

Impact of Asymptomatic Neurosyphilis on Patients Quality of Life and Social Stigma

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Background/Objectives: Neurosyphilis is a disease caused by *Treponema pallidum* when it invades the central nervous system. Asymptomatic neurosyphilis (ANS) is one of the most common types of neurosyphilis, however it is often misdiagnosed. This study aimed to explore the impact of ANS on patient's quality of life and social stigma.

Methods: A total of 159 ANS patients were diagnosed by their serology and cerebrospinal fluid. These patients' stigma and quality of life were assessed separately through the Social Impact Scale (SIS) and the Easy Response Questionnaire.

Results: The average age was 36.25±8.36 years old, and 114 patients were males (71.69%). The serum syphilis test of 159 selected patients was positive, and the indicators of nucleus cells, protein quantification, and syphilis antibodies in the cerebrospinal fluid met the criteria for ANS. The total stigma score was (40.23 ±10.12), with the scores of the different entries being clearly differentiated, with the highest being the 15th entry (I feel I need to keep my illness a secret), with an average score of 3.15/4.

Conclusion: Patients with asymptomatic neurosyphilis may feel social stigma and are more negative when facing their disease. Health-care workers should be aware of the particular aspects of their condition and pay special attention to the need for patient privacy.

Keywords: neurosyphilis, asymptomatic neurosyphilis, social stigma, quality of life, social impact scale, sexually transmitted diseases

Introduction

Syphilis is a sexually transmitted disease caused by the bacteria *Treponema pallidum*. In 2018, 36 cases of syphilis per 100,000 people were reported in China.^{1,2} Syphilis, also called the "great imitator", can have various symptoms, making diagnosis difficult.^{3,4}

Syphilis is treated with antibiotics;⁵ however, if it is not treated on time and the *Treponema pallidum* invades the nervous system, it leads to neurosyphilis.^{1,2} Neurosyphilis usually occurs about 10 to 20 years after being first infected with syphilis.⁵ It can be classified according to whether symptoms are present as symptomatic or asymptomatic. Symptomatic neurosyphilis is characterized by abnormalities in the way of walking, numbness in the lower extremities, thinking problems, headaches, urinary incontinence.⁴

Although the prevalence of asymptomatic neurosyphilis (ANS) is unknown, some studies stated that its prevalence is 13.5% of patients with syphilis,⁴ does not present any symptoms, but there is still inflammation, damage, and blood abnormalities that are typical of syphilis, such as anemia, thrombocytopenia, leukopenia, or leukocytosis.⁶

In addition, because it does not show symptoms, it is usually diagnosed quite late, and therefore the treatment is also usually late. This can result in long-term neurological complications and the development of more serious entities that become symptomatic.^{4,6-8}

Although ANS patients do not have symptoms, but they may suffer from stigma, shame,⁹ and social exclusion mainly due to two reasons. On the one hand, they are categorized as people with a sexually transmitted disease, which is associated with disgust, shame, depression, anxiety, worry, and feelings of being less loved. In addition, a high percentage of patients with

syphilis also have HIV,^{5,10,11} which adds to the emotional and social burden of the patient.⁴ On the other hand, they can be categorized as patients with mental problems because if patients with ANS are late-diagnosed or not well treated,⁴ they can develop symptomatic neurosyphilis, which makes them susceptible to mental illness.^{1,2,12,13} Also, it has been reported that when patients feel stigma, it will affect the treatment and prognosis of the disease due to less cooperation and social maladaptation, bringing a double burden to physical and psychological health.¹⁴

In recent years, there have been many research reports on patients' stigma. However, studies on stigma and influencing factors in patients with ANS are limited. Thus, our study aims to investigate the current status of stigma and coping patterns in these patients and their impact on quality of life.

Methodology

Diagnostic Criteria

The diagnostic criteria for ANS were: (1) positive serological tests for syphilis [T. Pallidum Passive Particle Agglutination (TPPA), Rapid Plasma Reagin Test (RPR)]; (2) positive for syphilis cerebrospinal fluid tests (TPPA and/or RPR test); (3) cerebrospinal fluid white blood cell count $>5 \times 10^6/L$; (4) cerebrospinal fluid protein quantitative >500 mg/L. ANS was diagnosed if both (1), (2), and (3), or (1), (2), and (4) of the above criteria were met without significant symptomatic neurosyphilis clinical symptoms.

Study Population

We used the convenient sampling method. ANS patients admitted at Hangzhou Seventh People's Hospital from January 2018 to November 2020 were included in our observational study.

Inclusion Criteria

Age ≥ 18 years; compliance with CDC's 2017 diagnostic criteria for ANS; clear awareness, no language communication disorder, ability to read and independent completion of questionnaires; patient informed consent, and voluntary participation in research.

Exclusion Criteria

Patients with serious complications, including physical disability, cognitive impairment, low education level, and/or inability to understand the questionnaire.

This study complies with the requirements of Declaration of Helsinki.

General Information Questionnaire

The questionnaire included the patient's name, age, place of residence, education level, occupation, marriage, economic income, eating habits, sleep quality, knowledge of the disease, clinical history, and treatment methods.

Social Impact Scale

Our study used the Social Impact Scale (SIS) developed by Fife and Wright¹⁵ in 2000 and translated by Pan et al¹⁶ into Chinese in 2007 to investigate patient stigma. This scale includes 24 items divided into 4 dimensions. The first dimension is about social exclusion (items 1 to 9), the second dimension asks about financial insecurity (items 10 to 12), the third dimension is about internalized shame (items 13 to 17), and the last dimension is about social isolation (items 18 to 24). All items are scored on a Likert 4 scale, with 4 points = extremely agreeable, 3 points = agreeing, 2 points = disagreeing, and 1 point = extreme disagreement. The total score is 24 to 96 points, and the higher the score, the stronger the sense of stigma. Since "strongly disagree" and "disagree" are positive evaluations, and "strongly agreeing" and "agreeing" are negative evaluations, the total score median is 48, and it was set as the cut-off, <48 are scored as no shame/stigma, and ≥ 48 are scored as stigma.

Survey Methodology/Measurements

Our study adopts the method of a questionnaire survey. The investigators conducted the survey during patients' hospitalization and explained the purpose of the study and the questionnaire filling method. Patients' privacy was

ensured. Questionnaires were issued with informed consent and were completed independently by patients. A total of 165 questionnaires were collected, of which only 159 were valid and added to the study. The effective valid questionnaire rate was 96.36%.

Statistical Analysis

The data were analyzed statistically using SPSS22.0 software. The results were described as the mean \pm standard deviation. Frequency and percentage were used for descriptive statistics. The statistical method was described by independent sample *t*-test and one-way ANOVA. Statistical significance was determined for *p* value <0.05 .

Results

General Information Questionnaire

A total of 165 questionnaires were distributed, of which 159 were valid questionnaires. Table 1 shows the baseline characteristics of the patients of our study.

SIS Score in Asymptomatic Patients with Neurosyphilis

The 159 asymptomatic patients with neurosyphilis had an SIS score of 27 to 41 (40.23 ± 10.12), with 12 of the 24 items showing a significant positive correlation (the scores were high to low, item 15: I feel I need to keep my illness a secret, 13: I do not feel I can be open with others about my illness, 4: I feel others are concerned they could “catch” my illness through contact like a hand shake or eating food I prepare, and 21: I feel set apart from others who are well,

Table 1 Baseline Characteristics of the Subjects

	n (%)
n	159
Age (mean \pm SD)	36.25 \pm 8.36
Gender	
Males	114 (71.69%)
Females	45 (38.31%)
Employment	
Employed	135 (84.90%)
Education level	
Junior high school	60 (37.73%)
Marital status	
Married	110 (69.18%)
Income	
4000–6000 yuan	70 (44.02%)
Disease course (mean \pm SD)	21.04 \pm 19.67
>12 months	102 (64.15%)
<12 months	55 (34.59%)
Treatment cost	
Medical insurance	71 (44.65%)

10, 12, 20: I feel that my abilities are worse than before I got sick, and 3: I feel I have been treated with less respect than usual by others). Interestingly, while patients with ANS had some degree of high scores in all four dimensions, the scores of different entries within the same dimension showed significantly different differentiation, with 12/24 entries showing low scores (disagreeing with 2 points, extremely disagreeing with 1 point), covering all four dimensions. The 1, 2, 5, 6, 7, 8, and 9 of the same social exclusion projects are all at low latitudes (Table 2). The average dimensions, from highest to lowest, were: internalized shame (3.01 ± 0.21), social isolation (2.51 ± 0.69), social rejection (2.31 ± 0.42), and financial insecurity (1.47 ± 0.78). However, that total score mean \pm SD (40.23 ± 10.12), financial insecurity; (5.16 ± 1.56), social isolation; (20.13 ± 4.21), internalized shame; (13.85 ± 3.09), social rejection; (23.78 ± 5.20). The comparison of SIS scores in ANS patients with different demographic characteristics showed that

Table 2 Social Impact Scale, SIS

Scales/Items	Strongly Disagree	Disagree	Agree	Strongly Agree
1. My employer/co-works have discriminated against me	80	73	4	2
2. Some people act as though I am less competent than usual.	80	73	4	2
3. I feel I have been treated with less respect than usual by other	62	65	19	13
4. I feel others are concerned they could "catch" my illness through contact like a hand shake or eating food I prepare.	8	21	87	43
5. I feel others will avoid me because of my illness(social exclusion)	78	75	3	3
6. I feel some friends have rejected me because of my illness	78	75	3	3
7. some family members have rejected me because of my illness.	78	74	4	3
8. I encounter embarrassing situation as a result of my illness	80	73	4	2
9. Due to my illness others seems to feel awkward and tense when they are around me.	88	70	1	0
10. I have experienced financial hardship that has affected how I feel about myself	62	57	25	15
11. My job security has been affected by my illness.	72	71	11	5
12. I have experienced financial hardship that has affected my relationship with others.	63	56	24	16
13. I do not feel I can be open with others about my illness	2	14	68	75
14. I fear someone telling others about my illness without my permission	56	59	28	16
15. I feel I need to keep my illness a secret.	3	15	55	86
16. I feel I am at least partly to blame for my illness.	63	65	19	12
17. I feel others think that I am a blame of my illness.	80	73	4	2
18. I have a greater need than usual for reassurance that others care about me.	88	70	1	0
19. I feel lonely more often than usual.	78	75	3	3
20. I feel less competent than I did before my illness.	56	59	28	16
21. I feel set apart from others who are well.	51	59	28	16
22. Due to my illness, I have a sense of being unequal in my relationship with others.	80	73	4	2
23. Due to my illness, I sometimes feel useless.	72	72	10	5
24. change in my appearance have affected my social relationships.	72	72	10	5

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the SIS scores of patients with different educational levels and disease-related knowledge awareness were not statistically significant ($P > 0.05$).

Discussion

Stigma is more than just wrong or disresponsible stereotypes and beliefs.¹⁷ It is defined as the negative feelings that a person has towards another due to their condition.¹⁸ According to some researchers, stigma can occur at various levels: individual, institutional, and/or social, so that patients who are victims of stigma and social impact may suffer a reduction in their quality of life in different areas of their daily life.¹⁹

The perception of stigma and discrimination is associated with a lower sense of personal control and higher levels of psychological stress. In addition, they are often afraid to disclose their situation for fear of social rejection and may develop a distorted self-identity. Also, they can develop two extremes of self-perception of security; on the one hand, feeling dangerous to others, and on the other hand, feeling weak when dealing with themselves, that is, the feeling of self-control.^{5,8} These psychological problems can influence the performance and efficiency at work, which translates into economic losses^{17,20,21} and an increase in the risk of morbidity and mortality.⁴

Although patients with ANS do not have symptoms, they may suffer rejection from others because they are infected by the pathogen and can infect other people, as shown in our study. These factors lead to a significant reduction in life quality in areas such as daily life, social activities, sexual behavior, avoiding medical check-ups due to feeling of fear or stigma from medical staff. These variables can result in depression, anxiety, and other psychological problems.^{4,8,13}

In our study, the items that were valued the most, ordered from highest to lowest, were: 15. I feel I need to keep my illness a secret. 13: I do not feel I can be open with others about my illness. 4: I feel others are concerned they could “catch” my illness through contact like a hand shake or eating food I prepare, such as shaking hands with me or eating what I had prepared. 21: I feel set apart from others who are well. 10, 12, 20: I feel that my abilities are worse than before I got sick, 3: I feel isolated from healthy people.

The high scores on item numbers 15 and 13 reflect the difficulty that patients with ANS have to expressing what they feel and think. Item number 4 reflects how these patients perceive themselves as a danger, so they will avoid contact with other people.

Syphilis usually occurs in more disadvantaged people. It is found that people of lower social status and with lower economic income perceive greater stigma than people with better socio-economic status, as corroborated in our study. These three factors (disease condition-low socioeconomic status-stigma) are variables that seem to go hand in hand.⁹

We did not find studies about stigma in ANS patients, but we found it in other diseases. The feelings of guilt and shame are also found in other sexually transmitted diseases such as genital warts,¹² human papillomavirus,²² herpes²¹ or HIV.²³ Social stigma also occurs in diseases that are not sexually transmitted, such as migraines²⁴ or patients infected with the new COVID-19 virus. In addition to guilt and shame, depression, anxiety, post-traumatic stress and/or somatic symptoms are frequently found among these patients.²⁵ These studies also show that stigma is a stressor and that the disease condition makes them worry about what others think. In addition, they are often abused and insulted, and optimistic thoughts, such as safety or self-esteem, are often negatively correlated.^{26,27}

We found in the literature review that certain aspects of personality, such as anxiety or neuroticism, are risk factors for perceiving stigma and social exclusion, which negatively affect the quality of life of these patients.¹² On the other hand, a protective factor would be when a person with mental illness does not consider the illness as part of their identity, so they will not have an aversion to telling other people about their situation.¹³

Thus, teaching these patients to not feel guilty due to their condition could bring promising results.²⁸ Some strategies could be psychological help, education, and learning to communicate.^{13,19} It is important for stigma victims to learn to communicate their problems since it has been shown that it can decrease the burden of psychological stress.^{13,19} We see the need to establish public education programs on psychosocial issues^{22,25} and train medical personnel to teach patients about stigma and blame issues, with the collaboration of a team of psychologists, in order to improve these feelings of guilt.⁴

Also, as ANS is usually diagnosed late because it has no symptoms, it is important to screen high-risk patients in order to achieve an earlier diagnosis and treatment, because the earlier treatment leads to lower complications in the future.^{4,29}

Limitations

We have found two main limitations in our study. The first one is that our study population was too small (159 patients) and it was conducted in only one hospital in Hangzhou. The second limitation was the scarcity of research dealing with the relationship between suffering from ANS and the patient's quality of life from the point of view of stigma and social impact.^{11,30} Therefore, we see the need to carry out more research that associates sexually transmitted diseases with the stigma and social exclusion suffered by this group of patients, since it would improve the quality of life of patients and the people around them.

Conclusion

The majority of patients with ANS in our study feel stigma and social problems due to their condition. Patients' quality of life is negatively impacted by the stigma associated with the disease and the impact on social life. Health-care workers should be aware of the patient's conditions and the need for confidentiality. Given the limitations in literature, further studies about this topic are necessary to investigate the stigma and impact of ANS on quality of life and to use coping methodology for ANS.

Institutional Board Review

The study was approved by the Hangzhou Seventh People Hospital, institutional ethical and review board.

Data Sharing Statement

The statistical analyzed data are available in the tables and the detail data will be available on request from corresponding author.

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The patients in this manuscript have given informed written consent to the publication of their details.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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