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# Psychometric characteristics of the multidimensional scale of perceived social support in ostomy patients and their caregivers

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## Abstract

Despite the importance of social support in ostomy care, the Multidimensional Scale of Perceived Social Support (MSPSS) does not appear to be validated in the context of ostomy care. This study evaluated the psychometric characteristics of MSPSS in ostomy patients and their informal caregivers. The MSPSS was tested in a sample of 775 participants with confirmatory factor analysis. Internal consistency reliability was assessed with the ordinal Omega coefficient. Criterion-related validity was ascertained via hypothesis testing by correlating the scores of the MSPSS with other measures. MSPSS for patients and caregivers has a three-factor structure with a good fit. Internal consistency reliability of the factors was excellent. Concurrent validity was supported by the negative correlations between MSPSS scores with depression and stoma-related QoL, and the positive correlations with perceived mutuality. Our research indicates that the MSPSS is a sound measure of social support for ostomy patients and their caregivers.

## Keywords

social support, MSPSS, psychometrics, surveys and questionnaires, factor analysis, statistical, ostomy

## Background

The creation of a stoma (or ostomy) is a common procedure performed as part of the treatment of benign and malignant diseases. Approximately 2 million people worldwide have a stoma, of which 650,000 live in Europe (FAIS, 2018), and 70,000 in Italy (Menin et al., 2019), where this study was conducted.

The placement of an ostomy typically affects the life of the individuals in several ways including changes in diet habits, clothing, travel plans, physical activity, sexuality, social interactions, and job responsibilities (Stavropoulou et al., 2021; Villa et al., 2018). Moreover, individuals undergoing a stoma surgical procedure may

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experience undesirable effects that include poor body image, depression, maladjustment, and physical (e.g., sexual dysfunctions and stoma complications) and social repercussions (e.g., anxiety, loneliness and isolation; Gomez et al., 2014; Recalla et al., 2013; Villa et al., 2018, 2019), with detrimental consequences for overall quality of life (Gomez et al., 2014; Villa et al., 2019).

In order to effectively manage their ostomy and reduce the risk of complications, patients need to have adequate sources of social support (Nam et al., 2019). The term "social support" describes an individual's attachment to a social source that provides care and security as well as satisfaction with the support received. This source may be tangible (e.g., practical assistance), emotional (e.g., empathy) and informative (e.g., advise; Fleury et al., 2009; Peplau, 1985).

People who suffer from chronic conditions mostly receive social support from families, friends, neighbours, and healthcare providers (Tomaka et al., 2006). The research of social support in the context of ostomy care is scant, but it is known that the informal support provided by families, friends and others may reduce ostomy-related complications and facilitate adaptation to the device (Ayalon & Bachner, 2019; Giordano et al., 2022; Nam et al., 2019; Villa et al., 2019). Other evidence can be found in studies of patients affected by chronic conditions; for example, Liu et al. (2016) showed that family support protects individuals from depression and other mental health problems and higher levels of perceived social support are also associated with lower disease burden (Kim and Son, 2021; Yildirim et al., 2023), improved ability to adapt to the chronic condition and cope with stress (Karataş and Bostanoğlu, 2017). Finally, previous findings highlight that individuals with high social support are more likely to have better self-care abilities than the others (Riegel et al., 2012; Villa et al., 2019).

Informal caregivers of patients with ostomies are generally the main source of reference for these individuals (Giordano et al., 2022), because they can substitute the actions of care or prompt the patients to perform self-care behaviours. However, to optimally deliver this function, these caregivers, in turn, need to have a sufficient network of support. There is little evidence in the context of ostomy care, but we know at least that a preserved support network leads to less frequent depression symptoms and unpleasant experiences than those with lack of social support (Palma et al., 2012). In other chronic conditions, research has shown that support from others and the degree of interaction between patients and caregivers affect caregivers' ability to support patient self-care (Iovino et al., 2021; Vellone et al., 2019). Social support is linked to lower caregiver stress (del-Pino-Casado et al., 2018) and also has a beneficial impact on caregivers' health, including emotional resilience (Donnellan et al., 2017; Yildirim et al., 2023), caregiving burden (Lök and Bademli, 2021), and quality of life (Brand et al., 2016). Having a significant support network helps caregivers cope with the distress of not being able to care for their relatives and interact with other people in similar situations (Maia and Assis, 2019).

Over the years, social support has become a key multidimensional construct in the field of chronic care, resulting in the development of several self-report tools to measure this contribution. In recent decades, perceived social support has garnered prominence in research due to its superior ability to predict psychological well-being compared to objective measures (Kim and Son, 2021; Liu et al., 2016; Yildirim et al., 2023). Notable examples of perceived support measures include the Social Support Questionnaire (Sarason et al., 1983) which tallies the number of people the respondents think as supportive, and the Inventory of Socially Supportive Behaviours (Barrera et al., 1981), which evaluates the frequency of various supportive behaviours perceived by the respondents. However, these and other self-report questionnaires fall short in distinguishing between specific sources of support networks. To address this limitation, Zimet et al., (1988) introduced the Multidimensional Perceived Social Support Scale (MSPSS) designed to quantify social support from family, friends, and significant others, separately. Assessing the support of each of these groups in the life of individuals with chronic conditions and their caregivers, is crucial as this allows researchers and clinicians to determine which domains are more accurate indicators of physical and psychological well-being, enabling the development of customized interventions.

Despite the importance of social support in ostomy management, the MSPSS has never been validated for ostomy patients and their informal caregivers. The availability of this measure in the context of ostomy care would shed further insights on the perception of social functioning of this population, where such a device leads to inevitable changes of their social networks (Silva et al., 2017). Moreover, this tool would facilitate a more nuanced screening of social support and its role in improving patient and caregiver outcomes.

## Materials and methods

### Aim

The aim of this study was to evaluate the psychometric characteristics of the Multidimensional Scale of Perceived Social Support (MSPSS) in ostomy patients and their informal caregivers.

### Design

The psychometric characteristics of the MSPSS were tested on a purposive sample of ostomy patients and their informal caregivers by using a cross-sectional design.

### Sample and data collection

The sample was recruited from seven outpatient clinics for ostomy patients across central and northern Italy. To be recruited patients had to meet the following inclusion criteria: (a) having an ostomy for any diagnosis for more than one month, including elective and urgent cases; (b) being more than 17 years of age; (c) being able to speak Italian; and (d) providing written consent to participate in the study. Individuals with confirmed cognitive impairment (as determined by a Six Item Screener score of less than 4), were excluded. To be enrolled, caregivers had to be identified by patients as their informal caregivers and provide written informed consent. After the approval of the Institutional Review Board, the nurse research assistants recruited the participants at the outpatient clinics at the time of their visits.

### Instruments

*Multidimensional scale of perceived social support (MSPSS).* The MSPSS is a self-reported 12-item instrument used to measure the adequacy of social support received from others (Zimet et al., 1988). Scale items assess whether family, friends, or significant others are real sources of practical and emotional support for respondents. The original version of the MSPSS was based on three-factor structure relating to the source of the support (i.e., family, friends, or significant other). Each subscale consists of four items formulated on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree.” Scores on each subscale range from 12 to 84, with higher scores meaning greater perception of social support. Examples of the questions on the scale are “My family really tries to help me,” “I can talk about my problems with my friends,” and “I have a special person who is a real source of comfort to me.” The MSPSS has been validated in a wide range of chronic diseases both in patients and caregivers (Dambi et al., 2018).

*Mutuality scale (MS).* The MS is a self-reported 15-item instrument to measure the quality of the relationship between the patient and his or her informal caregiver (Archbold et al., 1990). The items assess the extent to which a relationship is characterized by emotional investment and mutual support (e.g., "How much do you confide in the person you care for?"). The MS explores the dimensions of reciprocity, shared values, shared pleasurable activities, and love. Items are formulated on a 5-point Likert scale ranging from "nothing" to "very much." Scores range from 0 to 4 with higher scores reflecting higher mutuality. The MS has been validated in heart failure (Dellafiore et al., 2018) and stroke populations (Pucciarelli et al., 2016), demonstrating satisfactory validity and reliability. In this study, the Italian version of the MS was used to test the criterion-related validity of the MSPSS. Omega reliability coefficients (ω) were satisfactory in our data for all the patient and caregiver subscales (patient subscales range: ω = 0.78–0.93; caregiver subscales range: ω = 0.72–0.94).

*Patient health questionnaire-9 (PHQ-9).* The PHQ-9 is a self-reported 10-item instrument to measure depression (Kroenke et al., 2001). The scale asks respondents how often they have been bothered by specific depressive symptoms in the last 2 weeks (e.g., loss of appetite, insomnia, depressed mood). Items are reported on a 4-point Likert scale ranging from "not at all" to "nearly every day." Scores range from 0 to 27, with higher scores reflecting worse depressive symptoms. Based on these scores, individuals can be grouped into five categories: no depression (0–4), mild depression (5–9), moderate depression (10–14), moderate to severe depression (15–19), and severe depression (20–27). This scale has also been used in an Italian study resulting in adequate validity and reliability (Mazzotti et al., 2003). The reliability in our sample was satisfactory (patient scale ω = 0.85; caregiver scale ω = 0.88). The Italian version of the PHQ-9, which is freely downloadable at http://www.phqscreeners.com was used to test the criterion-related validity of the MSPSS.

*Stoma specific quality of life questionnaire (Stoma QOL).* The Stoma QOL is a self-reported 20-item instrument to measure quality of life of ostomy patients (Prieto et al., 2005). Items explore how often people with an ostomy experience anxiety, worry, difficulty, and embarrassment related to the presence of an ostomy in everyday life. Items are formulated on a 4-point Likert scale ranging from "always" to "never." Questions investigate the dimensions of sleep, sexual activity, relationships with family and close friends, and social ties outside of family and close friendships. Scores range from 20 to 80, with higher scores indicating higher stoma related QOL. Reliability in our sample was supportive (ω = 0.98). The Italian version of the Stoma QOL (Canova et al., 2013) was used to test the criterion-related validity of the MSPSS.

*Sociodemographic and clinical questionnaire.* This was a questionnaire developed ad hoc by the researchers to collect the characteristics of patients and their caregivers. Data collected on patients included age, gender, marital status, occupation, education, perceived income, condition of living (alone or not), type of stoma, whether the stoma was permanent or not, stoma-related illness and complications during the hospital stay, time since stoma placement, and presence of comorbidities. Data collected on caregivers were age, gender, marital status, occupation, education, caregiving hours per week declared, and whether they lived with the patient or not.

## Sample size

Since this is a secondary analysis of an observational longitudinal study, a post-hoc estimation for assessing the sample adequacy was performed. First, adequacy was confirmed according to the traditional rule of thumb of 20 cases per measured indicator (Schumacker and Lomax, 2012). In addition, according to Kim's method (Kim and Son, 2021), for a critical alpha of 0.05, a power level of 0.80, and 51 degrees of freedom of the least parsimonious model, the required sample size was 240, thus confirming that the sample was sufficient to avoid model misspecification.

### Data analysis

The sociodemographic characteristics of participants were analyzed with descriptive statistics including mean, standard deviation, frequencies, and percentages. The items of the MSPSS were described in terms of frequencies per Likert point and mean scores per item.

The factorial structure of the MSPSS scale (for both patient and caregiver version) was investigated with confirmatory factor analysis (CFA) by specifying the three factor structure reflecting the theoretical dimensions of family, friends, and significant others (Zimet et al., 1988).

To assess the goodness of fit the following indices were used: (i) comparative fit index (CFI): values above 0.95 are indicative of excellent fit; (ii) Tucker Lewis incremental index (TLI): values above 0.95 are indicative of excellent fit; (iii) root mean square error of approximation (RMSEA): values lower than 0.08 are indicative of good fit, and (iv) standardized root mean square residual (SRMR): values lower than 0.08 are indicative of good fit. For completeness, $\chi^2$ test was also reported, but this index was not used for assessing model fit because of its excessive sensitiveness to sample size. The items in the CFA were treated as ordinal by using the ULSMV estimator (Forero et al., 2009).

Internal consistency reliability of the MSPSS factors was assessed with ordinal Omega coefficient ($\omega$). Since the MSPSS scale is multidimensional, a total ordinal $\omega$ will also be computed to evaluate the joint reliability of all the factors in the model (Trizano-Hermosilla et al., 2021).

Convergent and criterion-related validity were inspected to assess the more general construct validity. Convergent validity was ascertained by computing the average variance extracted (AVE); standard recommendations for this index to reflect adequate convergence is an AVE $< 0.50$, which indicates the construct explains more than half of the variance in the indicators (Hair, 2014).

Criterion-related validity was ascertained via hypothesis-testing by correlating the factors and total scores of the MSPSS with other measures collected. Specifically, it was hypothesized that patients perceiving greater social support also perceived better dyadic mutuality (Hanks et al., 2007), were less depressed (Gariépy et al., 2016), and exhibited better stoma-related QOL than their counterparts (Luszczynska et al., 2013). For caregivers, it was hypothesized that greater social support improved mental well-being (Palma et al., 2012) and enhanced relationship within the dyad (Hanks et al., 2007). Criterion-related validity was confirmed if the Pearson's correlation coefficients had *p*-values lower than 0.05.

All descriptive and correlational analyses were performed with SPSS® Statistics V. 26 and confirmatory factor analysis was conducted with MPlus® v.8.9 (Muthén and Muthén, 2019).

### Ethical consideration

This research received approval from the Institutional Review Board Committee (Ref. number Ref. number 19159/18, ID2075). The principles and ethical standards outlined in the Helsinki Declaration were respected. Patients were informed about the study's objectives and provided written informed consent. All collected data have been securely stored and managed solely for scientific research purposes.

## Results

The overall sample consisted of 775 participants (523 patients and 252 caregivers). Because not all patients had a caregiver, there were fewer caregivers than patients. Table 1

**Table 1.** Descriptive statistics of the participants.

| Variables | Patients (*n* = 523) | Caregivers (*n* = 252) |
|---|---|---|
| Gender (female), *n*, % | 189 (36.1) | 203 (80.6) |
| Age (years), *m*, SD | 68.65 (12.45) | 58.7 (13.98) |
| Civil status (married/partnered), *n*, % | 366 (70) | 200 (80) |
| Occupation (unoccupied/retired), *n*, % | 353 (67.5) | 148 (58.7) |
| Education (<9 y), *n*, % | 266 (50) | 134 (53.2) |
| Perceived income (adequate), *n*, % | 427 (81.6) | — |
| Live alone, *n*, % | 92 (17.6) | — |
| Type of stoma, *n*, % | | |
| Colostomy | 203 (38.8) | — |
| Ileostomy | 153 (29.3) | — |
| Urostomy | 158 (30.2) | — |
| Permanent stoma, *n*, % | 379 (72.5) | — |
| Stoma-related illness, *n*, % | | |
| Oncologic | 433 (82.8) | — |
| Stoma-related complications during hospital stay (no), *n*, % | 411 (78.6) | — |
| Time since stoma placement (months), *m*, SD | 40.6 (69.47) | — |
| Comorbidities, *n*, % | 242 (46.3) | — |
| Caregiving hours per week, *m*, SD | — | 46.46 (58.5) |
| Live with patient (yes), *n*, % | — | 204 (81) |

reports the characteristics of patients and caregivers. Briefly, patients were 68.7 years of age (SD = 12.5) on average, were mostly male (63.9%), married or partnered (70%) and unoccupied/retired (67.5%). The most frequent ostomy was a colostomy (38.8%), followed by urostomy (30.2%). The illness causing the ostomy placement was oncological (82.8%). Caregivers were 58.7 years of age (SD = 14) of age, mostly female (80.6%), married or partnered (80%), and lived with the patient (81%). The hours of caregiving declared were 46.5, albeit with a high variability (SD = 58.5).

Table 2 reports the frequency of the answers endorsed. All patients declared high support, with most answers given to the options "strongly" or "very strongly agree." The same trend was also observed for the caregivers' responses, which indicates substantial ceiling effects.

The CFA specified for the patient version of the MSPSS yielded satisfactory fit indices: $\chi^2$ (51, $N = 523$) = 113.085 $p < 0.001$; RMSEA = 0.048 (90% CI = [0.036, 0.060]; $p$ (RMSEA $< 0.05$) = 0.577); CFI = 0.95; TLI = 0.94; SRMR = 0.028. As the three factors are considered part of perceived social support, it was also specified a second-order CFA, whose indices were identical to the previous model. Figure 1 presents the standardized factor loadings of the model derived from MPLUS. All the factor loadings were significant and greater than 0.80. Figure 2.

The CFA specified for the caregiver version of the MSPSS yielded satisfactory fit indices: $\chi^2$ (51, $N = 252$) = 92.293, $p < 0.001$; RMSEA = 0.055 (90% CI = [0.036, 0.074]; $p$ (RMSEA $< 0.05$) = 0.297); CFI = 0.99; TLI = 0.98; SRMR = 0.032. As the three factors are considered part of perceived social support, it was also specified a second-order CFA, whose indices were also satisfactory: $\chi^2$ (51, $N = 252$) = 90.281, $p = 0.001$; RMSEA = 0.053 (90% CI = [0.033, 0.071]; $p$ (RMSEA $< 0.05$) = 0.381); CFI = 0.99; TLI = 0.98; SRMR = 0.034. Figure 2 presents the standardized factor loadings of the model derived from MPLUS. All the factor loadings were significant and greater than 0.80.

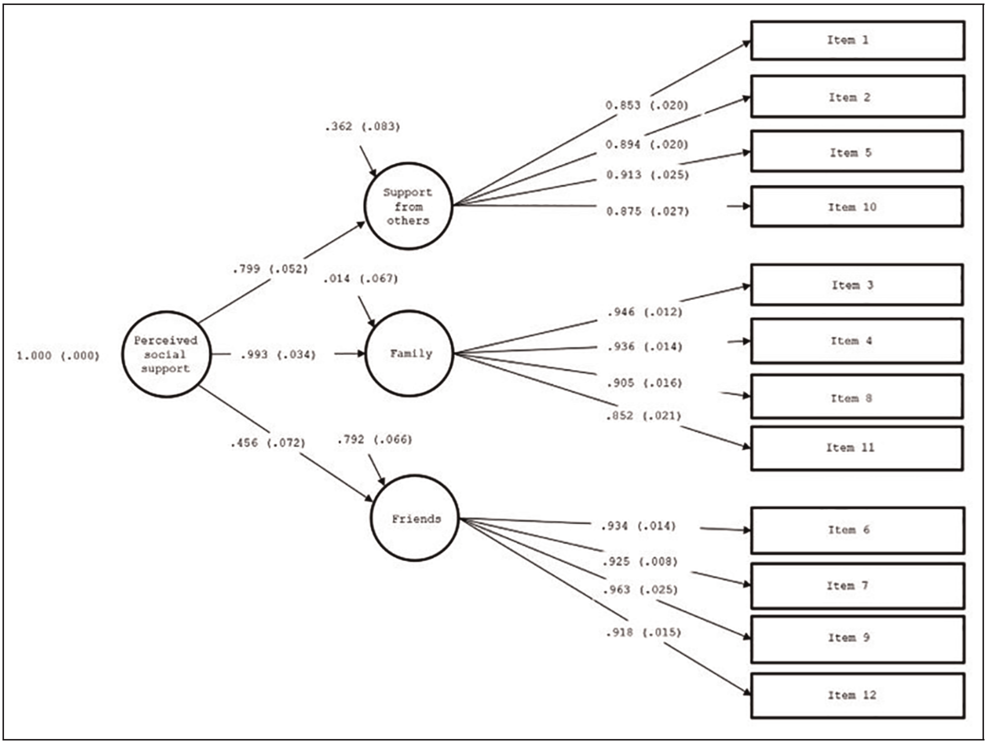

**Figure 1.** Confirmatory factor analysis of the patient version of the MSPSS (*n* = 523). Coefficients near the one headed arrows are standardized factor loadings.

Internal consistency reliability of the factors was excellent, with the following values: support from others (patients: ω = 0.95; caregivers: ω = 0.91), family (patients: ω = 0.89; caregivers: ω = 0.96), and friends (patients: 0.97; caregivers: 0.96). Total omega was excellent at 0.98 both for the patient and caregiver version of the MSPSS.

The AVE was 0.55 and 0.66, for the patient and the caregiver version of the PHQ-9, respectively, indicating satisfactory convergent validity of the construct. Table 3 highlights the Pearsons' correlations between the scores of both versions of the MSPSS and other collected measures. Specifically, the family and friends' subscales of the patient version, as well as the total score, were significantly and negatively correlated with depression and stoma related QoL. The total domain and the subscales of both versions of MSPSS were positively correlated with the perceived mutuality.

## Discussion

Previous findings emphasize the importance of testing the MSPSS in a specific population before using it for clinical and research purposes (Dambi et al., 2018). To the best of our knowledge, this is the first study to investigate the psychometric properties of the MSPSS in ostomy patients and their caregivers. A well-validated instrument for measuring social support in these populations is essential for a thorough understanding of the concept and provide direction for subsequent interventions.

In general, the level of social support among people with ostomies and their caregivers was found to be high. Thus, social support seems to

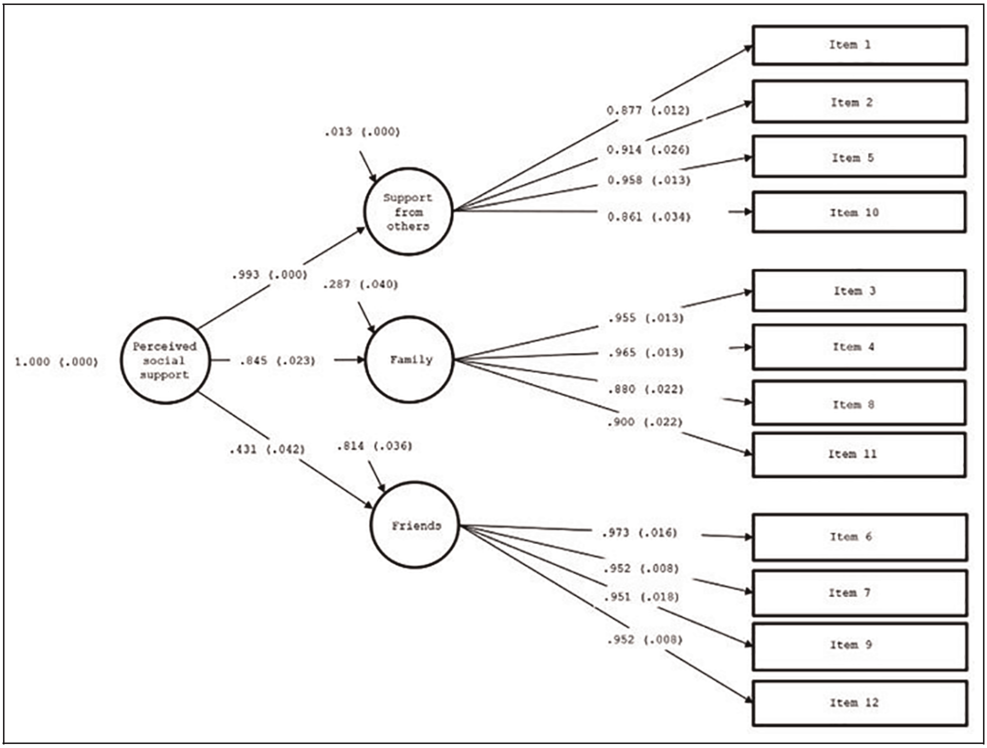

**Figure 2.** Confirmatory factor analysis of the caregiver version of the MSPSS (n = 252). Coefficients near the one headed arrows are tandardized factor loadings.

be necessary to cope with the challenges that ostomy requires. Patients with an ostomy have significant met and unmet needs, especially in terms of psychological support and medical information (Bulkley et al., 2015). Their caregivers also need to be empowered and informed (Villa et al., 2019). Similar to other chronic conditions, patients with ostomy and caregivers seem to need social support to overcome difficulties (Pasek and Suchocka, 2022).

Our study provides evidence that the MSPSS has satisfactory validity and reliability in sample of patients with ostomy and their caregivers. Specifically, both versions of the MSPSS for patients and caregivers have a three-factor structure consistent with the original instrument (Zimet et al., 1988) with a good level of fit, and excellent internal consistency reliability.

Social support appears to be strongly influenced by cultural context (Akhtar et al., 2010; López Ramos et al., 2017). Dambi et al. (2018) examined the problem of linguistic and social contextual differences in cross-cultural translation of the MSPSS. For example, the first version of the MSPSS did not clearly define the other significant persons. As a result, the definition of the term may be interpreted differently or modified depending on the culture. In different cultural contexts, the other significant person is found within the family or the circle of friends and MSPSS resulted in a two-factor model (Akhtar et al., 2010; Nam et al., 2019). The three-factor structure of the MSPSS suggests that ostomy patients and their caregivers in Italy, as in other Western countries among chronic patients, strongly distinguish the three

**Table 2.** Descriptives of the items of the MSPSS.

| Items of the patient version | *N* | Mean (SD) | Very strongly disagree | Strongly disagree | Mildly disagree | Neutral | Mildly agree | Strongly agree | Very strongly agree |
|---|---|---|---|---|---|---|---|---|---|
| 1. There is a special person who is around when I am in need | 523 | 6.23 (1.23) | 13 (2.5) | 3 (0.6) | 2 (0.4) | 24 (4.6) | 37 (7.1) | 155 (29.6) | 289 (55.3) |
| 2. There is a special person with whom I can share my joys and sorrows | 523 | 6.26 (1.21) | 12 (2.3) | 4 (0.8) | 3 (0.6) | 18 (3.4) | 38 (7.3) | 154 (29.4) | 294 (56.2) |
| 3. I have a special person who is a real source of comfort to me | 523 | 6.45 (1.06) | 10 (1.9) | 1 (0.2) | 2 (0.4) | 14 (2.7) | 14 (2.7) | 143 (27.3) | 339 (64.8) |
| 4. There is a special person in my life who cares about my feelings | 523 | 6.37 (1.14) | 9 (1.7) | 7 (1.3) | 2 (0.4) | 12 (2.3) | 25 (4.8) | 145 (27.7) | 323 (61.8) |
| 5. My family really tries to help me | 523 | 6.25 (1.24) | 12 (2.3) | 6 (1.1) | - | 21 (4.0) | 48 (9.2) | 131 (25.0) | 305 (58.3) |
| 6. I get the emotional help and support I need from my family | 523 | 4.88 (1.91) | 54 (10.3) | 26 (5.0) | 29 (5.5) | 83 (15.9) | 78 (14.9) | 132 (25.2) | 121 (23.1) |
| 7. I can talk about my problems with my family | 523 | 4.77 (1.94) | 57 (10.9) | 30 (5.7) | 27 (5.2) | 100 (19.1) | 81 (15.5) | 104 (19.9) | 124 (23.7) |
| 8. My family is willing to help me make decisions | 523 | 6.27 (1.23) | 13 (2.5) | 4 (0.8) | — | 24 (4.6) | 35 (6.7) | 140 (26.8) | 307 (58.7) |
| 9. My friends really try to help me | 523 | 4.92 (1.94) | 55 (10.5) | 25 (4.8) | 23 (4.4) | 93 (17.8) | 77 (14.7) | 108 (20.7) | 142 (27.2) |
| 10. I can count on my friends when things go wrong | 523 | 6.16 (1.33) | 15 (2.9) | 7 (1.3) | 1 (0.2) | 27 (5.2) | 45 (8.6) | 137 (26.2) | 291 (55.6) |
| 11. I have friends with whom I can share my joys and sorrows | 523 | 6.37 (1.15) | 10 (1.9) | 5 (1.0) | 1 (0.2) | 16 (3.1) | 30 (5.7) | 135 (25.8) | 326 (62.3 |
| 12. I can talk about my problems with my friends | 523 | 4.78 (1.95) | 61 (11.7) | 31 (5.9) | 21 (4.0) | 83 (15.9) | 104 (19.9) | 100 (19.1) | 123 (23.5) |
| Items of the caregiver version | | | | | | | | | |
| 1. There is a special person who is around when I am in need | 252 | 5.94 (1.32) | 4 (0.8) | 6 (1.1) | 5 (1.0) | 18 (3.4) | 22 (4.2) | 96 (18.4) | 101 (48.2) |
| 2. There is a special person with whom I can share my joys and sorrows | 252 | 6.14 (1.12) | 3 (0.6) | 1 (0.2) | 1 (0.2) | 20 (3.8) | 20 (3.8) | 89 (17.0) | 118 (22.6) |
| 3. I have a special person who is a real source of comfort to me | 252 | 6.25 (1.22) | 2 (0.4) | 8 (1.5) | 1 (0.2) | 9 (1.7) | 19 (3.6) | 68 (13.0) | 145 (27.7) |
| 4. There is a special person in my life who cares about my feelings | 252 | 6.14 (1.34) | 5 (1.0) | 6 (1.1) | 4 (0.8) | 9 (1.7) | 23 (4.4) | 68 (13.0) | 137 (26.2) |
| 5. My family really tries to help me | 252 | 6.06 (1.32) | 6 (1.1) | 3 (0.6) | 4 (0.8) | 14 (2.7) | 26 (5.0) | 75 (14.3) | 124 (23.7) |

*(continued)*

**Table 2.** Continued

| Items of the patient version | N | Mean (SD) | Very strongly disagree | Strongly disagree | Mildly disagree | Neutral | Mildly agree | Strongly agree | Very strongly agree |
|---|---|---|---|---|---|---|---|---|---|
| 6. I get the emotional help and support I need from my family | 252 | 5.09 (1.84) | 23 (4.4) | 9 (1.7) | 10 (1.9) | 36 (6.9) | 41 (7.8) | 69 (13.2) | 64 (12.2) |
| 7. I can talk about my problems with my family | 252 | 5.12 (1.81) | 22 (4.2) | 9 (1.7) | 11 (2.1) | 29 (5.5) | 48 (9.2) | 71 (13.6) | 62 (11.9) |
| 8. My family is willing to help me make decisions | 252 | 6.15 (1.29) | 6 (1.1) | 5 (1.0) | 2 (0.4) | 6 (1.1) | 23 (4.4) | 82 (15.7) | 252 (48.2) |
| 9. My friends really try to help me | 252 | 5.15 (1.78) | 20 (3.8) | 10 (1.9) | 10 (1.9) | 31 (5.9) | 45 (8.6) | 74 (14.1) | 62 (11.9) |
| 10. I can count on my friends when things go wrong | 252 | 6.13 (1.14) | 3 (0.6) | 2 (0.4) | 1 (3.1) | 16 (3.1) | 28 (5.4) | 82 (15.7) | 120 (22.9) |
| 11. I have friends with whom I can share my joys and sorrows | 252 | 6.25 (1.25) | 6 (1.1) | 1 (0.2) | 6 (1.1) | 7 (1.3) | 16 (3.1) | 70 (13.4) | 146 (27.9) |
| 12. I can talk about my problems with my friends | 252 | 5.05 (1.81) | 22 (4.2) | 13 (2.5) | 7 (1.3) | 31 (5.9) | 51 (9.8) | 71 (13.6) | 57 (10.9) |

sources of support (i.e., family, friends, other significant persons; Denis et al., 2015; López Ramos et al., 2017; Pucciarelli et al., 2016). Different factor structures were found in previous literature, which can be justified by the analytical approach (i.e., EFA or CFA) and the sociodemographic characteristics of the study sample (Dambi et al., 2018; Wang et al., 2021). Regarding this aspect, it is worth noticing that most of our sample (both patients and caregivers) were married, less than 65 years old, and approximately half were employed at the time of data collection. Therefore, it is likely that both members of the dyad had sufficient exposure to all sources of social support outside of the family, such as friends, and co-workers, which explains their clear discrimination of the three sources of support. Contrariwise, older people tend to group the individuals into a single collective as a result of restricted social contacts (Dambi et al., 2018) and the aging process (i.e., by relating significant others and friends to the family; Wongpakaran et al., 2018).

Criterion-related validity of the MSPSS was also satisfactory as it was found that social support from family and friends was related to lower depressive symptoms. These results are in line with previous studies (Kim and Son, 2021; Liu et al., 2016; Yildirim et al., 2023) and emphasize the positive relationship between perceived social support and mental well-being.

The finding that a higher level of social support from family members was associated with a lower patients' stoma related QOL was somewhat surprising and inconsistent; indeed, previous research constantly underscores the significant positive correlation between perceived social support and QOL in people with ostomy and other chronic conditions (De Maria et al., 2020; Kim and Son, 2021). Nevertheless, this correlation could be attributed to patient health conditions and reflect the cross-sectional relationship tested; it is true that patients with more severe conditions may experience more difficulties in their daily lives due to the presence of an ostomy and may need more social support.

**Table 3.** Correlations among the scores of the patient and caregiver version of the MSPSS.

| Patient scores | Family | Friends | Significant others | Total score |
|---|---|---|---|---|
| PHQ-9 | −0.150** | −1.171** | −0.027 | −0.170** |
| STOMA-QoL | −0.070 | −0.094* | −0.025 | −0.093* |
| Mutuality | 0.413** | 0.302** | 0.427** | 0.491** |
| Caregiver scores | | | | |
| PHQ-9 | −0.085 | −0.076 | **−0.033** | −0.087 |
| Mutuality | 0.289** | 0.289** | 0.277** | 0.361** |

MSPSS, Multidimensional Scale of Social Support; PHQ-9, Patient Health Questionnaire 9; QoL, quality of life.
*$p < 0.05$; **$p < 0.01$.

In contrast to previous studies, it was found no association between caregivers' perceived support and depressive symptoms. This finding may be due to the smaller sample size of caregivers as compared to patients, or to the adaptive coping strategies used by caregivers. Indeed, caregiving requires efforts to adapt to the disease process. In several cases, this can be due to personal growth experience that helps manage stressful situations by adapting to their negative effects (Cohen et al., 2002). These adaptive coping strategies can reduce caregivers' burden and emotional distress (Palacio et al., 2020).

Finally, our results indicate that the perception of social support was greater when caregivers perceived a higher quality of the relationship within the dyad. This is not surprising as mutuality has been constantly related to better quality of life and mental well-being, which in turn explains a higher perception of supportive social networks. However, so far, there is scant evidence on the relationship between mutuality and social support both in the general population and among patient-caregiver dyads. One interesting finding can be found in the work by Streff (2001) who studied caregivers of stroke survivors in China and found that those with a higher level of mutuality also perceived higher social support. Notwithstanding, this evidence was contradicted by the most recent work by Pan and Jones (2017). Clearly further investigation is needed to explore the reasons for such uncovered relationships.

## *Limitations*

The study has several limitations. First, results should be interpreted with caution, as they may be influenced by the cultural context in which data were collected. Second, not all psychometric properties of the MSPSS have been tested; for example, test-retest reliability has not been performed. Third, the clinical characteristics of patients suggest their ostomy-related disease severity was mild; thus, it is not possible to know whether our results would have changed with a higher severity level of the disease, for example, in terms of different factor structures. Future studies could investigate the MSPSS's sensitivity to change over time, which would be valuable for tracking the effectiveness of specific strategies on social support. Finally, it would be desirable to assess the measurement invariance properties of the MSPSS across social support-sensitive groups of ostomy patients and caregivers.

## *Implications for practice and research*

Our study provides evidence of supportive validity of the MSPSS. This tool is reliable and applicable in clinical practice and research to assess perceived social support both in patients with ostomy and caregivers. In situations where social support is perceived as inadequate, healthcare professionals may promote interventions that encourage alternative forms of support (e.g., social aggregation activities or support groups). At the same time, researchers are encouraged to use both versions of the MSPSS instrument to examine the impact of specific strategies on social support. In addition, these instruments may be used to investigate the role of social support in different cultural contexts or among individuals with different levels of ostomy complications.

## Conclusion

The MSPSS has proven to be a valid and reliable tool for assessing perceptions of social support in individuals with an ostomy and their caregivers. The original three-factor structure of the instrument appears to be preserved for both the dyad members, indicating that patients and their caregivers are able to discriminate well between different sources of support. The study of criterion validity provides a basis for further investigation on social support and related variables in this specific population.

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### Author contributions

Conceptualization, E.V., G.V., P.I.; methodology, E.V. and P.I.; formal analysis, P.I.; investigation, G.V.; resources, G.V.; data curation, E.V., G.V.; writing—original draft preparation, P.I., I.M.; writing—review and editing, E.V., G.V., I.P., I.M.; visualization, P.I.; supervision, D.F.M., L.R.All authors have read and agreed to the published version of the manuscript." Please turn to the CRediT taxonomy for the term explanation. Authorship must be limited to those who have contributed substantially to the work reported.

### Data availability statement

The data that support the findings of this study are available from the corresponding author but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the corresponding author.

### Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Ethical approval

This research received approval from the Institutional Review Board Committee (Ref. number 19159/18, ID2075). The principles and ethical standards outlined in the Helsinki Declaration were respected. Patients were informed about the study's objectives and provided written informed consent. All collected data have been securely stored and managed solely for scientific research purposes.

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