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Health Utility, Social Interactivity, and Peristomal Skin Status

A Cross-Sectional Study

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ABSTRACT

PURPOSE: The objective of this study was to examine relationships among social interaction, health utility, and peristomal skin status in adults with ostomies.

DESIGN: Cross-sectional, descriptive.

SUBJECTS AND SETTING: 15,591 persons residing in the United States were randomly selected from 3 multinational proprietary databases of individuals who had undergone surgery.

METHODS: The study was a cross-sectional assessment utilizing the SF36v2 survey instrument. Potential subjects were sent an e-mail letter of invitation that included instructions for completing the questionnaire, an informed consent form, and nontransferable link to an electronic survey. Health utility was derived from the SF6D, and the Hawthorne Friendship Scale was used to measure social connectivity. Social functioning was derived from the SF36v2. A minimally important social value of health (MISVH) is reported as the minimum quality-adjusted life-days to be of benefit (influence) within indices of social connectivity and function. A self-reported determinant of peristomal skin health was included.

RESULTS: Increased social interactivity, defined as social functioning and social connectivity, was associated with increased health utility. In addition, health utility decreased as peristomal skin integrity worsened. A MISVH can be demonstrated.

CONCLUSION: Findings indicate that peristomal skin complications are more than dermatologic issues. They negatively affect the well-being of those who must cope and adapt to their impact and the community at large. Social interaction is also negatively influenced.

KEY WORDS: Health utility, Irritant dermatitis, Peristomal moisture-associated skin damage, Peristomal skin, Quality of life, Social interactions.

INTRODUCTION

Approximately 120,000 ostomy surgeries are performed in the United States annually.¹ An unfortunate and common complication of living with a stoma is peristomal skin complications. The peristomal skin is broadly defined as the abdominal skin surrounding the stoma; however, a more practical definition would be within the footprint of the occlusive adhesive barrier attaching the ostomy pouching system to the skin.² The peristomal skin is subject to mechanical, chemical, and biological factors that can compromise its protective, regulatory, and sensory functions. A common reason for peristomal skin complications in the individual with an ostomy is leakage of ostomy effluent and repeated contacts with peristomal skin,

resulting in moisture-associated skin damage, also referred to as irritant dermatitis.³⁻⁵

Problems associated with peristomal skin health, whether they are acute or chronic, affect the well-being of those who live with an ostomy. Compromised peristomal skin health affects multiple components of daily living. Irritant contact dermatitis is the most common of the peristomal skin conditions and is often exacerbated by stoma effluent coming into contact with the peristomal skin.^{5,6} Lyon and Smith⁷ report peristomal dermatosis to be a significant problem affecting 2 out of 3 people who have undergone ostomy surgery. Sixty-two percent of the individuals with an ostomy in this study reported some degree of peristomal skin irritation.

The effects of various dermatoses on health-related quality of life (HRQOL) have been studied. Salek⁸ suggests that the effect of skin diseases on a patient's quality of life may be more important than the physical manifestation of the disease itself. Nichols and Inglese² demonstrated measurable effects of peristomal skin complications on physical health domains associated with the health utility and HRQOL. Their findings indicate that increased peristomal skin health is correlated with increased health utility and quality-adjusted life. Health utility is a multiattribute function of health states that varies proportionally with health burden. In addition to direct effects

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of HRQOL, skin problems have been linked to psychological and economic disturbances.^{9,10} Skin diseases or disruptions in skin integrity can be considered health stressors whose presence leads to behavioral changes¹¹ sensitive to economic, biological, social, and cultural paradigms.^{12,13} Based on this evidence, I propose that the health burden of peristomal skin complications may be no different.

While a considerable body of research exists that demonstrates an association between social relationships and health,¹⁴ there is limited evidence regarding the association between compromised peristomal skin health and social interactivity. Social interactivity is operationally defined in this study as the interrelationship between social well-being (the degree to which people have purpose in the community and the influence of the community on the individual) and social function (the extent to which physical health and emotional problems impact social activities).¹⁵ Social well-being is considered sufficiently distinct from physical and mental health, and experts in the field argue that it should be considered a distinct element of an individual's health status.¹⁶⁻¹⁸

I hypothesize that, similar to other dermatoses, peristomal skin complications act as health stressors and influence social interactivity; this relationship can be demonstrated as a function of social connectivity and well-being manifested in health utility. Therefore, the objective of this study was to examine the relationship among social interaction (operationally defined as social function and social connectivity), health utility, and peristomal skin condition in adults with ostomies. The aim of the study was to explore the relationship between peristomal skin condition, social function, and social connectivity as measured by health utility and quality-adjusted life-days (QALDs). A secondary objective was to construct a quantitative measure of the concept of a minimally important social value to health (MISVH) defined as improvements in peristomal skin condition associated with improvements in social connectivity and social function. An MISVH is assessed as QALDs and said to be the minimal change to be of consequence to the patient.¹⁹

METHODS

This study is a cross-sectional survey of adults who have undergone ostomy surgery. The data presented are part of a multinational survey conducted by randomly sampling from 3 proprietary databases containing e-mail contact information for individuals who have undergone ostomy surgery. This article reports findings from persons with ostomies residing in the United States; 15,591 potential participants were randomly selected from those who had given permission to be contacted. Data were collected between quarter 4 of 2012 and quarter 1 of 2013. Potential participants were contacted by e-mail, with a letter of invitation that included a description of the study, participant rights in regard to the study to include informed consent, and a nontransferable link to the survey. Opening the survey link, completing the 72 item survey, and submitting the completed survey were deemed consent. The survey required approximately 30 minutes to complete. Demographic data were collected including age, weight, height, month and year of initial surgery, and type of surgery. While respondents had given permission to be contacted, identifying information such as e-mail addresses was deleted from the response data. The institutional review board of the Copernicus Group (Durham, North Carolina) reviewed and approved study procedures. (IRB approval no. HOL1-12-013).

Instruments

Health-related quality of life was measured with the SF36v2 survey instrument (Optum Inc, Eden Prairie, Minnesota).²⁰ It provides a population referenced generic evaluation of HRQOL that is often overlooked in ostomy population studies. The SF36v2 contains 36 items designed to query the health and well-being of adults 18 years or older.¹⁵ The SF36v2 evaluates 8 domains of HRQOL: physical functioning, physical role, bodily pain, general health, vitality, social functioning, role emotional, and mental health. I focused on assessment of social functioning domain that captures the frequency and degree to which health interferes with social activities. I also measured physical and mental health, along with a preference-based health utility index.

Health status was assessed as a measure of health utility measured via the SF6D.²¹ The SF6D is a classification for describing health based on 6 multilevel dimensions taken from the SF36v2. It defines 18,000 health states using preference weights obtained from a sample of the general population using a standard gamble as the valuation technique. The SF6D scores range from 0, indicating worst health, to 1, which indicates best health.

In addition to the SF36v2, the Hawthorne Friendship Scale was chosen as a measure of social connectivity.²² The Hawthorne Friendship Scale, a 6-item scale, demonstrates discriminant validity when assessed against other short social relationship scales and is sensitive to known correlates of social connectivity. Cronbach's α in Hawthorne's study was reported as 0.868 (standardized α ; $n = 2226$). Social connectivity and the SF36v2 domain of social functioning are defined collectively in this article as social interaction.

Peristomal skin condition assessment was based on self-report. Respondents were asked 2 questions regarding peristomal skin condition: their perception of the usual condition of their skin, and the condition of the skin at the time of the survey. Ranking and cross-tabulating the responses provided 3 stressor levels^{2(p90)}: *level 1*—peristomal skin integrity intact, that is, no presence of irritated skin; *level 2*—low to moderate level of reddening and irritation, including occasional but slight blistering; and *level 3*—severe irritation and reddening along with severe blistering resulting in denuded skin and ulceration.

Data Analysis

Quality-adjusted life-years (QALYs) is a measure of the quantity and quality of life lived or to be lived.²³ It is frequently used to quantify the burden of various diseases or disorders affecting health over a period of years. However, peristomal skin irritation is an intermittent condition characterized by duration of days instead of years. I therefore chose to measure QALYs as days per month (where a month is defined as 30 days) expressed as QALDs; it is calculated as the health utility value (weight) multiplied by 30 days.²⁴ Statistical analyses were performed using SAS v9.4²⁵ (SAS Institute, Cary, North Carolina). General linear models were used to calculate analysis of covariance to estimate marginal means; covariates were time since ostomy surgery and age. Regression analysis was used to determine the impact of social functioning and social connectivity on peristomal skin integrity levels in regard to health utility.

Because the study generated cross-sectional versus longitudinal data, an actual perceived benefit by a patient could not be determined, and I calculated a minimally important social value of peristomal skin health (MISVH).^{2,19} Within the context of this study, the MISVH was operationally defined as an improvement in peristomal skin condition associated with an

TABLE 1.
Respondent Characteristics (N = 2329)

	n	%	Age,	Time Postsurgery,
			Mean ± SD, y	Mean ± SD, mo
Males	1230	53.5	65.1 ± 12.6	102.3 ± 132.4
Females	1070	46.5	61.8 ± 13.4	102.9 ± 133.5
Type of ostomy surgery				
Colostomy	920	39.5		
Ileostomy	1031	44.3		
Urostomy	308	13.2		
Multiple types	33	1.4		

improvement in social connectivity or social function; it was estimated using a distribution technique.

RESULTS

The study sample comprised 2329 adults with ostomies residing in the United States. A profile of the study respondents is shown in Table 1.

Peristomal Skin Condition, Social Function, and Social Connectivity

The primary aim of the study was to explore the relationships among peristomal skin condition, social function, and social connectivity as measured by health utility and QALDs. Study findings indicate that health utility values decreased as the level (severity) of peristomal skin damage increased. Participants with normal peristomal skin (level 1; n = 551) had an unadjusted SF6D health utility value of 0.754 (95% CI, 0.742-0.768). This value is comparable to the SF6D value of 0.74 reported for the US general population.^{15(p240)} Among the 1029 respondents who reported a level 2 peristomal skin condition, the unadjusted SF6D value was 0.697 (95% CI, 0.688-0.706), and it was 0.633 (95% CI, 0.602-0.647) for the 427 respondents who reported level 3 (severe) peristomal skin damage.

The data were then analyzed using a general linear model with the covariates time since ostomy surgery and age. Stoma surgery type was included as a categorical variable in the model due primarily to differences in the reasons for the surgery. Comparing skin integrity levels for health utility indicated statistically significant differences between the 3 levels (1 vs 2, 1 vs 3, and 2 vs 3; $P < .0001$). The overall adjusted health utility value was 0.701 (n = 1933). The adjusted health utility score for the 536 respondents indicating level 1 peristomal skin condition was 0.758 (95% CI, 0.745-0.771); it was 0.698 (95%

CI, 0.688-0.708) for the 944 respondents who reported level 2 peristomal skin condition; and it was 0.638 (95% CI, 0.623-0.653) for the 403 respondents indicating level 3 peristomal skin condition. These findings indicated that as the severity of peristomal skin damage worsened, health utility declined.

Regression analysis was calculated to determine the impact of social functioning and social connectivity on peristomal skin integrity levels in regard to health utility (Tables 2 and 3). Comparison of the slopes of the regression lines was significantly different from 0 for all levels in both indices. These findings indicate that as social functioning increased, and as social connectivity increased, health utility increased ($P < .0001$). Least squares means were used to compare responses at each level of social index and skin integrity.

Tables 4 and 5 summarize QALDs per month for the social index categories based on level of peristomal skin damage (stressor level). The average unadjusted QALD for those at peristomal skin level 1 was 22.6 days (adjusted 22.8 days; 95% CI, 22.4-23.2), and for those at a mild to moderate level, it was 20.9 days (adjusted 21.1 days; 95% CI, 20.8-21.4). For respondents indicating level 3 peristomal skin damage, the average unadjusted QALD was 19.0 days (adjusted 19.2 days; 95% CI, 18.8-19.7). These data indicate that as social functioning and connectivity increased, QALDs increased ($P < .0001$). Least squares means were utilized to compare responses at each level of social index and skin integrity.

A Minimally Important Social Value of Health for the Peristomal Skin

A secondary aim of the study was to provide a measure of the concept of MISVH for peristomal skin condition and to link this value to changes in social connectivity and social function. In order to analyze this relationship, the mean difference between levels of peristomal skin irritation was calculated, yielding an overall health utility mean unit difference of 0.0350 for the change in stressor level. The mean differences between levels of social functioning and social connectivity were then computed, resulting in an overall mean difference for social functioning levels of 0.0403 and for social connectivity of 0.0360. Differences for both parameters were statistically significant ($P < .0001$). However, differences in vertical or horizontal movement of data in the tables are less important than differences in diagonal movement. Using the marginal means found in the cells of Tables 2 and 3, and computing the diagonal mean differences, a value of 0.059 was found for social functioning and 0.056 for social connectivity. Using these values, I estimated that the minimal QALD required to benefit (influence) the index of social functioning is $30 \times 0.059 = 1.78$ days per month; similar

TABLE 2.
Health Utility Scores by Levels of Health Stressor and SF36v2 Social Function Domain Levels^a

	Social Function Levels							
	Impaired				Marginal	Average		No Limitations Indicated
	Lt 25	25-29.9	30-34.9	35-39.9		40-44.9	45-49.9	
No peristomal skin irritation	0.489	0.560	0.581	0.610	0.644	0.663	0.734	0.836
Mild to moderate peristomal skin irritation	0.502	0.552	0.581	0.608	0.619	0.651	0.703	0.810
Severe peristomal skin irritation	0.490	0.526	0.576	0.589	0.607	0.616	0.702	0.792

^aScores are adjusted for age, time from surgery, gender, and general health. A statistically significant difference exists between peristomal skin levels, $P < .0001$. The linear decrease in health utility values by social function, for each level of peristomal skin condition, was found to be statistically significant; $P < .0001$.

TABLE 3.
Health Utility by Levels of Health Stressor and Social Connectivity^a

	Social Connectivity				
	Very Socially Isolated, 0-11	Isolated or Low Levels of Social Support, 12-15	Some Social Support, 16-18	Socially Connected, 19-21	Very Socially Connected, 22-24
No peristomal skin irritation	0.605	0.616	0.668	0.703	0.758
Mild to moderate peristomal skin irritation	0.592	0.624	0.658	0.678	0.731
Severe peristomal skin irritation	0.566	0.594	0.618	0.658	0.700

^aHealth utility values are adjusted for age, time from surgery, gender, and general health. Social connectivity is categorized according to levels described by Hawthorne. A statistically significant difference exists between peristomal skin levels, $P < .0001$. The linear decrease in health utility values by social connectivity, for each level of peristomal skin condition, was found to be statistically significant; $P < .0001$

analysis found that the mean QALD needed to benefit social connectivity is $30 \times 0.056 = 1.68$ days per month.

Ideally, the MISVH provides the smallest change in value that is both statistically significant and perceived as beneficial by a given patient. However, because respondents were not directly asked about minimal benefit, this measure remains a hypothetical construct grounded within metrics of this analysis and further research is needed to apply this construct to the clinical setting.

DISCUSSION

I investigated relationships among social functioning (social connectivity vs isolation), health utility, and peristomal skin condition. Analysis revealed that as social connectivity increases, there is a corresponding increase in health utility for the person living with an ostomy. This finding indicates the importance of community to the health of individuals with an ostomy. Findings also indicate that rises in social interactivity, seen as increased social functioning or connectivity, are linked to an increase in health status independent of the level of the health burden. The correlation between the social constructs and health utility was 0.8097 and 0.5143, respectively (Pearson's r , $P < .0001$). Link and Phelan support the clinical relevance of these findings when they note, "Social factors such as ... social support are likely fundamental causes of disease that, because they embody access to important resources, affect multiple disease outcomes through multiple mechanisms, and consequently maintain an association with disease even when intervening mechanisms change."^{26 (p80)} I assert that social interactivity, be it social function or connectivity, provides access to the resources of a community at large and a lack of social interaction reduces

this resource. These findings are consistent with those of Jordan and colleagues,²⁷ who studied patients with respiratory tract infections and found that a lack of social connectivity (social isolation) resulted in a significantly increased risk of hospital admission. Social isolation is not specific to those who have geographically withdrawn from society; rather, it is likely to be found in those living within a community or family structure who withdraw from the support that such structures offer.²⁸

Multiple studies have demonstrated that social interactivity is a quantifiable factor associated with changes in HRQOL.²⁹⁻³¹ Evidence from Ellaway and colleagues³² concur with findings from this study (Table 2) that indicate that socially isolated individuals not only experience worse health status but also have a higher consumption of health care resources. These findings further suggest that social isolation is a direct cause of decreased health status in some persons.

Study findings further suggest that health utility and social functioning are influenced by peristomal skin health stressors such as peristomal moisture-associated skin damage. I found that increasing levels of severity of peristomal skin damage are associated with decreasing health utility values within social functioning or social connectivity levels. Conversely, effective treatment of peristomal skin damage improves overall health utility.

In addition, study findings strongly suggest that an MISVH for peristomal skin condition can be determined. Specifically, as peristomal skin condition improves, there is a corresponding increase in health utility and as social interactivity improves, there is a corresponding increase in health utility (Tables 3 and 4). Of even greater importance, the association between the presence of a health stressor (peristomal skin condition) and social interactivity suggests that as one improves, the other improves, and vice versa.

TABLE 4.
Quality-Adjusted Life-Days per Month by Levels of Health Stressor and SF36v2 Social Function Domain Levels^a

	Social Function Levels							
	Impaired				Marginal	Average		No Limitations Indicated
	Lt 25	25-29.9	30-34.9	35-39.9		40-44.9	45-49.9	
No peristomal skin irritation	14.7	16.8	17.4	18.3	19.3	19.9	22.0	25.1
Mild to moderate peristomal skin irritation	15.1	16.6	17.4	18.2	18.6	19.5	21.1	24.3
Severe peristomal skin irritation	14.7	15.8	17.3	17.7	18.2	18.5	21.1	23.8

^aQuality-adjusted life-days are based on health utilities adjusted for age, time from surgery, gender, and general health. A statistically significant difference exists between peristomal skin levels, 1 vs 2, 1 vs 3: $P < .0001$, 2 vs 3: $P = .0014$. The linear decrease in health utility values by social function, for each level of peristomal skin condition, was found to be statistically significant; $P < .0001$.

TABLE 5.
Quality-Adjusted Life-Days by Levels of Health Stressor and Social Connectivity^a

	Social Connectivity				
	Very Socially Isolated, 0-11	Isolated or Low Levels of Social Support, 12-15	Some Social Support, 16-18	Socially Connected, 19-21	Very Socially Connected, 22-24
No peristomal skin irritation	18.2	18.5	20.0	21.1	22.7
Mild to moderate peristomal skin irritation	17.8	18.7	19.7	20.3	21.9
Severe peristomal skin irritation	17.0	17.7	18.5	19.7	21.0

^aQuality-adjusted life-days are based on health utility adjusted for age, time from surgery, gender, and general health. A statistically significant difference exists between peristomal skin levels, $P < .0001$. The linear decrease in quality-adjusted life-days by social connectivity, for each level of peristomal skin condition, was found to be statistically significant; $P < .0001$.

Identification of an MISVH for patients experiencing peristomal skin damage remains an important goal. The social value of health is considered to be both structural (degrees of social connectedness vs isolation) and functional (the impact that peristomal skin health on social activities). Findings from this study suggest that it is possible to determine an MISVH that can be demonstrated throughout the range of data (albeit scale dependent). From a clinical perspective, findings indicate that a tipping point exists that can be used to demonstrate a clinically relevant clinical effect of an intervention or intervention bundle. I calculated a tipping point based on a minimal number of QALDs. I further assert that the clinical relevance of reaching this tipping point goes beyond a change in peristomal skin condition; it also exerts a positive benefit, enhancing the patient's movement back into society as a contributing member. Just as health stressors such as peristomal skin damage have the potential to interrupt the networking interactive process, improvements in these stressors enable increases in social interactivity. In return, community involvement offers a protective effect that maximizes health utility and social connectivity.

Thus, whether one is discussing the protective value that social interactivity has on health, or the influence that health has on social interactivity, it must be recognized that health, independent of the form it takes, is a capital asset invested in the community. Health stressor events such as peristomal skin problems decrease the health value, while reduction or elimination of the event increases it, and the return on the investment can be an overall socioeconomic benefit to society.

Limitations

As noted previously, the cross-sectional data generated in this study limit the ability to determine an MISVH. In addition, it is not possible to definitely determine whether the respondents are truly representative of the target population. Finally, I relied on self-reported peristomal skin conditions rather than assessment by a trained health care professional.

CONCLUSIONS

Study findings provide empirical evidence that as social interactivity increases, there is a corresponding increase in health utility in those who have undergone ostomy surgery. Findings further established that this relationship is influenced by deterioration in peristomal skin condition, which acts as a health stressor. Of further interest is the health utility change associated with an increase in peristomal skin health accompanied by increases in social interactivity; the result is a corresponding

increase in health utility that can be translated into an MISVH. This provides evidence that limitations placed on the individual by peristomal skin problems have consequences that extend to the protective value of social interactivity.

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