

"What pressure ulcers mean to me?" Representations of pressure ulcer in persons with spinal cord injury: A qualitative study

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Title: "What pressure ulcers mean to me?" Representations of pressure ulcer in persons with spinal cord injury: a qualitative study.

Running title: PU representations in persons with spinal cord injury

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Abstract

Objectives: Explore the perceptions and beliefs related to pressure ulcers (PU), their prevention and treatment strategies, in order to discuss potential learning objectives for PU-related therapeutic education in persons with spinal cord injury (SCI).

Design: Qualitative study, using grounded theory for the analysis of data collected via a questionnaire.

Setting: Nine SCI referral centers, inpatient care

Participants: 131 persons with SCI were included. 76% were male, and 65% presented with paraplegia. The median age was 48 years (33.5; 58) and median time since injury was 11 years (3; 24.5). 70% had experience with PU.

Interventions: None

Main outcome measures: Data collection via an open-ended questionnaire on the representation of PU, its prevention and life experience of having a PU.

Results: Six categories were identified: (1) identifying what might become problematic, (2) daily preventive actions, (3) detecting the early signs, (4) managing the early signs, (5) need for care, (6) experience with PU and being bedridden. Pressure ulcers have dramatic consequences on psychosocial health. Prevention and treatment require self-management skills, such as self-risk assessment abilities, self-detection skills and problem-solving strategies, to optimise daily PU prevention in persons with SCI.

Conclusion: PU prevention tackled by persons with SCI bears some specificities that the physician must take into account in the construction of a self-management program in this high-risk population.

Keywords: Pressure ulcer, spinal cord injury, prevention, self-management, qualitative study.

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3 **1. Introduction**

Pressure ulcer (PU) is the most common complication in persons with spinal cord injury (SCI), representing the second cause of re-hospitalization after SCI [1,2]. There are major PU-related economic consequences in this population [3]. In fact, in persons with SCI, the presence of a pressure ulcer was related to a fourfold increase in the annual cost of care over a one-year period [4].

9 In specialized SCI units, PU prevention includes both a mechanical dimension with the evaluation of the seating position, and a behavioral dimension, with the development of skincare management skills on a daily basis. In this population, a recent systematic review of the literature on the efficacy of interventions related to skin care self-management showed promising results, especially following postoperative flap surgery [5]. However, there is a great heterogeneity in the proposed approaches and underlying theoretical frameworks [6], reflecting the difficulties in apprehending skin self-care management in this population.

16 Several qualitative studies have explored PU-related beliefs and perceptions in persons 17 with SCI and their potential involvement in the development of PUs. In a sample of 14 18 persons with SCI, Jackson et al [7] tried to identify how life habits could influence the 19 development of PUs. Several characteristics emerged from the semi-directed interviews, such 20 as change in daily routine, alteration of preventive behaviors over time or compromising 21 between PU risk and activities of daily living. More recently, Florindez et al [8] conducted a 22 qualitative study with a similar objective in 25 persons with SCI. Data were extracted from 23 clinical observations and the main factors reported were: lack of rudimentary wound care 24 knowledge; equipment and supply issues; comorbidities; non-adherence to prescribed bed 25 rest; and inactivity. Conversely, Sleight et al [9] conducted a qualitative study on 50 persons

with SCI who presented with PUs, they identified eight types of potentially protective factors: meaningful activity, motivation to prevent negative health outcomes, stability/resources, equipment, communication and self-advocacy skills, personality traits, physical factors, and behaviors/activities. King et al [10] described beliefs related to PU prevention on a sample of 22 persons with SCI and identified 4 types of representations classified according to PU prevention approach: taking vigilant care, taking charge of care, maintaining health and passing up care.

8 These studies refined the development of PU by identifying protective or at-risk 9 behaviors. Down the line, they could help categorize individuals according to their presumed 10 behavioral risk, but these studies bear a limited relevance in terms of identifying learning 11 objectives to better structure and enhance the efficacy of existing educational programs (e.g. 12 [11]). Furthermore, previous results based on data from medical charts must be consolidated 13 [8,9], and few studies have constructed their interview on the basis of a theoretical model 14 [7,10].

15 Explicit use of theory in health research has several benefits, including the 16 identification of key concepts related to behavior adoption[12]. Numerous theories exist in the 17 literature [13]. These notably include the Health Belief Model (HBM) [14], the theory of 18 planned behavior [15], the social cognitive theory [16] or the transtheoretical model [17]. The 19 HBM [14] appears to be the most used conceptual framework in health behavior research 20 [18]. According to this model, behaviors can be predicted based on several beliefs relying on 21 the perception of (1) the susceptibility of having a disease or developing a pathology (e.g. 22 probability of developing a PU in the future), (2) the severity of the disease or pathology (e.g. 23 a PU has major consequences on one's health), (3) the barriers associated with adopting the 24 required behavior (e.g. performing skin check and skin care takes time), (4) the benefits associated with adopting the required behavior (e.g. performing skin check and required skin 25

1 care helps maintaining a healthy status) and (5) the cue that an action is required (e.g. redness 2 on pressure points) [14]. HBM relevance to explain health behaviors adoption was reported 3 elsewhere [18,19]. This model can notably serve as a conceptual basis to better understand the 4 subjective experience of patients with PU and refine some of the factors implied in the 5 process of health behaviors' adoption among this population [20].

6 The main objective of this work was to explore perceptions and beliefs related to PUs
7 their prevention and treatment in a SCI population, in order to discuss potential learning
8 objectives for PU-related therapeutic education in persons with SCI.

9

10 **2.** Methods

11 **2.1. Study design**

This was a qualitative cross-sectional study, based on an open-ended questionnaire and
conducted from December 2012 to February 2013. Study design was approved by the local
ethics committee (IRB 19-09-07). A signed consent form was obtained from all participants.
This protocol follows the consolidated criteria for reporting qualitative research (COREQ)
[22].

17 **2.2. Participants and procedure**

Inclusion criteria were: (1) being over the age of 18, (2) presence of SCI, (3) ability to read and write in French and (4) having signed the consent form. Participants were recruited in 9 SCI units distributed across France. Eligible participants were first identified by the study physicians and then invited to take part in the study.

22 **2.3. Data collection**

Each SCI unit made available a room fitted with a computer with adapted keyboard interface, if necessary. The questionnaire was completed online on the web platform Epsyline®v6 (www.epsylab.fr). Mean time to fill out the questionnaire was 20 minutes. This platform the French data protection agency (CNIL), and was especially designed for online data storage of scientific research protocols within the Ekilia Compagny. The questionnaire designed by the workgroup (MG, AP, AG) (Appendix 1) included 6 open questions. The HBM was used as a framework for the study questions to identify perceptions and experiences of persons with SCI. The formulation of each question was based on the definition of each concept of this model [18]. There was no word limit for answers and participants were encouraged to freely express their opinions, experiences, or feelings.

2.4. Data Analysis

8

9 We used the grounded theory to structure our analytic approach[23].

10 Open coding: The work group (MG, AP, AG) analyzed each questionnaire to formulate in codes the relevant elements of the questionnaire. A definition was proposed by the working 11 12 group for each code and all coding discrepancies were discussed. Each member of the work 13 group had the possibility to include memos when reading the questionnaires, in order to note a 14 hypothesis, a code property, similarities between codes, potential categories or relationships 15 between the codes. These codes were treated with the RQDA software (RStudio software, 16 version 0.2-8, 2016). Saturation was reached when no new code appeared after a full 17 comprehensive questionnaire.

18 <u>Selective coding</u>: the work group organized open codes into themes and then categories,

19 which are more conceptual codes. Each category was a component of the general

20 phenomenon i.e. perceptions and beliefs related to PUs. They were precisely described and

21 defined.

22 <u>Theoretical coding</u> represents the identification of relationships between these categories (e.g.,

23 causal, dependence). To establish relationships between categories we used the notes or

24 memos written by responders and the workgroup discussed these relationships on a

25 conceptual level. The comprehensive framework was built using the different categories and

their relationships. In order to assess the appropriateness of the framework, questionnaires
 that were not coded were studied to see if codes and categories found were present in the
 comprehensive framework.

4

5 **3. Results**

6 131 participants were included in the study. Their main characteristics are in Table 1. 7 Code saturation was obtained after 62 questionnaires. Based on the 71 codes retained 8 (Appendix 2), the research team formulated 11 themes, grouped into 6 categories. The 9 appropriateness of the model was evaluated in the remaining questionnaires. The framework 10 of PU representations (Figure 1) has 6 categories, which can be grouped in two areas: 11 according to the person's environment (home or medical setting) and skin status (presence or 12 absence of PU). Table 2 groups quotes illustrating categories.

13

3.1. Category 1: Identifying what might become problematic

14 This category groups 2 themes for patients' perceptions of PU risk.

15 *3.1.1.* Theoretical knowledge on the risk of PU

16 This theme reflects the general knowledge on PU formation and its underlying mechanism.

17 Most often mechanical factors are reported (seating time, muscle atrophy, skin aging).

18 *3.1.2. My own susceptibility to develop a PU.*

PU risk factors identified by patients in their life experience. They can be physical factors
(e.g. prominent ischial bone), psychological or behavioral factors (lack of vigilance,
depression) or environmental factors (e.g. hospital stay, airplane trip).

22

23

3.2. Category 2: Daily preventive action

Daily skin care strategies implemented by patients included 4 themes, reflecting the
 dimensions in which these strategies can become problematic.

1

3.2.1. Involvement of a caregiver

Persons with SCI regularly depend on a third person for monitoring at-risk areas, or nursing care to decrease immobility or bad positioning or more generally body hygiene. Some individuals experience their dependence on a third party as difficult: frustration at not being able to do things alone, difficult interpersonal relationship with the third party, trust issues with the third party when the latter is a newcomer. The life partner acting as a care provider can also become problematic for patients.

8 *3.2.2. The place of equipment*

9 For some patients, specialized equipment can offer an absolute protection against PU and take 10 away the worry of PU emergence. This equipment can also lead to functional limitations such 11 as ability to perform transfers. Patients can also think that the equipment is responsible for the 12 PU when it is defective, improperly used or outdated.

13 *3.2.3. Body care*

This covers daily skin care actions. Some actions are related to a healthy lifestyle (e.g. balanced diet, proper hydration) and some others are skin-specific, including skin care (e.g. monitoring pressure points, skin cleanliness or hydration) and physical measures (e.g. massaging pressure points, regular movements, changing position). The importance given to these three dimension (healthy lifestyle, skin care and physical measures) can vary greatly from one person to the next.

20 *3.2.4. Daily management.*

Individuals describe their perception of integrating preventive strategies in their daily life. Ideally, they are experienced as usual tasks that are not difficult to implement. However, in practice, they can be seen as constraining for various reasons: the need to think about doing them, the time needed to execute them, the need to rely on a third party, and sometimes limiting activities to avoid PU occurrence. The need for regularity in preventive actions is
 regularly mentioned as a barrier.

3

3.3. Category 3: detecting the early signs

Patients report several skills to screen for skin lesions: sensation that there is the beginning of a lesion (pain, vegetative signs, spasticity), and/or direct visualization of the early lesion (with a mirror mostly). Strategies can be implemented to use these two modalities in a gradual manner: for example, sensation of an early lesion is followed by the patient inspecting it and then asking confirmation to a third party.

9 Multiple difficulties were reported by patients: perception of being unable to visualize the 10 skin areas, skin anesthesia rendering them numb to the pain caused by the wound. They could 11 also present with vegetative symptoms without linking these symptoms to a potential skin 12 issue.

13

3.4. Category 4: Managing the early signs

14 Two themes can be differentiated in the management of early-stage PU:

15 *3.4.1. Interpretation of the issue*

16 Individuals described their interpretation of the pressure ulcer's development, i.e. the intrinsic 17 or extrinsic factor that, in their opinion, led to the skin issue. The pressure ulcer can be 18 accidental, or caused by an abnormally long seating time. Some persons did not have a precise 19 idea and could bring up fate as a reason for the development of a PU.

20 3.

3.4.2. Acting at the beginning of the issue

Some persons mentioned a list of necessary actions to manage this, e.g. relieving pressure from the area concerned, reducing seating time, verification of the pneumatic cushion, increasing vigilance level and monitoring. Some developed a coherent, efficient problemsolving strategy adapted to their own personal situation once the beginning of a PU was evidenced. For others, this strategy can be inadequate or nonexistent. 1

2

3.5. Category 5: Need for care

In the presence of PU, it can be difficult for patients to rebuild a trusting relationship with new healthcare professionals. For some the need for care can bring up the notion of time (time to achieve complete wound healing), notion of burden of care or the feeling of being powerless faced with the wound evolution. Finally, there is the negative experience of returning to the hospital where they stayed for their initial SCI management post injury.

8

3.6. Category 6: Experience with PU and being bedridden

9

3.6.1. On mood and anxiety

10 PU can be the source of worries or anxiety. Some patients avoid thinking about the 11 consequences of bed rest and PU. The boredom generated by being bedridden can be hard to 12 overcome. Symptoms of depression can be experienced consequently to this boredom and 13 bed confinement.

14 *3.6.2. On social life*

The bed rest needed to treat the PU is experienced at best as uncomfortable and at worst as cutting social ties. Patients report a withdrawal from social activities and isolation related to being bedridden, which reduces their mobility and activities of daily living. Life projects and, more generally, enjoyable life moments (family dinners, going to a movie) are forbidden.

19 *3.6.3. On health*

20 Some reported being aware of medical risks related to the presence of PU (infection, 21 malnutrition). However, health consequences were rarely brought up compared to 22 psychological and social consequences, i.e. few persons reported the risk of sepsis for their 23 health, and were more inclined to speak about their social or psychological experiences.

24

1 4. **Discussion**

The qualitative study assessed PU perceptions and beliefs in 131 persons with SCI. The six emergent categories describe daily strategies deployed to prevent PU (categories 1 & 2), to manage early signs (categories 3 &4) and the main bio-psycho-social difficulties related to the presence of PU (categories 5 & 6). Furthermore, the first 4 categories cover the experience of persons with SCI in their home environment, whereas the late two categories deal with the medical setting experience.

8 The breakdown proposed in this study can help physicians target preventive therapeutic 9 education actions in this at-risk population related to the different categories highlighted, in 10 order to develop PU prevention competency, composed of several skills.

11 A first skill was the ability to evaluate one's personal risk to develop PU, also described by 12 Schubart [24]. It combines theoretical knowledge on PU pathophysiology and experience-13 based knowledge, acquired over time by exchanging with healthcare professionals, peers or 14 previous PU self-experience. The construction of perceptions and beliefs in persons with 15 chronic diseases is based on these two types of knowledge and was brought forward as a 16 concept by Borkman [25], and constitutes one of the key points of the educational approach. 17 In persons with SCI, time since injury, but also access to information are determinants in 18 health-related knowledge [26]. It is likely that the sharing of experiential knowledge regularly 19 put into perspective with professional knowledge progressively helps build a more realistic 20 representation of PU risks.

The second skill pertains to screening for the beginning of skin complications. It can involve, and often combines, the direct vision of the skin and wound experience (vegetative signs, spasticity or neurological pain). If education on skin monitoring showed its effectiveness in being a protective factor in this population [27–29], there has yet to be a study evaluating the place of physical symptoms in the screening of skin disorders. During the course of SCI, early signs of PU are generally poorly understood by patients, who often spend years interpreting these new physical symptoms [30]. On a physiological level, autonomic dysreflexia and neuropathic pain induce a type of neo-sensitivity [31], which can be useful to detect physical problems such as the beginning of a PU. Patients need professional support to create a personalized self-screening procedure for beginning PUs, using these two pathways and the intervention of a third person if necessary.

7 Problem-solving abilities represent the third main skill underlined in this study. According to 8 D'Zurilla and Nezu [32], social problem-solving skills encompass cognitive attitudes and 9 instrumental skills necessary for coping effectively with daily life events. Elliott et al [33] followed a cohort of 188 persons with SCI during the first 3 years post injury, in order to 10 11 evaluate the risk factors of developing a PU. After a multivariate analysis, predictive risk 12 factors were: being male, complete SCI and low problem-solving abilities. May et al [34] 13 reported a significant improvement of skin-related problem-solving strategies after an 14 educational intervention in a study without a group control and low statistical power (N=27). 15 To date, no one has measured the impact of an intervention centered on PU-related problem-16 solving abilities in a population of persons with SCI.

17 The negative experience of the PU is mainly related to the necessity to receive intensive care (i.e. Category 5) and to the psychosocial consequences of being bedridden (i.e. 18 19 category 6), which generates social isolation, boredom and can lead to symptoms of 20 depression, and may partly explain the difficulties with adherence to bed rest regime [8]. In 21 our experience, some people with SCI are able to develop efficient adaptation strategies to 22 fight boredom and the feeling of isolation. More precisely, it may be possible that these 23 patients have succeeded in building their character strength [35] to cope with the experience 24 of being bedridden. For instance, character strength of zest (i.e., approaching life with excitement and energy) and self-regulation (i.e., regulating what one feels and does) were 25

notably associated with a lower level of disability and a higher level of physical health in
patients with traumatic brain injury [36]. In this context, future research could specifically
explore the living experience as well as the character strength that bedridden patients with
PUs succeed (or fail) to develop.

5 Several recommendations can be made to clinicians in light of this study, specifically in the 6 design of educational programs and the personalization of patient support. It is import to focus 7 on how the patient perceives his or her own likelihood to develop a PU, on how prevention is 8 organized daily, on the quality of the relationship with third parties involved, and finally on 9 the mental burden related to this prevention of top of the actions themselves. It is essential to 10 define modalities for detecting these wounds right from the beginning, as well as problem-11 solving strategies for managing these wounds. The issue of consulting a healthcare 12 professional is also important. When there is a PU, the prescription of bed rest must be 13 carefully evaluated by the physician, especially in light of the patient's experience and 14 tolerance, and it might be essential to provide support to help the patient develop strategies to 15 fight boredom.

This study highlights the need of a scale in order to score skin-related prevention strategies in this population. This could be helpful to clinicians to better analyze the development of a PU, including behavioral components of PU prevention. It would be interesting to explore strategies implemented to fight boredom and social isolation secondary to bed confinement. The last perspective relates to the impact of educational programs, targeting teaching objectives developed in this study, and especially promoting problem-solving strategies.

22 Limits:

The choice of designing an online questionnaire rather than conducting individual semidirected interviews could be discussed. Online surveys have been used for many years in health psychology [37]. This data-collection technique bears the advantage of including an important number of patients, vs. one-on-one interviews. Fewer elements are collected per participant but it is counter balanced by the number of inclusions. In this study, we were able to reach the coding saturation with 62 questionnaires. The main biases were controlled by the

- 4 precision of the recruitment and the quality of the questionnaire's design.
- 5

To conclude, this study describes the construct process of PU-related prevention strategies for
persons with SCI. Specifically, the construct of the perception of PU risk, modalities of self-

8 detection of skin wounds, and the role of problem-solving abilities. It also highlights the

9 negative experience on a psycho-social level of the prescribed bed rest for PU wound healing.

- 10 Taking into accounts these elements should allow the clinician to provide an individualized
- 11 support to patients, in prevention as well as management of the PU.
- 12
- 13

14 **References**

- [1] DeJong G, Tian W, Hsieh C-H, Junn C, Karam C, Ballard PH, et al. Rehospitalization in
 the first year of traumatic spinal cord injury after discharge from medical rehabilitation.
 Arch Phys Med Rehabil 2013;94:S87-97. https://doi.org/10.1016/j.apmr.2012.10.037.
- [2] Cardenas DD, Hoffman JM, Kirshblum S, McKinley W. Etiology and incidence of
 rehospitalization after traumatic spinal cord injury: a multicenter analysis. Arch Phys Med
 Rehabil 2004;85:1757–63.
- [3] Krause JS, Murday D, Corley EH, DiPiro ND. Concentration of Costs Among High
 Utilizers of Health Care Services Over the First 10 Years After Spinal Cord Injury
 Rehabilitation: A Population-based Study. Arch Phys Med Rehabil 2019;100:938–44.
 https://doi.org/10.1016/j.apmr.2018.10.020.
- [4] Stroupe K, Manheim L, Evans C, Guihan M, Ho C, Li K, et al. Cost of Treating Pressure
 Ulcers for Veterans with Spinal Cord Injury. Top Spinal Cord Inj Rehabil 2011;16:62–73.
 https://doi.org/10.1310/sci1604-62.
- [5] Baron JS, Sullivan KJ, Swaine JM, Aspinall A, Jaglal S, Presseau J, et al. Selfmanagement interventions for skin care in people with a spinal cord injury: part 1—a
 systematic review of intervention content and effectiveness. Spinal Cord 2018;56:823–36.
 https://doi.org/10.1038/s41393-018-0138-3.
- Baron JS, Sullivan KJ, Swaine JM, Aspinall A, Jaglal S, Presseau J, et al. Self management interventions for skin care in people with a spinal cord injury: part 2-a
 systematic review of use of theory and quality of intervention reporting. Spinal Cord
- 35 2018;56:837–46. https://doi.org/10.1038/s41393-018-0136-5.

- [7] Jackson J, Carlson M, Rubayi S, Scott MD, Atkins MS, Blanche EI, et al. Qualitative
 study of principles pertaining to lifestyle and pressure ulcer risk in adults with spinal cord
 injury. Disabil Rehabil 2010;32:567–78. https://doi.org/10.3109/09638280903183829.
- [8] Florindez LI, Carlson ME, Pyatak E, Blanchard J, Cogan AM, Sleight AG, et al. A
 qualitative analysis of pressure injury development among medically underserved adults
 with spinal cord injury. Disabil Rehabil 2019:1–7.
- 7 https://doi.org/10.1080/09638288.2018.1552328.
- 8 [9] Sleight AG, Cogan AM, Hill VA, Pyatak EA, Díaz J, Floríndez LI, et al. Factors
 9 Protecting Against Pressure Injuries in Medically Underserved Adults With Spinal Cord
 10 Injury: A Qualitative Study. Top Spinal Cord Inj Rehabil 2019;25:31–40.
- https://doi.org/10.1310/sci2501-31.
 [10] King RB, Porter SL, Vertiz KB. Preventive skin
- [10] King RB, Porter SL, Vertiz KB. Preventive skin care beliefs of people with spinal cord
 injury. Rehabil Nurs Off J Assoc Rehabil Nurses 2008;33:154–62.
- [11] Robineau S, Nicolas B, Mathieu L, Duruflé A, Leblong E, Fraudet B, et al. Assessing
 the impact of a patient education programme on pressure ulcer prevention in patients with
 spinal cord injuries. J Tissue Viability 2019;28:167–72.
- 17 https://doi.org/10.1016/j.jtv.2019.06.001.
- [12] Michie S, Prestwich A. Are interventions theory-based? Development of a theory coding scheme. Health Psychol 2010;29:1–8. https://doi.org/10.1037/a0016939.
- [13] Michie S. ABC of behaviour change theories: [an essential resource for researchers,
 policy makers and practitioners : 83 theories. 2014.
- [14] Rosenstock IM. Historical Origins of the Health Belief Model. Health Educ Monogr
 1974;2:328–35. https://doi.org/10.1177/109019817400200403.
- [15] Ajzen I. The theory of planned behaviour: Reactions and reflections. Psychol Health
 2011;26:1113–27. https://doi.org/10.1080/08870446.2011.613995.
- [16] Bandura A. Self-efficacy: the exercise of control. 13. printing. New York, NY:
 Freeman; 2012.
- [17] Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking:
 toward an integrative model of change. J Consult Clin Psychol 1983;51:390–5.
 https://doi.org/10.1037//0022-006x.51.3.390.
- [18] Champion VL, Skinner CS. The health belief model. Health Behav. Health Educ. Res.
 Pract., San Francisco, CA, US: Jossey-Bass; 2008, p. 45–65.
- [19] Sulat JS, Prabandari YS, Sanusi R, Hapsari ED, Santoso B. The validity of health
 belief model variables in predicting behavioral change: A scoping review. Health Educ
 2018;118:499–512. https://doi.org/10.1108/HE-05-2018-0027.
- Wu H-L, Volker DL. The use of theory in qualitative approaches to research:
 application in end-of-life studies. J Adv Nurs 2009;65:2719–32.
- 38 https://doi.org/10.1111/j.1365-2648.2009.05157.x.
- Sheppard R, Kennedy P, Mackey CA. Theory of Planned Behaviour, Skin Care and
 Pressure Sores Following Spinal Cord Injury. J Clin Psychol Med Settings 2006;13:358–
 66. https://doi.org/10.1007/s10880-006-9048-1.
- 42 [22] Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research
 43 (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care
 44 2007;19:349–57. https://doi.org/10.1093/intqhc/mzm042.
- 45 [23] Strauss AL, Corbin JM. Basics of qualitative research: grounded theory procedures
 46 and techniques. 3. printing. Newbury Park, Calif.: Sage; 1991.
- 47 [24] Schubart JR, Hilgart M, Lyder C. Pressure ulcer prevention and management in spinal
 48 cord-injured adults: analysis of educational needs. Adv Skin Wound Care 2008;21:322–
- 49 329.

- [25] Borkman T. Experiential Knowledge: A New Concept for the Analysis of Self-Help
 Groups. Soc Serv Rev 1976;50:445–56. https://doi.org/10.1086/643401.
- [26] Tederko P, Krasuski T, Krasuski M, Długołęcka A, Tarnacka B. Determinants of
 health knowledge and health perceptions from the perspective of health-related education
 of patients with spinal cord injury: a systematic review. Int J Rehabil Res Int Z Rehabil
 Rev Int Rech Readaptation 2017;40:97–106.
- 7 https://doi.org/10.1097/MRR.00000000000215.
- [27] Garber SL, Rintala DH, Hart KA, Fuhrer MJ. Pressure ulcer risk in spinal cord injury:
 predictors of ulcer status over 3 years. Arch Phys Med Rehabil 2000;81:465–71.
 https://doi.org/10.1053/mr.2000.3889.
- [28] Raghavan P, Raza WA, Ahmed YS, Chamberlain MA. Prevalence of pressure sores in
 a community sample of spinal injury patients. Clin Rehabil 2003;17:879–84.
 https://doi.org/10.1191/0269215503cr692oa.
- [29] Gélis A, Dupeyron A, Legros P, Benaïm C, Pelissier J, Fattal C. Pressure ulcer risk
 factors in persons with spinal cord injury Part 2: the chronic stage. Spinal Cord
 2009;47:651–61. https://doi.org/10.1038/sc.2009.32.
- [30] Bhimani RH, McAlpine CP, Henly SJ. Understanding spasticity from patients' perspectives over time: *Understanding spasticity*. J Adv Nurs 2012;68:2504–14. https://doi.org/10.1111/j.1365-2648.2012.05949.x.
- [31] Walters ET. How is chronic pain related to sympathetic dysfunction and autonomic
 dysreflexia following spinal cord injury? Auton Neurosci Basic Clin 2018;209:79–89.
 https://doi.org/10.1016/j.autneu.2017.01.006.
- [32] D'Zurilla TJ. Problem-solving therapy: a social competence approach to clinical
 intervention. New York: Springer; 1986.
- [33] Elliott TR, Bush BA, Chen Y. Social problem-solving abilities predict pressure sore
 occurrence in the first 3 years of spinal cord injury. Rehabil Psychol 2006;51:69–77.
 https://doi.org/10.1037/0090-5550.51.1.69.
- [34] May L, Day R, Warren S. Evaluation of patient education in spinal cord injury
 rehabilitation: knowledge, problem-solving and perceived importance. Disabil Rehabil
 2006;28:405–13. https://doi.org/10.1080/09638280500192439.
- [35] Peterson C, Seligman MEP. Character strengths and virtues: a handbook and
 classification. Oxford: Oxford Univ. Press; 2004.
- [36] Hanks RA, Rapport LJ, Waldron-Perrine B, Millis SR. Role of Character Strengths in
 Outcome After Mild Complicated to Severe Traumatic Brain Injury: A Positive
 Psychology Study. Arch Phys Med Rehabil 2014;95:2096–102.
 https://doi.org/10.1016/i.apmr.2014.06.017
- 36 https://doi.org/10.1016/j.apmr.2014.06.017.
- [37] Kaye BK, Johnson TJ. Research Methodology: Taming the Cyber Frontier:
 Techniques for Improving Online Surveys. Soc Sci Comput Rev 1999;17:323–37.
 https://doi.org/10.1177/089443939901700307.
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Figure 1: Model of PU representations in persons with SCI

DAILY ENVIRONMENTS

PREVENTION

Category 1 : Identifying what might become problematic Category 2 : Daily preventive actions

PRESENCE OF A PRESSURE ULCER

Category 3 : Detecting the early signs Category 4 : Managing the early signs

MEDICALIZED ENVIRONMENT

Category 5 : Need for care Category 6 : Experience with the PU and being bedridden Table 1: characteristic of the studied population

Characteristics	N=131
Sociodemographics	
Age (years) median (Q1-Q3)	48 (33.5-58)
Sex	
Male	100 (76)
Living partner	80 (61)
Spinal Cord Injury	
Time since injury (years) median (Q1-Q3)	11 (3-24.5)
Etiology of the SCI	
Traumatic	107 (82)
Medical	24 (18)
Level of injury	
Quadriplegia	46 (35)
Paraplegia	85 (65)
Grade AIS	
А	83 (63)
В	26 (20)
C	22 (17)
Pressure ulcer experience	
Yes	92 (70)
No	39 (30)

Data are n (%) unless indicated. SCI: Spinal Cord injury; AIS: American Spinal Cord Injury Association Impairment Scale

Table 2:

Quotes extracted from the questionnaire, according to the categories

Category	Quotes
Identifying what might become problematic	I must have a medium risk, because to date the only time I developed a pressure ulcer was during my hip surgery. I was bedridden for a month in 1989. Since then, I have never had a PU. The fact that I can reposition myself in my wheelchair must protect me. (Mr. R., 35 years old, neonatal paraplegia. Presented with one pressure ulcer) I believe I am at high risk because as I get older I will lose my strength, my skin will become more fragile, I will have more difficulties with my transfers and the risks are greater for me to touch the wheel of my wheelchair with my buttocks (Mr. J, 48 year old, quadriplegic following a motor-vehicle accident, at the age of 19. He has had several pressure ulcers)
Daily preventive actions	I do not have any specific difficulties. I trust my wife and my nurse who take care of me daily (Mr. R, 48 years old, quadriplegic for the past 35 years, he had had several pressure ulcers)
	Not being able to check the skin under my buttocks really bothers me. It is also difficult to instruct new caregivers on the importance of this verification and teach them how to do it. (Mr. F., 58 years old, quadriplegic for the past 39 years following a motor-vehicle accident. He already presented with a pressure ulcer).
	Assessing the best positioning support for my wheelchair air cushion is problematic. Because it is a cushion with 4 differentiated pressure areas, it can be difficult to know if each area is over-inflated or under-inflated (Mr. C., 41 years old. Traumatic paraplegia 7 years ago. He already presented with several pressure ulcers)
	I really do not do much, except for good life hygiene, no alcohol, no smoking and I watch what I eat because nutrition is an important factor. (Mr. C, 48 years old, traumatic paraplegia 12 years ago.)
	I do not do anything. I massage my skin, especially in locations where I already presented with a pressure ulcer (Mme V., 38 years old, paraplegic for the past 24 years. Already had several pressure ulcers)
	I make sure to reposition frequently in a 24-hour cycle to ensure partial or complete relief of load-bearing pressure points. Generally I get up at 7am. I place myself in a pressure-relieving position from 9:30 am to 11:00am. I get back into my wheelchair from 11am to 2pm. I go back to bed from 2 to 3:30pm. I resume my activities until 6pm in the winter and 9pm in the summer (Mr. L., 50 years old. Paraplegic for the past 19 years following a motor-vehicle accident. He had several pressure ulcers)

	One of the main difficulties is to adapt one's life schedule to prevention and nursing care; without being a burden at work, keeping one's performances intact and one's abilities to adapt. It is difficult to be disciplined every day and repeat the same preventive gestures all the time (Mr. L., 50 years old. Paraplegic for the past 19 years following a motor-vehicle accident. He had several pressure ulcers) While taking care of my skin I can enjoy life, go outside with my electric wheelchair and enjoy the nice days and sun to play pétanque with my friends (Mr. D., 81 years old. Became paraplegic 26 years ago following a motor-vehicle accident. Already presented with several pressure ulcers)
Detecting the early signs	I don't feel anything, I don't see anything, but the nurses who care for me in the morning can see it since my quadriplegia is complete. (Mr. G., 40 years old. Paraplegia occurred 13 years ago after a motor-vehicle accident. Presented with one pressure ulcer) I have no sensations. To detect the early signs, visual screening is the only solution to protect myself (Mr. F., 44 years old, quadriplegia one year ago,
316113	had one pressure ulcer) I know that a problem is underlying when I have chills and sweats or if my skin becomes pink. (Mrs. T., 52 years old, quadriplegic for the past 13 years following a motor-vehicle accident. Never presented with a pressure ulcer)
Managing the early signs	Right from the onset of redness one must act to avoid a more serious problem. (Mrs. T., 52 years old, quadriplegic for the past 13 years following a motor-vehicle accident. Never presented with a pressure ulcer). Sweats and goose bumps in the upper body, where I can still experience sensations. Sometimes sudden muscle spasm. When it occurs at night it is a reminder to turn around. During the daytime it is a sign that can point to other causes. I proceed by elimination until I have a visual confirmation (Mr. F., 58 years old, quadriplegia 39 years ago following an accident. One previous pressure ulcer)
	When I see it is red and that the skin doesn't become white when pressing on it, it is a sign that the pressure ulcer is imminent. At first I massage the area, but when it becomes red I must stay in bed. As soon as the redness sets in, one needs to stay in bed until it heals (Mrs. V., 38 years old, paraplegic for 24 years. Presented with several pressure ulcers)
	The most bothersome thing is being bedridden with hospitalization and surgery if needed. It is not a good moment to experience (Mr. F., 47 years old. Became paraplegic after a motor-vehicle accident 26 years ago. He experienced several pressure ulcers)
Need for care	It has a major impact on our life, because of the dressings that need to be done daily. If we soil ourselves everything needs to be done again. It poisons our life. It acts on our mood and behavior (Mr. J, 48 years old, quadriplegia

	19 years ago following a motor-vehicle accident. He has had several pressure ulcers) When there is a pressure ulcer, what a drag! I would rather stay at home than go to the hospital. I am getting older and I am scared of the hospital, which is not adapted for people who are autonomous with their wheelchair (Mr. B., 57 years old, traumatic paraplegia 18 years ago, never had a pressure ulcer)
	It puts your life on hold because any action that was started or anything we usually do in our daily routine is stopped. Since we are already limited with our mobility and everything that comes with it: work, family lifeeverything. (Mr. T., 24 years old, paraplegic after a motor-vehicle accident a year ago. Has already experienced one pressure ulcer)
Experience with a PU and being bedridden	Bedridden and staying only on one side is very difficult. Eating in bed not with one's family at the table. Being bedridden halts any ongoing project. It prevents from spending good times, one is bored, gets depressed. Having to get cleaned in bed rather than taking a good shower, passing bowel movements in bed also is rather uncomfortable. The smell of the pressure ulcer can also be problematic (Mrs. C., 43 years old, paraplegia occurred 23 years ago after a motor-vehicle accident. She has already experienced several pressure ulcers)
	It is the most important freedom that is affected. A pressure ulcer, regardless of the location, alienates completely a person in her activities of daily living. Not being able to shower for example, limited autonomy, and dressings are time consuming (Mrs. T., 63 years old, paraplegic following a motor-vehicle accident 45 years ago. She has already experienced several pressure ulcers)