

## **Flexible work schedules and mental and physical health. A study of a working population with non-traditional working hours**

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### **Summary**

The relationship between health complaints and flexible work schedules was studied in a patient population selected by general practitioners. Four hundred and eighty patients between 20 and 60 years, currently employed or on sick leave, completed questionnaires which compiled data on their work situation, subjective physical health, psychological well-being, and quality of sleep. Subjective health measurements were performed by using the 21-item Subjective Health Questionnaire (VOEG). Psychological well-being was measured by applying a selection of the Sickness Impact Profile. Duration and quality of sleep were measured through a selection of the Groningen Sleep Scale. Patients working rotating shifts, compressed weeks, and irregularly changing hours showed significantly more health complaints, more problems related to their psychological performance, and more sleeping problems than a control group of workers with non-flexible work schedules. Patients working on temporary employment contracts reported significantly more problems with their psychological performance. Copyright © 1999 John Wiley & Sons, Ltd.

### **Introduction**

The concept of flexibilization has become a magic wand in modern organizational strategies. Practically all organizations try to organize their production in more flexible ways (Hakim, 1987). The reasons underlying this wave of flexibilization include: increased competitiveness, rapid fluctuations on the labour market, rapid changes in products made, and technological developments (Boekraad, Buitelaar and Vreeman, 1988). Industrial flexibilization will occur

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when efforts are made to break out of fixed task patterns and employment contracts. What are described are both positive and negative effects on health and well-being caused by non-traditional work patterns. Seen from a managerial or economic perspective, non-traditional work patterns seem to have a great number of advantages whereas, from a health-care point of view, the evidence points out that they are harmful to the health and well-being of the workers.

This article will discuss the possible effects of non-traditional work schedules on the workers' health and well-being.

A favourable effect of non-traditional flexible work schedules could be that employees are enabled to find a more agreeable balance between working hours and time at home. By deciding on their own working hours employees may use their creative powers to achieve best fit between their working and non-working lives (Hall and Parker, 1993).

Flexibilization may also be a way to respond to decreasing capability and strength in specific categories of workers, e.g. older employees (Schreter, 1984). Apart from flexibilization of working hours, flexible work schedules may also be achieved through more flexible appointments (part-time appointments, temporary appointments, having workers on call, etc.). The latter types of flexibilization may involve some amount of uncertainty (OIT, 1989).

Flexibility may also find expression in several types of functional flexibility: job enrichment, multi-purpose availability, etc. These types of flexibility will generally imply a more urgent appeal to workers' capabilities: they will lead them to enhance pre-existing skills and, as a result, will generally be perceived as a favourable influence (ten Dam, 1987; Nijhuis, Lendfers and Bullinga, 1990).

However, negative effects may be found in increased uncertainties about sustained employment, reduced task control, and being cut off from a regular social environment on the job. In addition, alternating working hours (e.g. shift work) may lead to health problems as well as social problems.

Based on an extensive review, four major phenomena can be distinguished with regard to the potential effects of flexible job patterns in promoting or reducing the workers' health and well-being (Lendfers and Nijhuis, 1989). They are: (1) alternating working hours; (2) changes in certainty of employment; (3) increased opportunities for individual growth; (4) varied interpersonal relations.

### *Alternating working hours*

Studies of alternating working hours, particularly shift work, have demonstrated that working shifts may lead to health complaints (Knutsson, Jonsson, Akerstedt and Orth-Gomer, 1986; Segawa, Nakazawa, Tsukamoto, Kurita, Goto, Fukui and Takano, 1987; Akerstedt, 1988) as well as social problems (Raymond, 1988). Still, there appear to be great individual differences between workers in their adjustment to shift work (Andlauer, 1987).

One of the main issues in assessing any health effects of alternating working hours has involved the amount of time available for rest and recovery within the context of current working hours. For example: lack of time for recovery will lead to increased risks of cardiovascular diseases (Siegrist, Matschinger, Cremer and Seidel, 1988).

### *Changes in certainty of employment*

In some types of activity, changes of work and workplace may result in increased motivation and satisfaction. However, if those changes involve some amount of uncertainty of employment,

including an imminent threat of becoming unemployed, they will lead to complaints about health and well-being (Joelson and Wahlquist, 1987).

### *Increased opportunities for individual growth*

It will be possible to find positive effects if flexibilization is realized by making adjustments in tasks and functions, providing workers with more opportunities to grow in their jobs. In many cases, this functional type of flexibility will lead to more control over the work environment, while individual growth will be seen as a positive effect that is accompanied by decreasing health complaints (Nijhuis *et al.*, 1990). Since this study is focused on non-traditional work schedules the element of functional flexibility will be left aside.

### *Varied interpersonal relations*

In flexible work schedules it may be necessary to work in various teams or work groups. If flexible relations result in less social support in the work situation, this may be accompanied by a decrease in physical and psychological well-being (Compernelle, 1988; Nijhuis *et al.*, 1990).

## **Research Questions**

The present study will focus on the potential impact of non-traditional flexible work schedules on the workers' health and well-being. This focus on health effects of flexible work schedules has been generated by our knowledge of the relations between health and timetable regulations as demonstrated by studies of night work, working regular shifts and continuous working hours, on the one hand, and by the still fragmentary results of a small number of studies over the past few years into the health effects of recent, highly flexible task schemes, on the other hand.

In the past, relationships between health and flexible work schedules tended to be examined in worker populations selected from specific business categories or economic sectors. In these studies workers used to have high degrees of individual freedom to choose in favour of flexible work patterns, thus leading to some self-selection of employees (de Lange, 1989). However, with the development of various types of modern flexible work schedules, increasing numbers of workers have to deal with various kinds of flexibility that are not self-chosen. As a result, research findings today can be expected to differ from those found among specific groups of workers in the past.

It was therefore decided to select an approach that did not start with the immediate work situation. This enabled us both to include workers who were dealing with highly diverse types of flexibility and to inquire after their health and well-being without immediately bringing up associations with specific working conditions.

In Belgium, workers with health complaints generally are required to consult a physician (their GP) on their first day of illness; as a result, general practitioners are confronted with all kinds of health problems and health complaints at an early stage (see also Prins, 1990). Thus, general practitioners are frequently the first to hear about relational problems as well as other kinds of difficulties in the family that may be related to working conditions, including problems with the

children. For this reason, the present study has tried to identify the effects on health and well-being as reported by workers with flexible work schedules when visiting their family doctor. The key question of this study was: what are the differences in complaints about health and well-being between workers with flexible employment conditions and workers with a permanent, non-flexible employment contract? The study was carried out with a sample from a population of workers with flexible and non-flexible work schedules who, for one reason or another, visited their family physician.

## Methodology

### *Sample*

In Flanders, Belgium, 116 general practitioners were asked to select during practice hours 20 workers aged between 20 and 60 years who were currently employed. They were allowed to select workers who were actually working or who received sickness benefits. Eighteen of the 20 questionnaires were to be handed out to the first 18 workers who either had a temporary employment contract or a contract to be available on call, worked shifts of at least 10 or more working hours a day, worked continuous working hours, or worked irregular shifts. The remaining questionnaires had to be presented to the first two workers with non-flexible employment contracts (i.e. a regular appointment and fixed day-time working hours and a 5-day working week).

The purpose of distributing 18 out of 20 questionnaires among employees whose situation was characterized by at least one or more of the selected flexible work schedules was to ensure that the study included a sufficient number of workers dealing with various types of flexible work schedules.

The criteria which the GPs had to apply in their distribution of questionnaires had no further use in the study.

In this study, the distinction between workers with and without flexible work schedules is based on their answers to relevant questions in the questionnaire.

Approximately 25 per cent of the general practitioners succeeded in distributing all 20 questionnaires within about 4 months, with a weekly average of one or two; 25 per cent of the GPs handed out 10 of their 20 questionnaires; 30 per cent stopped after about 6 weeks, when they had distributed between five and 10 questionnaires; even after repeated approaches by telephone 20 per cent of the general practitioners were not prepared to participate in the study. The general practitioners who had distributed all their 20 questionnaires were asked to distribute another 10. Ten GPs acted on this request. Thus, a total of 1100 workers may have received a questionnaire of 140 questions, which they were asked to complete and return by mail to the research unit. In this way we received 480 completed questionnaires, which is a low response rate of 44 per cent.

One of the advantages of distributing the questionnaires through general practitioners was that employees could be asked general questions about relations between workload, health and well-being without focusing their attention on the relationship between flexible work schedules and health complaints. This would reduce the risk of response bias. A drawback was, however, that the researchers had less control over the number of questionnaires distributed; calculations in this respect had to be based on information provided by the general practitioners. In some cases, social desirability appeared to be a reason to report the distribution of a greater number of

questionnaires than actually realized. Response rates have been calculated on the basis of data provided by the general practitioners. The result of this approach may have been to overestimate the number of questionnaires that were distributed, while overestimating response. The implications of a relatively low response rate will be discussed below.

### *Research variables*

#### **Independent variables**

In order to assess the amount of stress generated by different kinds of shift work several analytic approaches have been developed. For example, Jansen (1990) developed a method to reduce various types of shift work to a limited number of risk profiles referring to psychosomatic and psychosocial parameters. However, it is not possible to apply these methods to all non-traditional flexible work schedules. For example, flexible work may also include factors such as working on a temporary contract, working with prolonged intervals between working periods, and working through an employment agency.

As mentioned in the Introduction, flexible work schedules may be characterized through their irregularity and uncertainty. Thus, we tried to measure the amount of flexibility in the work-situation in terms of these two aspects, i.e. irregularity and uncertainty. The questions about irregularity covered issues such as: working split shifts, night shifts, or weekends; doing shift work or continuous work; being available on call; and working with irregularly changing working hours. Furthermore, the questions also included the times of day when working days began and ended, the amount of overtime, the maximum and minimum number of days of working without interruption, and the possibilities of taking time off to rest and recover. As for uncertainty, the questions included issues such as working on a regular or temporary employment contract, on a full-time or part-time basis, or working through an employment agency.

The answers on the questions about the distribution of working hours and the employment contract were used to construct a **control group** of patients who: (a) had a permanent employment contract; (b) had regular daily working hours; and (c) had a 5-day working week. In addition, five categories of flexible work schedules were distinguished:

- (1) **temporary work (TW)**: workers having an employment contract of limited duration, irrespective of their being employed through an employment agency;
- (2) **contracts for being available on call (AC)**: workers who should be available for work while being at home and waiting for a call (usually by telephone) from their employer;
- (3) **continuous working hours (CW)**: employees working four-shift or five-shift schemes, including night shifts and weekend shifts;
- (4) **irregular working hours (IW)**: employees working in irregularly changing shifts or with frequently varying times for starting or ending their working days, while usually not being free to choose their own working hours;
- (5) **compressed working weeks (WH > 10)**: employees working shifts of at least 10 working hours a day (overtime not included). Most of these cases include employees working 10-hour shifts for 4 days a week or 12-hour shifts for 3 days a week.

#### **Dependent variables**

We were interested in the possibility of finding differences in subjective physical health, psychological performance, and quality of sleep between workers with flexible work schedules and a control group with non-flexible working hours.

Since privacy considerations made it impossible for us to have access to data on the subjects' objective medical complaints, it was decided to use a subjective health questionnaire (the 21-item VOEG scale; Dirken, 1969). The VOEG is well-known for being an adequate measure of individual subjective health status (Visser, 1983; Joosten and Drop, 1987). The VOEG offers the possibility to examine a wide range of health complaints and the VOEG has proved to be a reliable questionnaire to distinguish healthy workers from those in poorer health (van der Horst, Nijhuis and Muris, 1993).

To assess individual psychological performance a questionnaire was designed based on a selection from the Dutch translation of the Sickness Impact Profile (SIP; de Witte, Jacobs, van der Horst, Luttick, Joosten and Philipsen, 1987), supplemented with some questions of our own. The unabridged SIP version measures the impact of diseases, chronic disorders or disabilities on the worker's general performance. The SIP questions referring to individual psychological performance were selected for the present study. They do not inquire after any symptoms or the subjective experience of being ill, but they do cover the frequency of performing certain behaviours and activities in daily life and their accompanying complications. In addition, we also constructed a quality-of-sleep scale based on the Groningen Sleep Quality Scale (SQS) and added some questions of our own.

Several variables were measured with a view to identifying potentially interfering or modifying variables in the relation between work and health status. Thus, the variables *work stress*, *autonomy*, *leave* and *children* were constructed. The factor *work stress* consisted of three different factors: *changing working conditions*, *subjective workload* and *physical stressors* (Table 1).

Table 1. Construction of variables: internal consistency

	$\alpha$
Dependent variables:	
Subjective health status (VOEG)	0.87
Well-being (SIP)	0.83
Quality of sleep (SQS)	0.85
Interfering and modifying variables:	
Work stress	0.64
Changing working conditions	0.68
Subjective workload	0.69
Physical stressors	0.53
Autonomy	0.67
Leave and recovery	0.62
Having children	0.64

### Data analysis

In this analysis  $\lambda^2$  tests were applied to establish how the control group and the various groups with flexible work schedules compared with regard to age, sex, marital status, educational level, smoking behaviour, alcohol consumption, and factors typical of the work situation, e.g. number of years employed, kind of work (manual work, repetitive work, intellectual work, supervisory or managerial work), damaging factors at work (heat, cold, handling toxic products), average working week duration, satisfaction with basic wage, and subjective estimate of workload. The  $\lambda^2$  analysis showed that the control group and the various groups with flexible work schedules did

not differ significantly on any of these parameters, except for the fact that those working on temporary contracts were predominantly women (85 per cent against 33 per cent in the control group,  $p < 0.0001$ ).

By applying a principal component analysis with varimax rotation and Kaiser normalization it was possible to determine the internal consistencies of both the constructed dependent variables and the VOEG, the SIP, and the SQS. As is shown in Table 1, the constructed health variables have high values for Cronbach's alpha.

Cronbach's alpha for interfering and modifying variables has mostly modest to reasonably high values. For these variables, modest  $\alpha$  values are likely to be caused by the fact that our respondents displayed a great variety of functions and work settings, containing various stressors in different configurations. Therefore, these variables should be seen primarily as a summation of subjective problems with stressors at home or at work. The low  $\alpha$  value for the variable of physical stressors should be explained by the fact that the presence of a particular physical stressor (e.g. noise) does not automatically imply the presence of other physical stressors (e.g. dirt). Thus, despite relatively low  $\alpha$  values, the aggregate number of physical stressors is evidence of the total of physical stressors.

The data were first analysed by using the  $t$ -test, followed by a multiple linear regression analysis to establish whether flexible work schedules also made independent contributions to explained variance in subjective health, psychological performance, and quality of sleep—independent of working conditions, educational level, age, or way of life.

## Results

### *Sample description*

Out of a total study population of 480 respondents, 96 per cent were Belgian employees; 65 per cent of them were men. The average age was 34 years ( $S.D. = 9.2$ ). Three hundred respondents did manual work, 49 did repetitive work, and 121 had supervisory or managerial positions. As a whole, the sample population had been employed for an average of 12 years. More than 70 per cent of them worked 38 hours a week or more. Twelve per cent were employed on a temporary contract. Twenty-seven per cent of the respondents reported currently receiving sickness benefits. Half of them had been away from work for 1 week or less; 9 per cent did not work at the time of the study as a result of accidents or illnesses which, in their own opinion, were work-related.

As was mentioned earlier,  $\lambda^2$ -analyses showed no differences on these parameters between flexible and non-flexible workers (except for sex).

The control group with non-flexible work schedules included 125 of all 480 respondents. The remaining 355 were assigned to at least one of the five selected categories with flexible work schedules, i.e. **temporary contract (TC)**, **being available on call (AC)**, **continuous working hours (CW)**, **irregular working hours (IW)**, and **compressed working weeks (WH > 10)**. The various flexible work schedules are not mutually exclusive. As a result, some respondents were working in more than one type of flexible work schedule. For example, 31 respondents, i.e. a majority of the 58 respondents employed on a temporary contract (TW), could also be characterized by at least one of the four other flexible work schedules.

Table 2. Differences in health, well-being and sleeping complaints between those employed in non-flexible and flexible work schedules

	Non-flexible working conditions	Non-traditional flexible work schedules				
		Temporary contract	Available on call	Continuous working hours	Irregular working hours	Compressed working week (> 10 hours/day)
Subjective health						
<i>m</i>	6.9	8.7*	7.6	8.6*	10.2†	9.9†
( <i>S.D.</i> )	(5.3)	(5.4)	(3.2)	(5.3)	(5.3)	(5.0)
( <i>N</i> )	(125)	(27)	(6)	(73)	(101)	(50)
Well-being						
<i>m</i>	6.7	9.2*	9.1	7.7	9.1†	10.3†
( <i>S.D.</i> )	(4.9)	(5.8)	(5.8)	(5.0)	(5.7)	(5.4)
( <i>N</i> )	(125)	(29)	(6)	(71)	(102)	(49)
Quality of sleep						
<i>m</i>	6.1	4.9	4.0	5.4	4.8†	4.6‡
( <i>S.D.</i> )	(2.6)	(2.3)	(1.8)	(2.9)	(2.8)	(3.0)
( <i>N</i> )	(123)	(28)	(5)	(72)	(102)	(46)

Two-sided *t*-test: \* $p \leq 0.05$ ; † $p \leq 0.001$ ; ‡ $p \leq 0.01$ .

### Comparative analyses

For each category, Table 2 presents the number of respondents (*N*), the average scores (*m*), the standard deviations (*S.D.*), and the *t*-test results for those employees whose situation was characterized by only one type of flexible work schedule.

We will now discuss the results for subjective health status (VOEG), well-being (SIP), and quality of sleep (SQS).

Higher scores on the VOEG and SIP scales mean more complaints about subjective health and well-being. Employees with flexible work schedules reported between 20 and 40 per cent more health complaints than those with non-flexible work schedules. Significant differences were found between the control group and employees working: **continuous hours** ( $p < 0.05$ ); **irregular working hours** ( $p < 0.001$ ); and **compressed working weeks** ( $p < 0.001$ ). The same applied to well-being. Here, too, employees with flexible work schedules reported less psychological well-being than those with non-flexible work schedules. Significant differences were found for employees with **temporary contracts** ( $p < 0.05$ ), **irregular working hours** ( $p < 0.001$ ), and **compressed working weeks** ( $p < 0.001$ ). Higher scores on the Sleep Quality Scale refer to better quality of sleep. All the categories of flexible work schedules appeared to have lower scores, while differences with statistical significance included employees working **irregular working hours** ( $p < 0.0001$ ) and employees working on a **compressed working week** schedule ( $p < 0.01$ ).

Further analysis showed that similar effects occurred when employees working on a combination of several types of flexible work schedules were included in the analyses. In that case, significantly more health and sleep complaints were found in all the categories of flexible workers. On the other hand, however, the combination of different flexible work schedules made it impossible to say which type of flexibility made the greatest contribution to the development of health and sleep complaints. The observed differences could not be explained by differences in age, sex, subjective workload, or working conditions, since no differences were found for these variables between the various categories. This was confirmed in a multiple regression analysis. The

Table 3. Multiple regression: flexible work schedules and health, well-being and quality of sleep

Variables	Health complaints $\beta$	Well-being $\beta$	Quality of sleep $\beta$
Subjective workload	0.25*	0.25*	-0.15*
Smoking behaviour	-0.16*	-	-
Problems finding leisure activities	-0.15*	-0.11‡	-
Flexible work schedules	0.12†	0.09‡	-0.13†
Raising children	0.12†	0.18*	-0.12†
Job autonomy	-0.09‡	-0.09‡	-
Age	-	-	-0.16*
Social activities outside working hours	-	-0.11‡	0.19*
	$F = 22.98$	$F = 23.44$	$F = 18.06$
	$r^2 = 23\%$	$r^2 = 26\%$	$r^2 = 16\%$

\* $p \leq 0.001$ ; † $p \leq 0.01$ ; ‡ $p \leq 0.05$ .

analysis demonstrated that—apart from age, subjective workload, smoking behaviour, appreciation of leisure time, involvement with education of the children, and autonomy in the work situation—flexible work schedules made their independent contributions to subjective health status, differences in complaints related with psychological performance, and quality of sleep (Table 3).

Flexible work schedules have considerably smaller effects than some other work-related variables, including subjective workload. Apparently, it is a matter of extra stress added to pre-existing work-related stress. Furthermore, different flexible work schedules do not appear to generate equal contributions to complaints about health, sleep, and well-being. As a result, a combined variable will have only limited explanatory powers. In addition to the effect of work-related variables (including workload and autonomy), factors related with non-work elements (leisure activities, participating in their children's education, etc.) also affected workers' health and well-being. Thus, flexibility may affect the health and well-being of workers in two ways, i.e. through flexibility-related factors within the work situation as well as through factors outside the work situation that are affected by flexible work schedules.

## Discussion

Our primary point of interest concerned the possibility of using a sample population of employees to measure differences in subjective health status, well-being, and quality of sleep between employees with flexible work schedules and those working in non-flexible conditions. Employees working on **temporary contracts**, working **irregular hours**, or working **compressed working weeks** reported significantly more *health complaints* on the VOEG than a control group with non-flexible work schedules. Employees working **irregular hours** or **compressed working weeks** reported up to even 40 per cent more health complaints. This is in agreement with findings of an earlier review study where these flexible work schedules were found to be the more burdening types (Lendfers and Nijhuis, 1989). Similar results were found for *psychological performance* as measured by the SIP: relatively poor scores for employees working on **temporary contracts** or working **irregular hours** as well as for those working **compressed working weeks**. For *quality of sleep* we found lower scores for the categories of employees working **irregular hours** and those working **compressed working weeks**.

The remaining question is whether the results found in this sample of an employee population selected by general practitioners are relevant to all those employed on flexible work schedules. Because the response rate is relatively low, the findings of this study cannot be generalized without some restrictions.

A low response rate would be especially problematic if the study focused on providing a description of the incidence of health, sleep and mental complaints in relation to flexible work schedules. However, if the relation between non-traditional work patterns and health and mental complaints is the central issue, as is the case in this study, the important thing is to have a sufficiently large range of variance. This was the case in the present study. Furthermore, the respondents were not aware of the specific goal of the study; therefore, there are no reasons to assume that non-response was associated with a specific subpopulation or that a specific selection effect occurred.

In view of our manner of acquisition there is no reason to assume that there has been a specific selection of respondents. And the fact that there is a rather high amount of variance within the categories of flexible and non-flexible work schedules seems to be sufficient reason to take the observed differences seriously.

Since our analysis was applied to a sample of employees visiting their general practitioners it is not possible to generalize these results without restriction to the entire population of those working on flexible work schedules. A conclusive answer can be found only by studying a number of worker populations employed in differently organized flexible work schedules. On the other hand, the present study can be said to be unaffected by specific business situations as it covers a population collected from a great, highly varied series of enterprises. Furthermore, the categories of workers employed in flexible and non-flexible work schedules showed similar characteristics on a great number of relevant parameters other than flexibility in working conditions. Thus, it should be concluded that there is no reason why the observed relations should not apply to other populations of employees in flexible work schedules (Knottnerus, Knipschild and Sturmans, 1989).

On the basis of these results it is our conclusion that specific types of flexible work schedules are associated with a greater number of health complaints, decreased feelings of well-being, and reduced quality of sleep. Employees working **highly irregular working hours** and employees working **compressed working weeks** report significantly more problems in the areas of subjective health status, well-being, and quality of sleep as compared to those employed in non-flexible work schedules. The category of employees working on **temporary contracts**, mainly consisting of female workers here, reported significantly more problems with maintaining adequate psychological performance than the control group with non-flexible work schedules, which had a more balanced sex distribution. In comparison with the control group, employees working **continuous hours** had a greater number of physical health complaints.

These findings suggest that flexibility is associated with increasing complaints about health and well-being, particularly when it is characterized by a great amount of irregularity. A striking example is the difference between employees working continuous hours and those in other kinds of flexible work schedules. Employees working continuous hours report more health complaints than other workers, although they do not show any differences with those working in non-flexible conditions in terms of well-being and quality of sleep. This would imply that the design of flexible timetables should take account of possibilities for workers both to have their influence felt and to anticipate irregular working hours. Negative effects for the well-being and health for the employees will show up when the worker is not able to control his own flexibility. The relevant aspect of the health and well-being effect of flexibility is: the controllability of the flexibility. Employees working under flexible employment contracts that are characterized by high degrees of job uncertainty (e.g. being available on call, temporary jobs) show only small

differences with other workers. This is probably due to the fact that employees working on temporary or on-call contracts (e.g. through employment agencies) typically tend to be at a particular (early) stage of their career or else may have made a deliberate choice in favour of those types of employment.

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