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pharmacovigilance; pharmacoeconomics; surveillance device; healthcare organization; epidemiology; pharmacology

Bio Statement:

Luigi Bellante, born in Rome on 8 February 1973, has a good command—trained during compulsory schooling and subsequently—of the English language (spoken and written) and excellent digital skills developed by himself.

He followed the entire process of school education up to and including the High School Diploma.

Subsequently, he obtained a Degree in Pharmacy and a Specialization in Hospital Pharmacy (both with honours), as well as obtaining the post-graduate university qualification three times: second level "Master".

He also provided his professional work as a consultant for drug safety from 2010 to 2020, on behalf of the Health Directorate of the Lazio Region at primary facilities—Territorial Health Authorities (ASL ROMA A) and Hospitals (Policlinico Umberto Primo - Rome and Bambino Gesù Pediatric Hospital of Rome).

In addition to the professional experience described, he held the role of Pharmacist Manager for the ASL ROMA A and the role of first level private pharmacy employee (for a period of more than ten years).

He has also carried out teaching activities on dozens of occasions to teach the safety of pharmacological treatments to healthcare workers undergoing training and refresher courses and has held Pharmacology lessons in two degree courses (Nursing and Pediatric Nursing) for seven consecutive years (2016–2022).

Furthermore, he has held the role of Speaker, Lecturer at Congresses, Conferences and Organizer and Manager of Training Projects, in the field of Public Health, on multiple occasions.

He has also published publications of a scientific nature, concerning a wide spectrum of topics of environmental, pharmaceutical and clinical interest and has taken part in hundreds of refresher courses as a student, has followed other profiles of professional activity, such as the role of Referee for two Scientific Journals, indexed and reviewed at an international level [for two consecutive mandates and still ongoing].

Over the years, he has obtained all the required qualifications in the national public and private pharmaceutical sector.

Luigi Bellante is part of nine Scientific Societies and Professional Associations; he obtained the honorary nomination (April 2019) as Academician of the Roman Academy of History of Pharmacy and Pharmaceutical Sciences, the oldest private Italian Scientific Society in the pharmaceutical sector (since 1429); furthermore, he is an active part in the Communication Committee of the European Society of Clinical Pharmacy and in numerous Special Interest Groups of the European Society of Oncological Pharmacy.

Luigi Bellante obtained international recognition for a scientific contribution presented at a Sector Congress, recognition coming from the Pharmaceutical Unit of the Lyon Hospital (France) and can boast many years of experience in Device Vigilance, Supervision of drug quality defects, Management of drugs National monitoring registers.

Collection and analysis of narratives for a values charter of the Italian society for hospital pharmacy

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ABSTRACT

In recent years, the field of Narrative Pharmacy was introduced, which particularly addresses the pharmacist not only to guide a relationship of listening to and caring for the patient but also to strengthen and motivate toward the profession, improve relationships with colleagues, enhance the ability to teamwork, and understand emotions. In this paper, we report the analysis behind the construction of the Value Chart from the personal narratives of members of the Italian Society of Hospital Pharmacy. Each member's subjective professional experiences and their own view of themselves within society were collected through a semi-structured interview. Personal thinking, including experiences, feelings, opinions, desires, and regrets was classified by objective methods, from which main concepts were extracted for the Value Chart. The feedback to the survey, including activities during the Covid-19 pandemic management, is classified according to the analytical methods of Kleinman, Frank, Bury and Launer-Robinson. Regarding sentiment analysis, the emotional and subjective context of the text provides an ideal baseline to validate the result. The analysis was implemented using neural networks trained on dictionaries and natural language (i.e., Tweets). The originality of the work lies in the fact that generally value charters are built on a Society's values. In contrast, in this case, individual contributions were gathered to complement the ethical values on which the society is founded.

Keywords: affective computing; sentiment analysis; narrative medicine; web-based data collection; ethics

1. Introduction

Narrative Medicine (NM)[1,2] through the collection of personal stories, adds value to the action of people involved in the care pathway (i.e., physicians, pharmacists, nurses, health care professionals). NM brings out the subjective experience of patients and health caregivers[8].

The *Italian Society of Hospital Pharmacy (SIFO)*[3] gathers about 2,500 pharmacists working in hospital and territorial facilities of the Italian national health system. The area of Narrative Pharmacy was born in SIFO a few years ago, which particularly addresses the pharmacist not only to guide in a listening and caring relationship with the patient but also to help her or him strengthening and self-motivating towards the profession, improving relationships with colleagues and the ability to work as a team, and understanding

emotions. In this paper, we report how the ethical values charter was created from the analysis of the individual members' narrative[4–6] with the addition of an automated sentiment analysis on the narratives collected to this aim.

The Mission of SIFO is not only to promote research, training, and the acquisition of clinical, technical, and managerial skills, but also to implement transparent ethical values. The idea aimed thus to build a Charter of Values by giving extensive emphasis to the vision and voice of each of the SIFO members, through a systematic collection and analysis of the individual perception, in the belief that SIFO can be enriched by listening to the professional and emotional experience of each member. SIFO, in addition to scientific education, research, and innovation, wants to provide a channel for the expression of each member by welcoming proposals, ideas, and requests[10].

2. Material and methods

SIFO members were given a semi-structured interview through an anonymous survey, consisting of 32 questions including a first section with multiple-choice tests, and a second section with open-ended tests. The survey was open from March 25, 2021, to May 17, 2021.

The studied sample consisted of 145 narratives from members who had given consent to data processing in compliance with European regulations. For broader randomization of the sample, and avoiding bias through generalization of the results, all categories related to gender, biographical data, year of SIFO membership, Region of membership, assignment, and role (e.g., organizational professionals, adjunct workers, resident trainee) has been included.

In the narrative, members followed the interview-induced prompts[7] to bring out what they experienced as the ethical-cultural value of the scientific society. Given the hospital pharmacist's involvement in the Cov-19 Sars vaccination, some questions were also asked to learn about the emotional experience and stress during the pandemic (see **Figure 1**).

The work environment, dissatisfaction, relationships can lead to a state of mental and emotional stress. Coping is defined as the conscious effort to solve personal and interpersonal problems, trying to overcome, minimize or tolerate stressful or conflict situations[13].

2.1. Subjective analysis

Narratives can indicate the presence of factors that activate or deactivate coping, e.g., optimism, positive thinking, openness to new experiences and curiosity, awareness, clarity, sense of reality availability, kindness responsibility[16].

A subjective analysis involved the authors in selecting the main concepts underlying the feedback given to questions. A brief report has been built for every feedback profile (i.e., person answering the survey).

Metaphor[14] is a literary medium that has high evocative and communicative power and is used not only in writing literary works but also in everyday natural language. Narrative medicine makes use of metaphor[15] because it allows feelings and emotions to be expressed with a single image.

In the analysis of narrative texts, emphasis has been placed on metaphors as linguistic means facilitating the expression of content that would otherwise be difficult to bring out[11,18].

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Biographical data: FEMALE/MALE, AGE,
SINGLE/MARRIED, TRAINEE
SPECIALIST/STRUCTURED/UNSTRUCTURED, REGION OF
WORK, N. OF INHABITANTS IN THE CITY WHERE YOU
WORK, SUBURBAN/URBAN CONTEXT

Professional data: TYPE OF FACILITY:
PUBLIC/PRIVATE, YEAR OF MEMBERSHIP IN SIFO,
MEMBER TYPE, OTHER POSTGRADUATE DEGREES EARNED
HAVE YOU BEEN INVOLVED IN THE ANTICOVID
VACCINATION CAMPAIGN?

Open questions:
DESCRIBE IN A SYMBOLIC WAY YOUR ROLE IN YOUR WORK
DESCRIBE IN A SYMBOLIC WAY YOUR ROLE AS A
PHARMACIST DURING THE COVID PANDEMIC
DESCRIBE SIFO WITH A FIGURATIVE IMAGE
I CHOSE TO BE A PHARMACIST BECAUSE…
TODAY IN MY JOB…
MY WORKPLACE IS…
MY WORKDAY IS…
WHAT HAVE BEEN YOUR SIGNIFICANT EXPERIENCES
WHAT HAVE I LEARNED
WHAT I LOST
SIFO WAS…
SIFO FOR ME IS…
FOR SIFO I AM…
I WOULD LIKE SIFO TO…
WHAT VALUES TO PURSUE AS AN ENROLLED SIFO?
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Figure 1. Semi-structured interview sample.

The term *metaphor* comes from the ancient Greek *meta ferein* meaning *to bring out*, *to carry beyond*. Through metaphor, bypassing the boundary of strict literal meaning, people draw on symbolic language to describe situations more easily, giving space to subjective feelings, emotions, desires, fears and, thus, the way they live their professional role[12,17].

Narrative styles and recurring words were also considered. In addition, categorical characters were related to narratives.

2.2. Analytical methods

The texts were classified according to the analytical methods of Kleinman, Frank, Bury and Launer-Robinson[8,9]. The response to the survey has been analyzed by the authors through analytical methods.

In particular, Frank[9] suggests ranking discomfort narratives in:

1) *CHAOS,* anti-narratives, fragmented sequencing, embodiment, confusion in the body reflected in the story
2) *RESTITUTION,* overcoming, or healing is narrated more than the problem
3) *QUEST,* the problem, the discomfort is an opportunity for a journey of discovery, a challenge with positive outcomes.

In addition, narratives can be categorized in the alternative categories of:

- *IN MOVEMENT*, physical and psychological/emotional pain can be processed or in the course of processing.
- *STATIC*, closed in on itself, where the psychological aspect of the person is damaged.

From these interview analyses, the contents for the Values Chart were extracted. It is relevant to note that

the charter of values subsumes the contribution of each individual member of SIFO, integrating the ethical values on which the society is founded.

2.3. Statistical analysis

The response to the survey has been analyzed with objective statistics, taking into account both biographical/professional data, and the involvement in particular activities such as support to the Covid-19 pandemics management.

2.4. Sentiment analysis

The response to the survey has been analyzed automatically, applying sentiment analysis algorithms to the open-ended part.

For Sentiment Analysis (SA), Neural Networks (NN) trained on dictionaries and Tweets for Italian and English, separately, had been used. The input has been cleaned from empty or null responses (i.e., where people did not give feedback for specific questions). The algorithms, trained on *BERT*[20], considered the best tool for SA with NN[22], and include a pre-processing phase tokening text and cleaning stop-words. Stemming is not needed, since the training has been done on natural spoken language expressions, with the addition of emojis so as not to lose the added visual meaning of the written form of the narrative[23]. The input is a narration: the analysis of the narration is thus obtained aggregating results of the individual sentences recognized by the algorithm. The output of the NN is a vector including a value for each class (i.e., positive, negative, neutral); the maximum value is chosen as sentiment tag for the narration. In a preliminary phase, among several BERT-based NNs with excellent performance, we chose some trained networks for the Italian and English languages. Results on a random sample of narratives were compared with the human objective analysis results (see II.B) to validate them; once validated, the algorithm was used to automatically analyze all narratives in response to the open questions.

3. Results

3.1. Subjective analysis

Figure 2 shows a sample narrative analysis.

In narratives, the most frequent metaphors have been identified:

Guide, Light, Home, Point of reference, Network, Family, Crew, Source of Professional Development, Captain, Boat

The emerging values are:

- Belonging/credit/identity
- Responsibility
- Unity/sharing/collaboration (collegiality)
- Professional information
- Guidance/confidence

Members highlight the need for a Scientific Society that represents and enhances the professional figure of the hospital pharmacist.

E.g., a member would like "*tomorrow*" SIFO to "*fly like an eagle*".

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The member in question, over 56 years old and a
member for over 20 years, shows through metaphors
(; an idea of progression both in his own story
(A METAPHOR ON YOUR WORK ROLE... After the storm
the sky clears), and in the vision of SIFO (A
METAPHOR ON THE SIFO... A beacon in the fog, that
is, the landmark in what could be a vision of
CHAOS). The pharmacist in Pandemic is described
as a storm in being, thus a story of true chaos
with no certainty of resolution due to divergence
in the direction to be taken A METAFORA ON YOUR
ROLE AS A PHARMACIST DURING THE PANDEMIA COVID...
A sailboat that is in danger of not making it to
port for too many skippers who think they can
sail in the stormy sea).


The member sets out to contribute actively in
SIFO, according to a model of restitution and
quest, since he says I AM FOR SIFO ... An active
member who wishes to pass on his experience for
equity of care and to receive feedback from
different realities; strongly positive how much
the person feels he has received and also wants
to give: AT THE BEGINNING OF THE WORK I WANTED
... to be prepared, updated, efficient,
functional. ..; NOW ON THE JOB I WANT to convey
the desire to grow and work in a
multidisciplinary and more human way; the story
is evolving with elements of copying: IN THE WORK
I LIKE ... Sharing, listening transmitting and
growing together.
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Figure 2. Narrative analysis #42.

The Scientific Society must advocate for its members through active collaborations with the Ministry of Health, Public Health Institutions, and other Scientific Societies.

The desire for Growth is also evident: members call for SIFO to become the leader in all disciplines related to their profession, including the "*humanization of healthcare*".

The keywords to express the values that SIFO has passed on to its members are:

Collaboration, sharing, dialogue

Relevant turns out to be "*collaboration with colleagues*" to "*network expertise*", "*sharing common goals*", "*growth*", "*comparison with colleagues from other regions, working in other areas of work*", "*teamwork*", and "community spirit." E.g., "*from SIFO I learned that unity is power*".

E.g., *"collaboration is important for the achievement of all goals"*

The sense of *Belonging* to the Scientific Society, together with the value of Continuous learning, the ability to "*turn ideas into projects*", and that SIFO turns out to be a "*reference to get updated*" is very evident.

E.g., "*from SIFO I learned passion in improvement and the desire for relationships and collaborations*".

E.g., "*360° Knowledge. Sharing*" E.g., "*ambition and determination*".

E.g., "*cooperation*", "*rules, commitment, meritocracy*".

The individuals' need for collective growth has also been described, most notably in the values of belonging, cohesion, and collaboration.

Regarding pandemics, the narrative tools applied highlight the adaptive efforts that the NHS pharmacist made during the pandemic and, at the same time, dissatisfaction with the lack of recognition of his professional role by the authorities. The survey revealed the uneven involvement of this professional figure in the management of anti-Covid vaccines. However, professional motivations and expectations toward SIFO, identified as an important reference, emerge.

Here we provide the results of the most significant sentiment analysis questions for the SIFO value chart (see **Figures 3–5**).
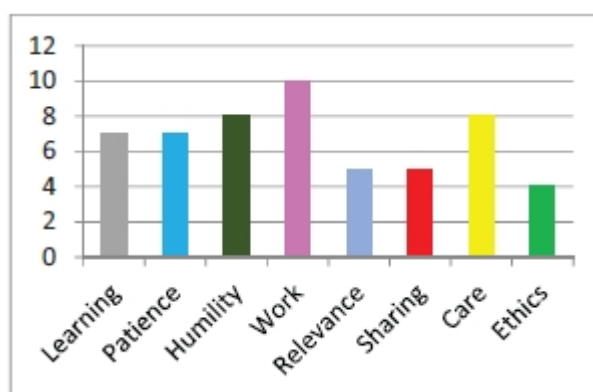

Figure 3. Main concepts and frequency for the narrative "From the profession I learned...".
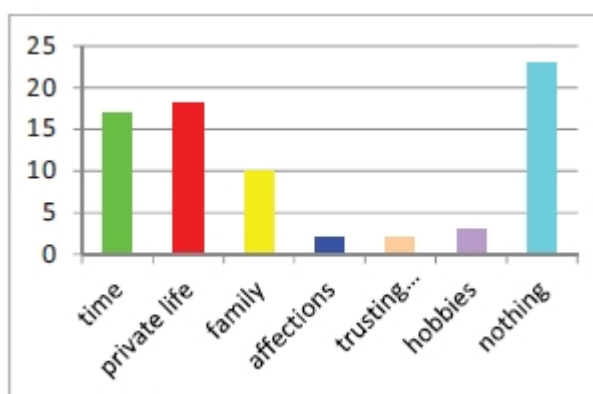

Figure 4. Main concepts and frequency for the narrative "For the profession I lost...".
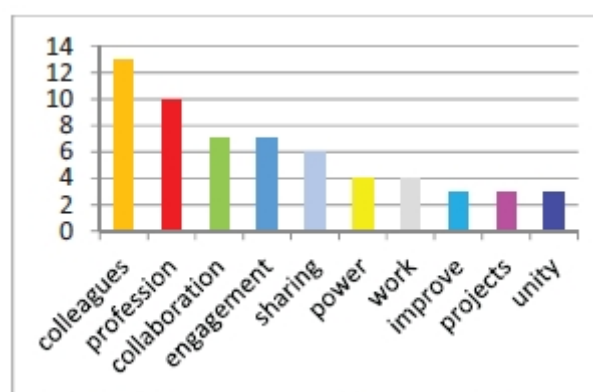

Figure 5. Main concepts and frequency for the narrative "From SIFO I learned...".

3.2. Analytical methods

Analysis methods show in the narratives 9% anti-narratives of the CHAOS type; 4% of the RESTITUTION type, with a request for recognition of one's activity; and 2% of the QUEST type, in which an opportunity for growth is identified. Eighty percent have predominantly factual language, contextual to the place and time of events.

The analysis of the most recurring metaphors shows that 20% of the members felt during the pandemic like an unrecognized hero, 14% like a whirligig, 11% like a joker/transformer, 11% like glue, 6% only like a

boat in a stormy sea, and 4% as fundamental as a crutch. The remaining 34% did not express themselves with metaphors.

3.3. Statistical analysis

The sample studied consisted of 145 interviews, received from March 25 to May 17, 2021, represented by: 71% women, 29% men; 74% from northern Italy, 26% from central-south; age up to 30 years old 10%, 31–45 years old 41%, 46–55 years old 23%, over 56 years old, 26%; 44% with less than 10 years in SIFO, 25% between 11 and 20 years of experience, 31% with more than 20 years of experience in SIFO.

Regarding the pandemic experience, the sample studied consisted of 96 interviews, represented by: 74% women, 26% men; 58% from northern Italy; 42% from central-south; 79% related to structured members, 21% unstructured.

Fifty-one percent of respondents did not participate in the vaccination campaign; the remaining 49% were involved in one or more activities such as: distribution (64%), set-up (45%), storage (32%), and collection of adverse reactions (6%); 3.1% reported an uneven campaign across the country.

3.4. Sentiment analysis

3.4.1. Italian sentiment analysis

The NNs used for Italian SA are trained on the BERT data set with the *Neuraly*[24] and *MilaNLProc*[25] NNs. Both NNs include a bugged training[21], leading to several mistakes in the tokenization phase, with the result that several words are split into parts devoid of meaning, thus losing their sentiment meaning entirely, and being classified as neutral (~80%). Despite this, the overall sentiment on the narratives generally reflects the positivity and negativity of the manual analysis, generally with a prevalence of positivity, although with less intensity because broken words critically increase the number of results with neutral sentiment.

3.4.2. English sentiment analysis

To obtain a better performance than from the Italian NN, we translated the narratives in English through *DeepL*[26], a free online translator based on a NN with excellent context-based performance and implemented sentiment analysis on English to use a better training. DeepL also has the added value to correct simple typos during the translation phase.

In the preliminary phase, among several BERT-based NNs with excellent performance, we chose *Finiteautomata*[27]. Here we provide the analysis of the three most significant questions for the SIFO value chart (see **Figures 6–8**) on the final 94 clean records of people giving a non-empty feedback, where the neutral percentage is lowered to ~60% (~20% more significant sentiment results compared with the Italian text mining).

In particular, the pie charts represent the absolute rate of positive and negative sentiments, while neutral are discarded because not significant for the task. It can be noticed that in the feedback for the two questions about "What I learned", the positive sentiment is highly prevalent, while in the feedback for the question "What I lost", the positive prevalence is less sharp as words with negative sentiment are used to express loss. In general, the positive sentiment is dominant, in accordance with the analysis of the Value Chart.
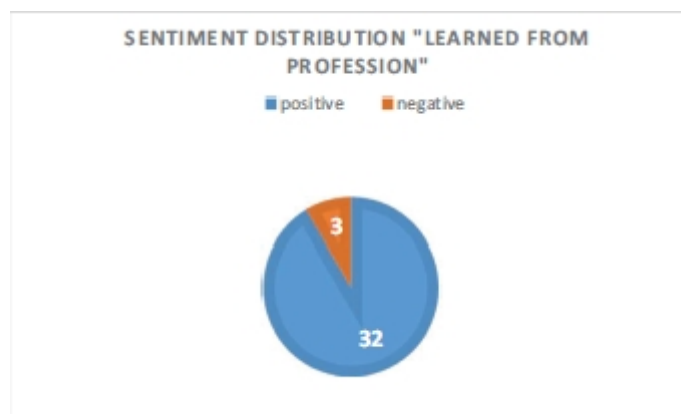
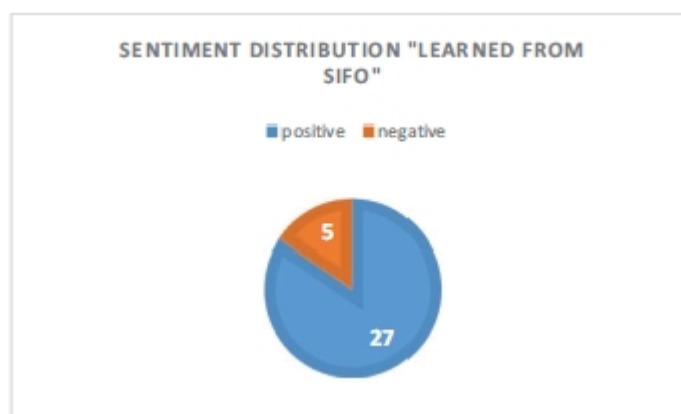**Figure 6.** Distribution of Positives and Negatives in the feedback of "From the profession I learned…".

Figure 7. Distribution of Positives and Negatives in the feedback of "From SIFO I learned…".
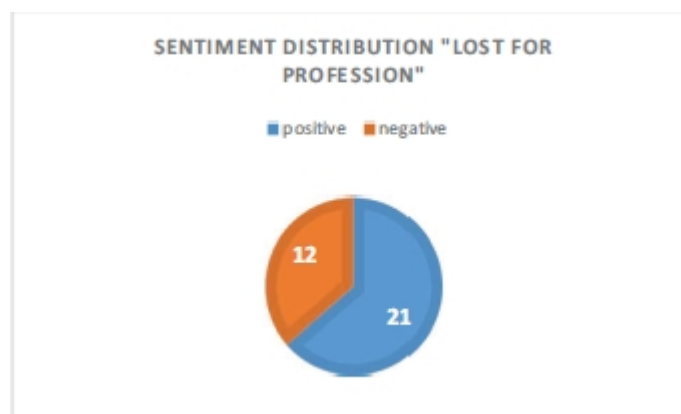

Figure 8. Distribution of Positives and Negatives in the feedback of "For the profession I lost…".

4. Conclusions

The collection of narratives expresses each person's subjective thought: experiences, feelings, opinions, perspectives, desires, regrets; towards one's profession, as a member of SIFO, as a pharmacist of the Italian National Health Service, engaged in the health emergency, and with the anti-Covid vaccination. The formal analysis underlined some main concepts underlying the feedback, from which the Values Charter of the Italian Society for Hospital Pharmacy has been derived. Sentiment analysis highlighted a prevalence of positive sentiment, in accordance with the Values Charter.

The originality of the work lies in the fact that generally value charters are built on a Society's values, whereas in this case individual contributions were gathered to complement the ethical values on which SIFO

is founded.

Acknowledgment

Authors contributions

Daniela Saetta, Luigi Bellante, Maria Vittoria Lacaita for developed the project work on the Charter of Values; Maria Ernestina Faggiano and Daniela Scala, experts in Narrative Pharmacy, provided their valuable support. Valentina Franzoni and Daniela Saetta managed the sentiment analysis of the interviews' text with neural networks, and prepared the paper.

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