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Perceptions of Construction Workers Regarding the Utility of Mindfulness-Based Stress Reduction Initiatives: An Exploratory Study

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Abstract. Psychological stress remains a major cause of accidents and fatalities on construction projects. Mindfulness-based stress reduction (MBSR) initiatives have been proposed as a mechanism for managing psychological stress. Although a plethora of studies have reported on MBSR initiatives, literature focusing on the concept in the South African construction industry context appears scant. Adopting a qualitative single embedded case study research design, this study contributes towards developing this body of knowledge by eliciting the perceptions of various construction actors concerning an identification of the causes of psychological stress among construction workers, an understanding of the impact of such stress on construction labour and/or project productivity and the utility of MBSR in facilitating psychological stress reduction. The data was collected through interviews with 19 purposively recruited interviewees and subsequently analyzed using thematic analysis. Findings reveal that the level of workload, supervision and/or managerial style of project managers and impact of factors like working away from home as major causes of psychological stress. It was also discovered that psychological stress posts a significant negative impact on construction productivity. Finally, the study reveals a low level of knowledge of MBSR initiatives among the interviewees. However, interviewees were optimistic that the initiative's potential to engender a reduction of psychological stress if adopted and effectively implemented within the South African construction industry context. This study provides a platform upon which further studies can be undertaken to not only unravel the benefits of the MBSR initiative but also to provide structured implementation protocols to enable effective implementation.

INTRODUCTION

The construction industry remains one of the industries wherein workers experience a prevalence of psychologically related health problems. Grossman argued that about 70% of injuries and fatalities result from construction accidents which are informed by the interaction between the work team, equipment, workplace, and materials[1]. As a result, an ample range of safety management approaches have been implemented to mitigate construction risks associated with this nexus[2, 3]. Some degree of success has been realised in terms of reducing lost time due to injuries and incidents[4]. However, it appears that extant safety management approaches deployed in the industry have failed to completely eradicate the causes of accidents whilst enhancing preventative measures. A plethora of these approaches have remained mostly reactive rather than proactive. This observation has contributed to the evolution of advanced approaches and methods which an cater to tackling the causes of accidents

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like stress emanating from physiologically related health problems[4, 5]. Mindfulness-based programmes happen to be one of such emerging solutions for achieving this objective[6-8].

Psychological stress is one of the major health problems that construction workers are susceptible to due to the nature of environment settings and the attendant pressure which they are exposed to[9-12]. This environment and the associated construction work is characterised by high risk and mental stress [13]. These attributes of the construction environment affect the psychological capital of construction workers thereby influencing their levels of safety behaviour and compliance [5, 13-16]. The impact of the psychological stress among workers in general is performance-based as it leads to underwhelming performance of assigned tasks. Reportage on the effect of psychological stress among workers has gained prominence in extant literature [13, 14]. Whereas most studies have focused on studying the relationship between such stress and safety behaviour and compliance among construction workers[11, 13, 15, 17] , other studies have focused on developing solutions to tackle psychological stress [18, 19]. Similarly, some studies have studied the mediating effect of psychological capital in the management of stress [10, 13]. Despite the plethora of solutions being proposed and deployed for managing the incidence of psychological stress among construction workers, the spate of accidents and fatalities resulting from stress persists, especially in developing country contexts.

Mindfulness-based programmes are being introduced in recent literature as a panacea for overcoming the incidence of stress and stress-induced accidents among construction workers [20-23]. Such programmes have been referred to as Mindfulness-based stress reduction training by these scholars. Furthermore, in enunciating the importance of mindfulness-based initiatives in facilitating stress reduction construction workers, studies have underscored the importance of supporting such initiatives with the use of wearables within the workplace [24, 25]. A cursory look at the corpus of extant literature detailing the successful adoption and implementation of mindfulness-based programmes highlights a limited number of studies focusing on the countries situated with the Global South context, despite the salient contribution of the construction worker to the industry's productivity due to the labour-intensive nature of the industry in such contexts.

This study contributes towards bridging this gap through a qualitative evaluation of the perceptions of construction workers on the usefulness of these programmes in enabling stress-reduction directly and the associated reduction in the spate of accidents and fatalities amongst construction workers in the South African construction industry.

PSYCHOLOGICAL STRESS AND MINDFULNESS-BASED INITIATIVES

Tackling Psychological Stress among Construction Workers

According to Snast et al.,[9], psychological stress can be described as a situation wherein an "individual perceives the environmental demands tax or exceed their adaptive capacity" (pp.1045). Corroborating this definition, Bowers et al. [11] opine that this kind of stress within the mining and construction environments result from lower-levels of work-life balance, compressed rosters, social isolation, sleep deprivation, substance abuse, lengthy shifts arrangements, among others. Arguably, these circumstances are rife within the construction context. These incidences culminate in certain attitudes among the workers which can be referred to as psychological hindrances.

Ajayi [26] articulates certain psychological hindrances which are related to stressful working conditions are consisting of; "feelings of helplessness, mood changes, anger, depression, anxiety, nervousness, irritability, tension, and boredom" (pp.345). These feelings and mood changes are often accompanied by acts of aggressiveness such as interpersonal aggression, complaints, sabotage, and hostility which produce negative performance, satisfaction, and poor decision making among others [3, 13, 26]. According to Menze [27], the inability of most employees to cope with stress often culminates in a decrease in actual performance due to the lack of concentration and reduced cognitive capacity. Therefore, it can be stated that individual, project, and organizational productivity levels remain affected by the previously mentioned psychological stressors [28].

Detecting the symptoms of psychological stress is rather challenging as employees tend to hide these to protect their reputation. This challenge is exacerbated by the differing abilities of various individuals to cope with the same amount of stress [12, 20, 29, 30]. Whereas some individuals have been known to capitulate under a certain degree of stress, others have thrived under same conditions[11]. Considering this complexity, construction organisations are increasingly moving towards the development of proactive stress management initiatives to sustain organisational productivity [29]. Ehsan and Ali [31] echo the same sentiment arguing that management of stress or measurement of

stress is of paramount importance as it addresses psychological, physical, social and economic survival of individuals for improved productivity. According to Hampton et al. [32], construction workers have adopted adaptive and non-adaptive strategies to reduce, handle, or tolerate stress. Whilst these adaptive strategies consist of problem-solving planning, positive cognitive reappraisal, confrontive coping, instrumental support seeking, and acceptance of responsibility, non-adaptive strategies include distancing, escapism, and emotional discharge[22, 23]. As a concept and strategy, mindfulness has been proposed as a veritable mechanism for managing psychological stress given that it encompasses various elements of these adaptive and non-adaptive strategies[21, 22, 33, 34].

Evolution of Mindfulness-Based Stress Reduction Initiatives

The mindfulness concept addresses awareness and the quality of consciousness of a particular context in the present moment [35]. Creswell[7] maintains that mindfulness adopts the notion of keeping options available to alternative views and categories of a situation in pursuit of understanding it without relying solely on a comparison of experiences. Also, mindfulness permits individuals to be sensitive to an environment that allows them to have clearer judgements and behaviours as well as improved decision-making, performance, and reduction of stress[8, 36]. The theory of mindfulness "refers to an individual's sensitivity to context through gathering an awareness of characteristics, freshness, and differences, challenging the limits of strict categories, and considering alternative perspectives" [37]. In simpler terms, it can be deduced that there is a connection between an individual's degree of awareness, decision making and mindfulness. Accordingly, the fundamental framework of mindfulness theory is founded on how "mindfulness is pervasive and contrasting to mindlessness which is a habitual and automatic behavior that generates closed mindsets and singular perspectives" [38].

The origin of mindfulness has been traced to countries situated in the Global East and was based on ancient meditation practices of Buddhism [39]. However, Dimidjian and Segal [40], posit that the modern-day mindfulness concept was founded by Jon Kabat-Zinn who was the founder of Stress Reduction Clinic in the 1970s at the University of Massachusetts Medical School. This clinic introduced the Mindfulness Based Stress Reduction (MBSR) programme to reduce diverse conditions such as heart disease, chronic pain, sleep problems, anxiety, psoriasis, and depression [33, 35, 41]. The MBSR has evolved further to help individuals suffering from depression by combining mindfulness and Cognitive Based Therapy (CBT) thus transforming into Mindfulness Based Cognitive Therapy (MBCT) [42, 43]. The MBCT has been clinically approved in the United Kingdom (UK) by the National Institute for Clinical Excellence (NICE) as a preferred treatment for recurrent depression [7]. Since the approval from the NICE Centre for Mindfulness Research and Practice, the efficacy of mindfulness in managing on emotion, cognition, and restlessness has been explored [43]. Currently, the utility of mindfulness in assisting patients reach metacognitive awareness has been observed[8, 22, 33, 44].

The findings from Gu et al. [43] concerning the use of mindfulness, be it in a religious or scientific form, indicates calmness as the result. This is because, from the origin, the aim was to assist an individual to have the ability to deal with restless thoughts, emotional aspects thereby becoming more aware and compassionate[39]. The Centre for Mindfulness Research and Practice presented intention, attention, and attitude as three mechanisms of mindfulness which help in dealing with psychological stress in a work environment[45].

Extant literature in South Africa has highlighted that psychological, physiological, and sociological strain effects are caused by workplace stress [12]. In their study on work stress experienced by construction professionals, Cattell, Bowen, and Edwards,[46] sought opinions of South African civil engineers, architects, quantity surveyors, and project and construction managers using an online survey. Findings revealed that work stress among professional construction workers in developing countries was attributed to economic hardships and social problems, such as inequality and crime [46]. Another study by Bowen *et al.*, [12] reported the feeling of lack of appreciation from colleagues and dissatisfaction with one's own performance at work as the core psychological effects culminating in workplace stress.

In another study by PWC, [47], stress levels and job demand, control and support experienced by construction professionals in South Africa and Hong Kong were examined and compared. Evidence indicates that South Africa reported higher jobs demands, high job control levels, and less job support which consequently give rise to work stress in the South African construction industry. Some of the measures put in place to reduce stress levels in the South African construction industry are, and not limited to, organizing social gatherings, job reallocation, and the implementation of fair compensation policies [47]. However, the performance of these measures remains underreported in the literature.

Deployment of Mindfulness-Based Stress Reduction Initiatives in the Management of Psychological Stress in South Africa's Construction Industry

Notwithstanding the emerging nature of the mindfulness concept as tool for managing psychological stress in the South African construction industry, there is evidence pertaining to the development of a strong community of mindfulness practitioners as well as an academic body of knowledge pertaining to mindfulness therein [8]. The effective deployment of mindfulness initiatives in the South African construction industry would relatively reduce work stress, and consequently increase performance. It is against this backdrop that the adoption of mindfulness-based programmes as a mechanism for the management of psychological stress among construction workers is being advocated. However, the jury is still out on the utility of mindfulness-based programmes to cater to the reduction of psychological stress among South African construction workers. In their study, Khoury et al[48] advocated for longitudinal studies to be conducted to better decipher the long-term effect of mindfulness-based programmes on the safety performance of the South African construction industry. This study seeks to contributes towards fulfilling this advocacy albeit relying on a cross-sectional elicitation of the views of relevant actors in the construction industry, particularly those involved with projects under the auspice of the COEGA Development Corporation (CDC)in South Africa's Eastern Cape province.

RESEARCH METHOD

This paper adopted a case study research design in its attempt to elicit the perceptions of various stakeholders on the utility of mindfulness in the management of psychological stress among construction workers on construction projects. According to Yin [49], the case study research design focuses on the scope, process, and methodological characteristics of the case being understudied, placing emphasis on the nature of inquiry, and the importance of context to the case. In this study, a case study comprising of the COEGA Development Corporation (CDC) was used. Details of the CDC used in the case study research design are presented in Table 1.

TABLE 1. Description of the Study based on Case Study Selection Criteria

Characteristics of case study	Description of this study
Scope	It is a state-owned enterprise that is divided into three structures and the study considered one structure which is the project management/consultancy services.
Process	The organisation (CDC) acts as implementing agent, for a range of private and public sector clients as it relates to infrastructure project delivery.
Methodological characteristics	The study obtained empirical data from purposively selected participants comprising of project managers responsible for six projects in the construction sector and workers working therein. Thus, construction projects being delivered by CDC were relied upon as contexts for data collection.
Nature of inquiry	The study sought to interrogate the perceptions of various actors concerning the causes of psychological stress, the effects of psychological stress and the usefulness of mindfulness-based programmes in facilitating psychological stress reduction.
Importance of context	The study seeks to gain an in-depth understanding of the utility of mindfulness-based programmes on the management of psychological stress among construction workers.

Based on the contents of Table 1, it can be observed that an embedded single case study research design was utilized as the selected projects were under the auspice of CDC. Also, the participant sample for the study comprised of actors (construction (project) managers and construction workers) working on six projects being procured by CDC. The CDC was chosen based on a combination of purposive and convenience sampling. A total of 19 interviewees participated in this study. See Table 2 for the allocation of interviewees according to projects.

TABLE 2. Allocation of Interviewees per Project

Project name	Pseudo name for Projec Employees	Pseudo names for Construction (Project) Manager
Zibi Meyer Project	P01Z; P02Z	PM01Z
Ntabeni Project	P01N; P02N; P03N	
Tinana Project	P01T; P02T	PM01T
Noninzi Project	P01NO; P02NO; P03NO	PM01NO
Pontseng Project	P01P; P02P	PM01P
James Ndulula Project	P01J; P02J	PM01J

An interview protocol consisting of questions which were delineated according to the three pre-set themes mentioned in Table 1. Questions contained therein sought to ascertain the perceptions of the interviewees concerning these themed areas. The interview sessions lasted an average of 30 minutes each and were conducted on construction sites by one of the authors between September and November 2019. The interview sessions which were conducted in a mix of Xhosa (native language) and English, were recorded and subsequently transcribed verbatim. The data was analysed using thematic analysis.

FINDINGS AND DISCUSSION

In this section, the findings from the data analysis relating to the three themes, which address the study's objectives are presented.

Causes of Psychological Stress

Extant literature presents the following as the main causes of psychological stress among construction workers, namely: job insecurity, lengthy shift patterns and working hours, nature of control at work and managerial style [11]. The data collected from the interviewees in this study further confirms the causal nature of these factors. Causal factors responsible for the incidence of psychological stress among construction workers as identified by this study's interviewees were further classified into three categories namely: level of workload, the level of supervision and the effects of relationships.

Concerning the contribution of the levels of workload to the incidence of psychological stress, most construction workers interviewed admitted that "*mostly workload is high when it is mid and month end"* and as such there are always pressures during these times which result in stressful conditions thereby making the occurrence of accidents most probable. However, despite acknowledging the high levels of workloads during month-end, these interviewees argued that "*it should not be considered as a significant cause of accidents as they have adapted well to such situations*". However, there was a consensus among the project managers interviewed concerning the factors contributing to psychological stress among the construction workers. Firstly, they all agreed that they had witnessed workers undergoing stress at different intervals at the workplace. Continuing, they identified causes of such stress as consisting of the following: *deadlines, wage cuts due to no work, delegation of too much work, working far away from home, fatigue, feeling of being under undermined, poor communication, poor planning, poor relationships with supervisors, and job insecurities*. The causes as observed by project managers do not mirror the perceptions put forward by the construction workers themselves as the latter whilst acknowledging the incidence of too much work when deadlines are approaching particularly during month end, admitted to that they had developed coping mechanisms to handle the stress.

Relevant literature highlights the influence of the supervision/managerial style adopted by construction managers on the incidence of psychological stress experienced by workers [50-52]. Corroborating the findings from these studies, findings from this study showed a positive relationship between supervisors, and the supervision/managerial

styles, and the well-being of the workers. The workers maintained that the supervision/managerial style also played a salient role in limiting their exposure to psychological stress. The interviewees opined that they "*like to work more with their supervisors as it helps them a lot to cope with workloads as they feel supported*." They opined that the management styles deployed in their projects enabled effective communication and planning, thereby putting them at ease. Accordingly, it can be discerned that the supervision/managerial styles deployed by respective supervisors across the projects were good for the wellbeing and psyche of the construction workers interviewed, thereby reducing their exposure to psychological stress.

Interrogating the impact of working away from home on the incidence of psychological stress among the construction workers, half of the interviewees indicated having a family. Interviewees working on the Ntabeni projects, acknowledged that "*working away from home affected them because they have family which they missed"*. This view was corroborated by interviewees working on the Tinana project. However, Potseng project participants acknowledged that their project required their working away from their families for the shortest possible time and maintained that this did not cause any psychological stress for them. For instance, P02P said, "...A*t most we work away from home three times a year and for a period of one week only*". This implies minimal effects of stress resulting from working away for construction workers on this project. A similar scenario obtained in James Ndulula project wherein P02 maintained that "*I worry much when I leave my children behind without a guardian*". Obviously, circumstances like this makes the worker feel uneasy when working, an indicative cause of psychological stress. Interviewees from the Zibi and Nozizi projects did not have to work away from home. Therefore, no responses relating to this sub-theme were elicited from them.

With the increasing deployment of technology on construction projects, taking over basic aspects which were hitherto associated with unskilled labour, most of the interviewees across the six projects expressed concern about their impending technological disenhancement, indicating that this was a major cause of psychological stress to them.

Summarily, it can be stated that the incidence of psychological stress among workers in the construction project context investigated, is caused by pressure of workload, supervision/management styles as well as relationship challenges due to working away from home.

Effects of the Psychological Stress

Questions associated with this theme sought to ascertain the impact of psychological stress on the productivity or performance of construction workers. Excerpts from the interviewees' comments based on their involvement in the six projects indicate that they believed that the psychological stress resulted in *poor performance, missing deadlines, headache, and anxiety, shut off especially when there was poor planning and communication*. This furthermore confirms the findings reported in similar literature. Some of these excerpts are presented in subsequent parts.

According to PM01Z, "*many accidents and erratic behaviour emanate from stress*". Impliedly, this means that there is a loss of focus which results in poor workmanship among construction workers undergoing bouts of psychological stress. This assertion is corroborated by PM01T who enthused; "*Stress sometimes is the cause of the accidents and incidents at workplace because employees experiencing stress become negligent and emotional so the stress at workplace is very dangerous. Moreover, they fail to concentrate and lose focus to the work they are doing and end up doing the wrong things like getting useless injuries.*"

PM01NO attributed the rising levels of toxicity among workers to the incidence of psychological stress. According to him, the use of "*harsh verbal responses to workmates*" by workers undergoing stress often leads to levels of disaffection among teams and a negative impact on teamwork quality.

Based on the foregoing, it is evident that the incidence of psychological stress negatively impacts on the productivity of the construction worker and in turn, on the productivity of the overall construction project. Such dwindling levels of productivity are accompanied by financial losses resulting from missed deadlines and employee compensation for workplace injuries.

Usefulness of Mindfulness-Based Stress Reduction Initiatives

Mindfulness-based stress reduction initiatives (MBSR)are novelty programmes which have been clinically proven as suitable methods for addressing workplace-based challenges relating to stress and depression, among individuals [33, 41, 53].

To arrive at this theme, questions were asked to ascertain the prevalence of stress among the construction workers and the availability of effective mechanisms for managing stress. Also, questions were posed to decipher the level of awareness and knowledge possessed by the project managers prior to attempts at eliciting the utility or otherwise of such initiatives. Accordingly, these above-mentioned constructs contributed to the development of the theme pertaining to the usefulness of mindfulness-based stress reduction initiatives.

From Zibi Meyer Project, it was reported that an estimated 20% of the workforce had reported experiencing stress. In addition, PM01Z maintained that some stress cases were not reported as the behaviour of the employees due to psychological stress accounted for more than the reported cases of stress. To address the matter of unreported cases that were observed, PM01Z said that he "*would call the employees and discuss with them and give them some time off to assist them regroup*". The action described by PM01Z is indicative of a good leadership style. In the Tinana project, PM01T maintained that many workers had also reported experiencing stress. The project manager for the Zibi project maintained that observations were used to check the stress levels of workers. Narrating how he manages or addresses the incidence of stress among workers, PM01T said, "*I motivate by telling the workers to accept things that they cannot control and also take part in regular exercises take their mind off work and also keep focused on their duties to avoid being expelled due to lack of concentration.*"

Within the Noninzi project, no cases of stress were reported but PM01NO observed that the workers experienced stress but possibly dealt with it privately. An alarming rate of reported cases of stress came from the Pontseng project where the project manager, PM01P said that 60% of the workforce had reported stress cases. To address the reported cases, he stated that he usually encourages and motivates the workforce. In the last case, the James Ndulula project, reported cases of stress were minimal. In addressing the stress levels observed or reported, PM01J said "*listening to employees, showing empathy and care and offering flexible working environment key to reduce stress levels of the employees. In addition to that, I always use informal settings like the lunch and after hours to confide them about their personal lives thanks for the moral support to ensure that you know the family at workplace, and this led to employees loving their work as they feel like they belong.*"

From the six projects, an absence of a professionally based intervention for managing stress reduction amongst construction workers remained the norm. Researchers like Bowen *et al.*, [12], Manganyi [54] and Cattell, et al,[46] present work-family balance under the auspice of the Employee Awareness Programmes (EAP) as an interventionist measure for managing stress.

Regarding a general understanding of MBSR, most interviewees did not understand the term, and many had not heard about the term. From the Zibi project, all participants and management from the basic description of the term MBSR following their lack of knowledge of the term assume that if it is applied in their organisations, it can aid stress reduction. From the Ntabeni project, one interviewee P02N understood the MBSR initiative. According to him, "*MBSR is a program developed to help people who are suffering from stress, anxiety, depression and pain.*" Though understanding it, the follow-up question regarding its use on the project proved that such strategies was not being implemented therein.

Participants from the Tinana project did not have any knowledge about the MBSR although they assumed that the program might be of help in engendering stress reduction. The management response on the understanding of MBSR was negative though they opined that MBSR was imperative as MP01T argued that "*when I checked this MBSR term out of curiosity, I was emotionally attached to what the program is all about and thought of what we go through in the construction projects and such projects can assist workers to be confident and concentrate on their work.*" This provides a clear insight as it pertains to the status of research related to MBSR in the South African construction industry.

Taking into consideration of the professional level (low and medium respectively) and skills possessed (unskilled and semi-skilled) by the participants from the project, it is vital for the organisations to offer such programs to its employees as it aids them to be exposed to new knowledge which can push them to aim for adding professional skills. In this age of information, stress levels are also accumulating as individuals who are at the lower rungs of their professions are becoming increasingly insecure due to the notion of robots and automation taking over their roles and the MBSR addresses all these concerns, hence it is considered a cogent need [55, 56]. According to the project manager of the Noninzi project, PM01NO, MBSR remains a new concept to them. Concerning its probable usefulness, PM01NO added, "*If it relates to workshops or initiatives that allows personnel to be heard and also take their mind of time bound assignment, I would say yes it is a need for every construction company in South Africa*."

Actors working on the Pontseng project concurred with PM01NO on the need for MBSR initiatives to be mainstreamed across construction projects in South Africa given its salient benefits. From the last project, James Ndulula, P02J admitted to being knowledgeable about MBSR saying, "*I know a lot because my sister attends the*

program and shares her experiences with me." Accordingly, P02J feels that it is imperative to have such initiatives at the workplace especially during the performance of demanding jobs like construction works.

Therefore, the findings from the study indicate the low levels of knowledge of MBSR initiatives within the case study. However, the interviewees are optimistic of the utility of the initiative in engendering a reduction in the incidence of psychological stress among construction workers if properly implemented.

CONCLUSIONS AND RECOMMENDATIONS

The study explored the perceptions of construction actors concerning the relevance of mindfulness-based stress reduction (MBSR) initiatives in the South African construction industry. Findings from the study indicate the persistence of psychological stress among construction workers in the six CDC projects which served as case studies for the study. Furthermore, it was also observed that the level of workload, type of supervision and/or managerial styles, job insecurity and nature of relationships influenced by working away from home (fly-in-fly-out- FIFO) were significant causes of the psychological stress experienced by construction workers.

Based on the study's finding, it is evident that psychological stress had a negative impact on the productivity of the construction worker and the project as well. It was discovered that there was a low level of awareness and uptake of MBSR initiatives within the case projects investigated in this study. This is indicative of the lack of structured MBSR initiatives supported by professional bodies within the South African construction industry context. This finding calls for the development of a structured MBSR programme and a framework for its adoption and subsequent implementation within the South African construction industry and beyond.

The use of the case study research design ensured that the study's findings cannot be statistically generalized to a broader sample of the South African construction industry. Therefore, these findings should be used cautiously in describing the state of MBSR implementation in the South African construction industry.

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