover, in our study, nurses' MCS was statistically correlated with the physical dimension of HRQOL and some physical diseases and limitations. Indeed, the mean PCS score was 42.64±3.22, with a poor physical QoL noted among half of the nurses (50,9%) and a low self-assessment of their work ability among 39,59% of them. These latter issues were statistically correlated with the decrease in the MCS score of SF12.

Different authors have reported comparable results [3, 4, 27-29]. A recent study conducted among 585 nurses in Cypriot public hospitals with the SF-12 questionnaire concluded a positive linear relationship between the physical and the mental HRQOL dimensions (r=0.634, p=0.000) [3]. Underestimating one's ability to do their work effectively could affect their experience and mental QoL [27-29]. This theoretical approach could explain the decrease in the mental HRQOL dimension in the case of limited physical abilities.

Additionally, obesity was noted among 62.46% of the interviewed staff and was correlated with a decreased mental HRQOL. A cross-sectional online survey was conducted among the adult population in the USA that controlled for comorbidities and concluded that the physical and mental dimensions of HRQOL decrease with increasing BMI, particularly among women for mental HRQOL [30]. Obesity alters self-image, creates a sense of incapacity and underestimation of one's abilities and additional and increases stress which leads to a lower mental HRQOL, with even depression or compulsive behavior that could further increase weight [30-32]. In addition, our nurses' lack of regular physical activity was associated with a lower mental HRQOL. Several studies conducted among adults have demonstrated that being physically active is substantially linked to a positive impact on HRQOL, reflected by the promotion of mental and physical well-being. These studies suggest that individuals with a sedentary lifestyle and Physical inactivity pay less attention to their health, leading to a decrease in their HRQOL [33, 34]. However, several organizational factors have been reported as barriers to healthy eating and physical activity among nurses, such as changing and atypical schedules [35, 36].

According to these results, during the 12 months preceding the current survey, MSD symptoms of the upper limbs were noted among 51.20% of nurses, and back problems were reported by 69.62%. The analysis concluded a negative correlation between

MCS score and MSDs for upper limbs and back localization. Several studies have reported that nurses are at a higher risk of MSD, negatively impacting their physical and mental HRQOL [37, 38]. A recent study conducted among 2170 Chinese nurses reported a total prevalence of MSDs of 79.52%, with a significant decrease in both physical and mental dimensions of HRQOL among the affected nurses [38]. This relationship between MSDs and HRQOL may be explained by frustration and stress associated with functional limitations, particularly gestures required during care activity, and low levels of work motivation [37, 39].

Additionally, the mental dimension of the HRQOL was statistically more impaired among nurses with heavy workload perception, those reporting a feeling of job insecurity, those with a desire to leave the nursing sector prematurely, and those with conflicting professional relationships.

Heavy workload is commonly reported as one of the leading occupational stressors among nurses [40]. The perceived workload is associated with the nurse-patient ratio, inadequate resources, patient dependency, undone tasks, and planned activity interruptions [33, 40, 41]. The perception of heavy workload levels reduced efficiency and performance, limited nurses' job satisfaction, emotional exhaustion, and even burnout, in addition to a willingness to leave the nursing field prematurely and adverse patient outcomes and medication errors [2, 24, 42, 43].

In these series, lower mental HRQOL was associated with work insecurity, noted among 73.72% of questioned nurses, and the intention to leave the profession prematurely was expressed by 77.47 %. Recent research highlights the link between organizational issues, occupational job dissatisfaction, and nurses' intention to leave prematurely [24, 42, 44].

Organizational specificities of nurses' jobs are important predictors of stressful work environments [44, 45]. The stress experienced by nurses is mainly associated with conflictual relations between care team members, organizational factors such as role ambiguity, and unsocial working schedules [36, 42, 44]. Although findings observed in this study did not retain autonomy at work as a determinant factor of mental HRQOL, this correlation was reported by many authors [46]. The feeling of well-being

associated with this autonomy allows freedom of planning and executing work, positively impacting the HRQOL [45, 46].

According to our results, nurses' conflictual relationships with superiors and colleagues negatively affected their mental HRQOL. Stress related to a conflicting psychosocial environment deteriorates work motivation, which is fundamental to facing activity demands, notably in highly psychological or emergency-demanding situations [41, 45, 46].

In total, our cross-sectional study was confronted with some limitations. One of the most critical limitations was the relatively small sample size. In addition, the variability of nurses' occupational characteristics, specifically regarding professional tenure. In conclusion, according to this study, the MCS score was impaired among nurses, and this impairment was more pronounced in women not practicing any regular physical activity, suffering from MSDs, or having unfavorable working conditions (characterized by a heavy workload, conflictual relationships, the feeling of insecurity or a desire to retire early). Priano et al., based on a literature review, concluded that healthy lifestyle behaviors, good physical activity and a healthy diet contribute to better HRQOL among nurses [47]. Furthermore, supplementary interventional research studies must be conducted to assess the impact of these factors on improving the well-being and global health of nurses, their work performance and quality of care provided, and patient security.

Louvain, who was behind the Tunisian-Belgian collaboration project and had actively and decisively contributed to the design of the study, its implementation and the analysis of the results.

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