Internship training

At

ZS Associates India Pvt. Ltd.

Gurgaon

On

Prevalence of Neck Pain among KM team

By

Dr. Prateek Yadav (PT)

PG/14/048

Under the guidance of

Ms. Kirti Udayai

Post Graduate Diploma in Hospital and Health Management

2014-16

International Institute of Health Management Research
New Delhi

The certificate is awarded to

Dr. Prateek Yadav (PT)

In recognition of having successfully completed his
Internship in Knowledge Management (KM) team

And has successfully completed his Project on

Prevalence of Neck Pain among KM team

15th April 2016

ZS Associates India Pvt. Ltd.
New Delhi

He comes across as a committed, sincere & diligent person who has
a strong drive & zeal for learning

We wish him all the best for future endeavors

Training & Development

Zonal Head-Human Resources

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Prateek Yadav student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at ZS Associates India Pvt Ltd, Gurgaon from 1st Feb 2016 to 15th April 2016.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfilment of the course requirements.

I wish him all success in all her future endeavours.

Dr. A.K. Agarwal
Dean, Academics and Student Affairs

Dr. A.K. Agarwal
IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Prevalence of Neck Pain among KM team"** at **"ZS Associates India Pvt Ltd, Gurgaon"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

1. Dr. Shyama Nagaraja.
2. Vanishree M.R.
3. DIVYA AGGARWAL

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Prateek Yadav (PT),** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. He/ She is submitting this dissertation titled " Prevalence of Neck Pain among KM team" at "ZS Associates India Pvt Ltd , New Delhi" in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Dr. A.K. Agarwal
Dean, Academics and Student Affairs

IIHMR, New Delhi

Bhawna Dora 18/May/2016

Ms. Bhawna Dora
Associate Consultant

ZS Associates, New Delhi

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INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Prevalence of Neck Pain among KM Team and submitted by Dr.Prateek Yadav (PT) Enrollment No. PG/14/048 under the supervision of Ms. Kirti Udayai for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 1st Feb 2016 to 15th April 2016 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

FEEDBACK FORM

Name of the Student: Prateek Yadav

Dissertation Organisation: ZS Associates, Gurgaon

Area of Dissertation: Knowledge Management (KM)

Attendance: Regular

Objectives achieved: ① Prevelance of Neck Pain in KM.
② Therapy Area Overview

Deliverables: Recommendations for Neck Pain.
Disease profiling of Cancer (Renal, Ovarian, Throat).

Strengths: Punctual. Team-Player, Obedient.

Suggestions for Improvement: Should prioritize things.

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

Ankuri 18/5/16

Date: 18/5/16
Place: Gurgaon

Ankuri Agarwal
Consultant
ZS Associates

ACKNOWLEDGMENT

On the very outset of this report, I would like to extend my sincere and heartfelt obligation towards all the personages who have helped me in this endeavour. The internship opportunity I had with ZS Associates was a great chance for learning and development.

I am also grateful for having a chance to meet so many wonderful people and professionals who led me through this internship period.

First and foremost, I would like to express my sincere gratitude to Mr. Nitin Aggarwal, Principal, KM team

At this juncture I feel deeply honoured in expressing my sincere thanks to Ms. Bhawna Dora (Associate consultant) who in spite of being extra ordinarily busy with her duties, took time out to hear, guide and keep me on correct path and providing valuable insights leading to the successful completion of my project.

I would also like to thank all my teammates for their critical advice and guidance without which this project would not have been possible.

I express my gratitude to my college International Institute of Health Management and Research, New Delhi for arranging summer training in good schedule. I also extend my gratitude to my project guide Ms. Kirti Udayai, Assistant Dean Academics and Student Affairs, IIHMR Delhi for her co operation, help and encouragement.

I perceive this opportunity as a big milestone in my career development. I will strive to use gained skills and knowledge in best possible way and I will continue to work on their improvement in order to attain desired career objectives.

Hope to continue co operation with all of you in the future.

Sincerely

Prateek Yadav

15/04/2016

DECLARATION

I, Dr Prateek Yadav, student of International Institute of Health Management Research, New Delhi, hereby declare that I have completed my project titled Prevalence of Neck Pain among KM team from February to April 2016. The information submitted herein is entirely true and original work.

The projects were undertaken and carried out by me, under the guidance of Ms. Kirti Udayai, Assistant Dean Academics and Student Affairs, IIHMR Delhi, and it has not been submitted to any other university or institute or published earlier.

Place- New Delhi

Date- 15/4/2016

Section 1

Organisational Profile

ZS is the world's largest firm focused exclusively on improving business performance through sales and marketing solutions, from customer insights and strategy to analytics, operations and technology. More than 3,000 ZS professionals in 21 offices worldwide draw on deep industry and domain expertise to deliver impact where it matters for clients across multiple industries.

ZS focuses exclusively on the two areas that create customer demand: sales and marketing. As a result, the expertise in this domain is both broad and deep. They provide a vast range of marketing- and sales-related services in the industry, from customer insight, product development, and sales and marketing strategies, to sales compensation planning and even plan administration, to name just a few.

The consultants leverage the firm's deep knowledge of the range of sales and marketing activities and how they interact in order to anticipate the upstream and downstream effects of virtually any decision. Thus, ZS offer clients the unique advantage of understanding what will work best for their company as a whole.

Thirty years ago, ZS helped pioneer the shift in commercial strategy from being determined largely by intuition to being driven by data. The fundamental approach is same even today: uncovering the truth through quantifiable facts of what works, informed by unrivaled experience and constant innovation. As a result, ZS possess deep expertise in what makes for successful sales and marketing, and has built a global team of more than 2,000 highly trained professionals who are committed to this pursuit.

Since 1983, ZS has been working shoulder to shoulder with leaders at hundreds of the world's top corporations. ZS clients typically are large and mid-sized companies whose success depends on the effectiveness of their sales and marketing.

ZS helps them gather and analyze data to create the best strategies; orchestrate sales and marketing activities to increase demand efficiently; and change quickly to become more competitive.

1.1 ORGANIZATION PROFILE

ZS Associates is rooted in an academic partnership that began in the early 1970s. In **1973**, Andy Zoltners completed a PhD in integer programming algorithms at Carnegie Mellon University, devoting a chapter in his dissertation to sales territory alignment problems. Andy subsequently accepted a teaching position at the University of Massachusetts (UMass).

The following year, Andy crossed paths with PhD student Prabha Sinha, who was exploring the use of higher math in meal planning for the military. The two collaborated on the Multiple Choice Knapsack problem and co-wrote a paper on the topic. Eventually they realized that this line of thinking was highly applicable to the problems of sales force sizing and resource allocation.

Over the next several years, the pair worked with a number of companies, gaining practical experience applying modeling techniques to sales force problems.

In **1982**, Andy presented his and Prabha's mathematical models for sales force sizing and territory alignment to the Pharmaceutical Management Science Association (PMSA), using an early Apple computer to display sales territories on-site. Executives from many of the attending companies were stunned by the model's ability to quickly solve sales force sizing, sales resource allocation, and territory alignment issues and see solutions visually in real time, with one exclaiming, "I've been waiting my whole life for this!"

By **1983**, both Andy and Prabha were teaching at Northwestern's Kellogg School of Management. They lectured by day, and by night they worked on the many client projects that came their way. Already having consulted to eight companies, the two professors concluded that there was an opportunity to help many clients address critical sales force effectiveness issues, and so they incorporated ZS Group, Inc., on September 21, soon renamed ZS Associates, Inc.**1985** saw ZS double in staff, from 12 to more than two dozen, and the burgeoning consulting firm soon outgrew the standard midnight computer runs to Northwestern's computer center. Andy and Prabha, realizing the need and opportunity to expand, collateralized an IBM 3481 mainframe computer purchase with their homes. That same year, the firm released the first version of its automated territory design software.

By **1986**, ZS had helped eight of the world's 10 largest pharmaceutical companies size their sales forces and align territories in the United States, Canada, or Europe. The two-year-old, 25-person firm had already worked on nearly 100 projects in a dozen countries.

In **1987**, ZS was selected by a global corporation to help reorganize, downsize, realign, and redeploy its US sales forces. It was one of ZS's largest projects to date. However, providing great analytics were simply not enough for this project – the people-oriented aspects of facilitating placement decisions proved to be critical as well. Providing change management processes and supporting tools for the human resources side of sales and marketing became a key element of the firm's placement work.

Additionally, ZS began working on incentive compensation design and administration, helping clients determine optimal incentive plans for their sales

teams as well as publishing performance reports and calculating attainment on an outsourced basis.

In **1990**, another international company chose ZS to help develop sales force strategies and deployments for its recently merged sales forces in a dozen key countries. This was the first of many such near-simultaneous, multi-country projects for the firm. The same successful model was repeated through the 1990's with multiple clients.In **1993**, ZS introduced a new sales force effectiveness and productivity framework. This framework – and future versions – has since been leveraged extensively by the firm to help clients determine their key issues and improve their business performance. The company also began to develop data warehouses for clients, as well as a range of analytical services. These projects were the genesis for ZS's services in client capability building and outsourcing.

In **1997**, ZS began to apply its data-handling capabilities and rigorous analytics to the marketing research function. In subsequent years, this new marketing research area grew together with ZS's already established forecasting practice and expanding expertise in broader marketing issues, to take shape as ZS's current marketing services practice area.

In **1998**, ZS introduced specialized software, processes, and dedicated teams to focus on the growing opportunity in administering sales force incentive compensation programs, an area the firm had been addressing for some time. In addition to providing outsourced services, our work in this area enabled clients to successfully administer their incentive compensation programs in-house.

In **2002**, ZS launched the Marketing Research practice, which eventually evolved to an even broader Marketing solutions area.

In **2004**, the Institute for Operations Research and the Management Sciences (INFORMS) awarded Andy and Prabha the Marketing Science Practice Prize for outstanding implementation of marketing science concepts and methods, recognizing the sales territory alignment system they had developed and implemented through the work of ZS Associates. Their winning paper, *Sales Territory Design: 30 Years of Modeling and Implementation*, was subsequently published in the INFORMS journal, *Marketing Science.*

By **2007**, ZS's headcount had topped 1000 employees. Also in 2007, the firm completed more than 2000 projects – a first for a single year – for almost 300 clients in 28 industries in 38 countries. The projects were in 30 different categories/issues: more diverse than ever.

ZS's Silver anniversary in **2008** marked 25 years of extraordinary growth:

- From one small office in a college town, the firm grew to 17 offices around the world – nine in North America, five in Europe and three in the Asia / Pacific region.
- Building on ZS's original MAPS® territory alignment software, today's Javelin™ Software Suite supports a myriad of sales and marketing needs.
- An early focus on the pharmaceutical industry has expanded to B2B organizations in nearly 30 industries.
- The client issues ZS addresses have evolved from sales force size, structure and alignment to include a full spectrum of sales and marketing issues, providing consulting expertise, client capability building and outsourcing services.

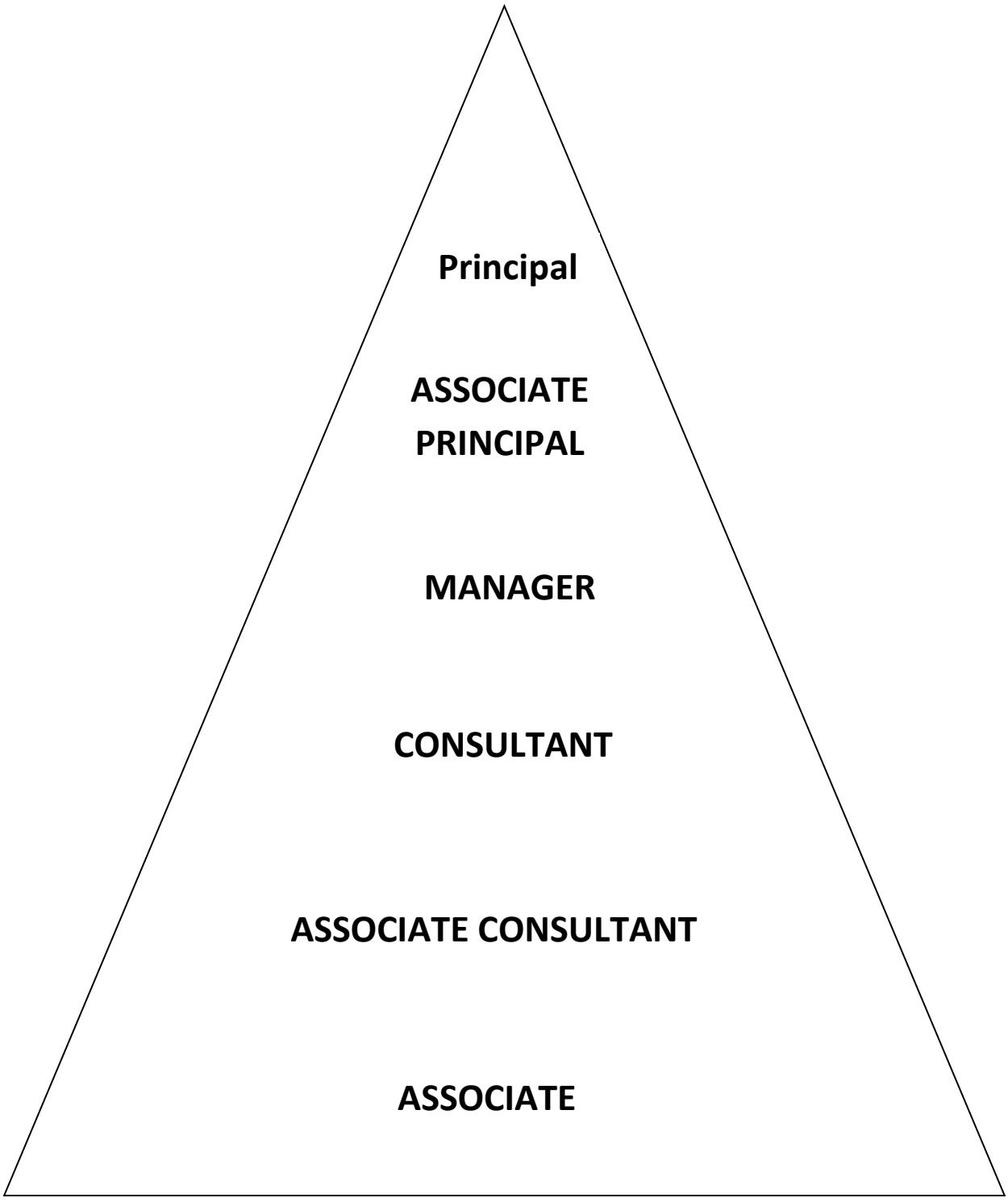
1.2 OFFICES AROUND THE GLOBE

ZS Associates is one firm with multiple offices positioned to provide the highest quality and most attentive service to our clients. Each office can effectively serve local or regional clients while also contributing to project teams working around the world, assembling the optimal mix of capabilities, experience, geography, language and culture.

Table 1.1 Offices Around The Globe

AMERICA	EUROPE	ASIA
Boston	Barcelona	New Delhi
Chicago	Frankfurt	Pune
Evanston	London	Shanghai
Los Angeles	Milan	Tokyo
New York	Paris	
Philadelphia	Zurich	
Princeton		
San Diego		
San Francisco		
Sao Paulo		
Toronto		

Figure 1.1 ORGANIZATIONAL STRUCTUREOF ZS ASSOCIATES, NEW DELHI



1.3 SERVICES PROVIDED

1.3.1 HEALTHCARE–SPECIFIC

1.3.1.1BUSINESS DEVELOPMENT AND LICENSING

Licensing is critical to maintaining a robust pipeline. However, competition for early- and late-stage compounds and medical products is tremendous. ZS accelerates the creation of business development strategies and ensures that potential opportunities are well-evaluated and aligned with portfolio and strategic priorities.

1.3.1.2 CONTRACT OPERATIONS

Life sciences companies spend billions each year in payer rebates—$40 billion by the U.S. pharmaceutical industry alone. But many companies overpay because of erroneous payer data and noncompliance. ZS can help prevent overpayments, boost compliance and reduce operational costs.

1.3.1.3 CUSTOMER DECISION JOURNEY

An insightful and actionable customer decision journey can give a key advantage over client's competition.

1.3.1.4 CUSTOMER – CENTRIC MARKETING

Life sciences companies today face enormous challenges in making marketing and sales more effective: reduced access to prescribers; unprecedented competition and cost pressures; customers embracing the online channel to learn about therapies; and consumers taking greater control of the purchasing decision, to name just a few. ZS helps these companies institute a customer-centric model for marketing and sales that can dramatically improve the overall customer experience, customer loyalty and revenue.

1.3.1.5 CUSTOMER AND PATIENT MARKETING

Developing and implementing the right combination of consumer and patient marketing tactics is critical to achieving business objectives.

1.3.1.6 MANAGED CARE

With hundreds of payers and disparate contracts, optimizing payer relationships has become extraordinarily difficult. ZS helps life sciences companies substantially increase the revenue, market share and profitability of working with managed care.

1.3.1.7 MARKET ACCESS AND PRICING

Pharmaceutical companies need to better incorporate payer perspectives in drug development and commercial decision making. Increasingly strict payer evidence requirements and intense competition mean companies must develop and articulate stronger payer value propositions. ZS helps pharmaceutical companies create and execute optimal market access and pricing strategies.

1.3.1.8 PRODUCT LAUNCH

Research shows that performance in a new product's first year is a strong predictor of long-term results. Therefore, maximizing the success of new product launches is critical. ZS helps its clients address a variety of challenges related to new product commercialization, from high-level questions to very detailed needs.

1.3.2 SALES

ZS's sales consulting services have helped companies around the world excel at critical sales activities such as: designing sales channels that leverage both direct and indirect paths to market; creating the best sales force structure, territory plan, size, allocation and incentive approach; and integrating sales and marketing programs with extraordinary results and levels of efficiency. Find out how ZS has helped hundreds of companies gain market share by markedly improving the performance of their sales organizations.

1.3.2.1 BUSINESS INTELLIGENCE AND TECHNOLOGY

ZS can deliver superior business intelligence solutions that transform data into insight. Our Business Intelligence practice gives you specialized analytical

monitoring and diagnostic solutions that improve your sales and marketing and help cut costs.

1.3.2.2 CUSTOMER TARGETING AND ACTIVITY PLANNING

The sales field force remains one of the most effective channels to engage the customer. But it is also one of the most expensive. And in a market in which you have to achieve more with less, companies must maximize the return on their sales force. ZS helps sales organization identify the best opportunities and field force tactics.

1.3.2.3 GO-TO-MARKET STRATEGY AND TRANSFORMATION

ZS helps sales and marketing executives identify critical growth opportunities, determine sales and marketing strategy, and implement the necessary changes – changes that regularly boost clients' revenue by 2-10% or more. ZS knows how to transform sales and marketing strategies and capabilities while minimizing transition risks and driving sustained adoption of new approaches.

1.3.2.4 SALES CHANNEL STRATEGY AND MANAGEMENT

ZS creates winning channel strategies. They align go-to-market strategy with overall business strategy by helping clients develop and manage a channel program with the right mix of direct and indirect (partner) channels to meet business goals and customer engagement requirements.

1.3.2.5 SALES COMPENSATION

An effective sales compensation plan helps retain top salespeople, increase market share, make selling costs predictable and reduce the cost of plan administration. An inferior plan does the opposite. ZS helps to create plans and quotas that support strategy and streamline administration.

1.3.2.6 SALES FORCE DESIGN

The sales force is one of an organization's most valuable and expensive marketing resources. Unlike other marketing tactics, building or reshaping a sales

force can take considerable time, money, and attention. ZS has designed sales forces for organizations across more than 25 industries and in over 70 countries.

1.3.2.7 SALES FORCE EFFECTIVENESS

Over the past 30 years, ZS has conducted thousands of sales force effectiveness engagements with over 700 companies in more than 70 countries and 25 industries. They have helped clients' salespeople achieve: longer face time with their customers, more topics discussed during customer visits, significantly improved customer satisfaction ratings—and most important, up to 30% higher sales performance.

1.3.2.8 TERRITORY MANAGEMENT

Territory management is at the heart of any company's sales operations. All key processes—from sales force planning and deployment to incentive compensation and financial reporting—depend on efficient, optimized territory management solutions. Having pioneered the concept nearly 30 years ago, ZS offers unparalleled experience and knowledge in territory management and its optimal role in your overall sales operations.

1.3.3 MARKETING

1.3.3.1 BUSINESS INTELLIGENCE AND TECHNOLOGY

When you're drowning in a sea of data, ZS can deliver superior business intelligence solutions that transform data into insight. Our Business Intelligence practice gives you specialized analytical monitoring and diagnostic solutions that improve your sales and marketing and help cut costs.

1.3.3.2 CUSTOMER EXPERIENCE

Orchestrating the right experience is a formidable challenge, especially as selling and promotional channels proliferate. But it's a challenge companies must meet

in order to thrive in highly competitive global markets. Customers will have an experience whether you design one or not—and if it's a poor one, their next experience may be with the competition.

1.3.3.3 CUSTOMER INSIGHTS

A clear understanding of customer needs, buying processes, buying preferences, perceptions, and potential is essential to sales and marketing success. ZS uses qualitative and quantitative methods spanning both primary and secondary data-based approaches to provide clients with customer insights.

1.3.3.4 CUSTOMER SEGMENTATION

ZS combines marketing science expertise with decades of experience to help companies around the world develop highly actionable segmentation strategies that drive brand strategy through to tactical execution.

1.3.3.5 FORECASTING

Understanding fundamental market drivers and their influence in shaping product demand is integral to good business planning and full utilization of company resources. ZS has developed customized forecasting processes to serve clients. They merge forecasting knowledge and experience with the industry expertise of clients to produce collaborative results.

1.3.3.6 MARKETING MIX

Sales and marketing organizations face unrelenting cost pressures. ZS helps sales, marketing and brand executives substantially increase the return on their investments and gives them confidence that they are making the optimal promotional spending decisions. They have helped top brands boost sales significantly and determine optimal marketing budgets across a broad product portfolio.

1.3.3.7 MARKETING PERFORMANCE MEASUREMENT AND OPTIMIZATION

Accurate and timely feedback on marketing program performance is critical to the real-time fine tuning and course corrections necessary to maximize marketing results and return on investment. ZS has extensive experience helping clients maximize the value realized from their investments in marketing programs.

1.3.3.8 PIPELINE STRATEGY

Your pharmaceutical brands and medical products may not be generating returns that maximize your company's substantial R&D and marketing investments. With market conditions creating higher barriers to commercial success, the pressures on R&D and marketing executives are becoming only more acute. ZS helps life science companies increase the commercial success of their product pipelines.

1.3.3.9 VALUE PROPOSITION

A compelling value proposition lies at the heart of sales and marketing effectiveness. Tailoring market offerings to the specific needs and preferences of customers, and effectively communicating and proving the associated benefits, have become a competitive imperative. ZS has helped hundreds of clients develop and implement effective value propositions across a broad array of products and services.

1.4 DEPARTMENT WORKED

I have worked with Knowledge Management team in Therapy Area Overview Team at ZS.

1.5 LEARNINGS FROM THE KNOWLEDGE MANAGEMENT TEAM

In general the overall learning and hands on includes the following:

1. I learned about my role of Knowledge Management Associate. I leaned together a unique combination of Business Research and Life-Sciences
2. I had hands on training on the methodology of secondary research. Many of the search was made by using 'Advanced search', using dedicated keywords and combinations of slots
3. Developed knowledge on US healthcare structure
4. Developed decks for diseases like Crohn's, Huntington's, HIV, COPD, Ovarian cancer, Renal cancer
5. Learned the ZS style of power point presentation
6. Learned about various paid data sources
    - Adis R and D
    - Datamonitor
    - Evaluate Pharma

Section 2

Dissertation Report

2.1 ***INTRODUCTION***

2.1.1 *Background*

Work-related musculoskeletal disorders (WRMSD) are defined as injuries or disorders of musculoskeletal tissues associated with workplace related risk factors. WRMSD are also known as cumulative trauma disorders, repetitive strain injuries and overuse injuries. WRMSDs of the neck are major problem among people who spend a great deal of time using computers.

Normal neck function underpins successful performance of activities of daily living. Neck pain may arise from any of the innervated structures in the neck, such as intervertebral discs, muscles, ligaments, zygapophyseal joints, dura or nerve roots. However in the majority of cases, the pathophysiological mechanisms underlying neck pain are unclear. Such "non-specific" neck problems are costly in terms of disability and work loss

WRMSDs are the most common cause of long-term sick-leave and disability pension in several industrial countries. Community based studies worldwide reported annual prevalence of neck pain ranging from 15 to 44%. Globally one-year prevalence of neck pain related disability has been reported ranging from 7% to 11%. Prevalence of neck pain among office workers is higher than in the general community. Globally, one-year prevalence of neck pain among administrative workers has been reported between 15% to 34.4%.

The aetiology of work related neck disorders is multidimensional which is associated with, and influenced by, a complex array of individual, physical and psychosocial factors. Neck pain is one of the commonest problems in office workers especially among those who are intensive computer users. It is generally agreed that the Computer has become an integral part of our life. However, its use is not free from health hazards. Intensive computer work puts stress and strain on muscles, as well as joints because of continuous and repetitive nature of movements

With advancement in technology and increased use of computers in offices; these have lead to development of neck pain in people because of improper posture and sedentary lifestyle. Not only people use computers/laptops/palm tops/mobile phones at home but also at many other places in their leisure time thereby increasing the possibility of neck pain.

Causal association of prolonged computer use and neck pain is already established. Factors such as awkward postures, repetitive work and aggravation of previous pain episodes are reported to contribute to WRNP.

2.1.2 *Patho-physiology of Neck Pain*

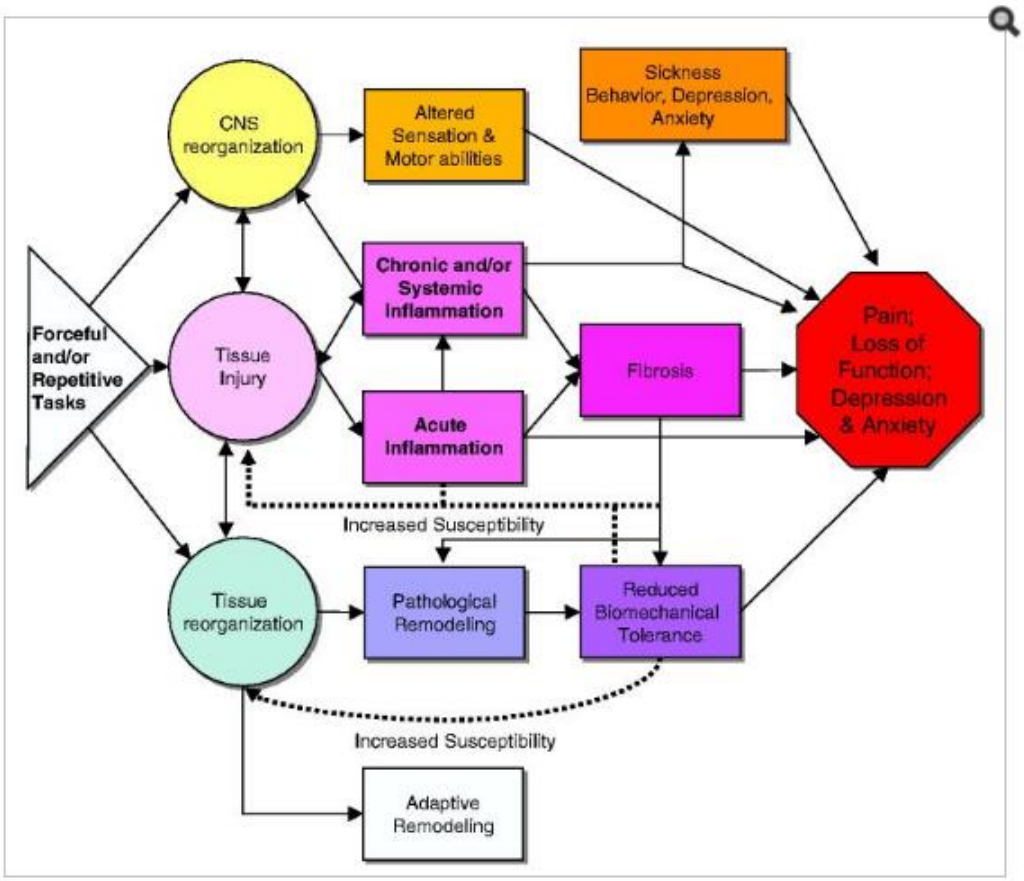


Image- Schematic diagram showing three primary pathways hypothesized to lead to work-related musculoskeletal disorders

Several structures are responsible for causing neck pain such as bones, nerves, discs, longitudinal ligaments, muscles, facet joints, and dura. All these structures cause pain when they are irritated or inflamed. The pain can be classified as nociceptive, neuropathic, or idiopathic in origin.

Nociceptive pain is the most common type of pain. Acute pain is often of nociceptive origin, but when it becomes a chronic pain then the influence of psychologic and social

factors becomes more apparent. The activation of peripheral primary afferents gives rise to nociceptive sensation of pain. Impulses are conducted by a part of myelinated A-delta fibers and unmyelinated-C which are produced by noxious stimuli and transmit sensations that are considered pain.

Primary nociceptive afferents ascend contralaterally and stimulate spinothalamic and spinoreticular neurons in the dorsal horn of the spinal cord by mediating neuro-transmitters, such as glutamate, aspartate, substance P, and calcitonin gene-related peptide. The axons transmit the stimulus to the brain travelling in 3 primary ascending tracts that project to the thalamus and the reticular formation. Damage or dysfunction of peripheral nerves or the central nervous system (CNS) causes neuropathic pain. Neurons may be sensitized to react to even an extremely slight stimulus that normally won't cause pain. Neuropathic pain often appears as chronic pain. Reorganization of central processing is thought to be related to this pain state. The pain is termed as idiopathic when no damage in tissues or neurons can be found.

It is unlikely that a single comprehensive pathophysiological mechanism exists that is responsible for tissue damage. Selective and sustained activation of type I motor units can be seen as the most influential hypothesis for the development of muscle damage due to sustained low-intnsity tasks (the CinderellaHypothesis).

This may lead to Ca2+ accumulation in the active motor units and other homeostatic disturbances due to limitations in local blood supply and metabolite removal in muscle compartment with larger numbers of active motor units. Additional mechanisms, such as nociceptor sensitization due to intra-muscular shear forces are also assumed to play a role.

2.1.3 *Operational definitions*

Pain- Pain was defined as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.

Neck Pain- Neck pain was defined as pain in the head and neck region caused by degenerative disease, trauma, inflammatory or mechanical disorders. Neck pain arising from habitual postures has been referred as “Non-specific Neck Pain

Ergonomics of the Work Station- It includes - work chair, work desk, screen, keyboard, mouse and document holder. The workers rated each component by a scale from 1 to 5, where 1 was very poor and 5 very good. For each subject the median of the six components was calculated to represent the value of the workstation ergonomics.

2.2 **PROBLEM STATEMENT**

It has been reported that the prevalence of neck pain in office workers is much higher than in the general population. The costs to the worker, employer and society associated with work-related neck pain are known to be considerable and are escalating.

The aim of this study is to investigate the incidence and risk factors of work-related neck pain in KM team members at ZS associates

*2.3 **NEED OF THE STUDY***

With the increase in industrialization and increase in number of people MNC's in metro cities; there is an increase in population of people joining these firms and working for them. However with the advancement in technology, people in these firms are bound to use more computers with the world going paperless these days.

Therefore Neck pain could become a major problem as well as disease burden with an effect on mostly the younger age group just as diseases like CVD's have become a disease burden to the nation making the people diseased and unproductive.

At ZS Associates, New Delhi, employees work for a considerable amount of time on computers. As a result they suffer from WRMSDs including neck pain.

Till time, there had been no documentation of these WRMSD in the KM team. This study will help in identifying the prevalence of neck pain and thus, help people to build more awareness on how to prevent further aggravation of the condition they suffer from.

2.4 **REVIEW OF LITREATURE**

Neck pain is a common health problem in the general population and especially among computer workers. Most people experience some degree of neck pain in their lifetime.[1,2]

In a study conducted by Dr. S.A.Shah and Dr.P.R.Patel on 'Prevalence of neck pain in computer operators' indicated a 47% prevalence of neck pain associated with work and individual factors[3.] A study on 'Prevalence and occupational associations of neck pain in the British population' by Keith Palmer et al concluded a strong association between neck pain and examined occupational physical activities and suggested the psychological factors may be more important[4.]

The results of the study by Cagnie, L Danneels et al on 'Individual and work related risk factors for neck pain among office workers: a cross sectional study' indicates that physical and psychosocial work factors, as well as individual variables, are associated with the frequency of neck pain[5].

Juul-Kristensen B in his study Computer users' risk factors for developing shoulder, elbow and back symptoms; concluded Influence on work pauses, reduction of glare or reflection, and screen height are important factors in the design of future computer workstations.[6]

A longitudinal study titled work related and individual risk-factors affecting radiating neck pain by Viikari-Juntura proposed that duration of work is an important predictor for neck pain among office workers.[7]Bernard BP et al in their study provides strong evidence of an association between MSDs and certain work-related physical factors when there are high levels of exposure and especially in combination with exposure to more than one physical factor.[8]

Korhonen T et al in their study concluded that poor physical work environment and poor placement of the keyboard increased the risk of neck pain.[9]A study titled Predictors of neck and shoulder pain in non-secretarial computer users by Evans O, Patterson K observed Workstation and postural factors wherein 65% of subjects reported pain.[10]

Ariëns GAM et al in theri study reported that High quantitative job demands and low coworker support as risk factors for neck pain.[11.]

Rattaporn Sihawong et al in their 1 year prospective cohort study pointed out that frequent neck extension during the work day, high initial pain intensity, and high psychological job demands scores may increase the risk of developing chronic neck pain.[12]

Surendra Babu et al in their study titled Work-related Neck Pain Among Desk Job Workers of Tertiary Care Hospital in New Delhi concluded that High one-year prevalence of WRNP was reported among desk job workers.[13]

Janwantanakul P et al reported a high prevalence of self-reported musculoskeletal symptoms among office workers in their study.[14.] Juul-Kristensen B et al in their study titled Computer users' risk factors for developing shoulder, elbow and back symptoms cocluded a longer work durationon computers is directly associated with neck pian in office goers.[15]

Paksaichol A, Janwantanakul P, Purepong N, et al. Concluded high prevalence of neck pain in their study titled Office workers' risk factors for the development of non-specific neck pain.[16] A study conducted on military office goers titled Prevalence and risk factors of neck pain in military office workers by De Loose V et al provided support for the role of physical and psychosocial job characteristics in the etiology of neck pain in military office workers.[17]

Arun Vijay S. In his study Work-related musculoskeletal health disorders among the information technology professionals in India concluded a high prevalence of neck pain among IT professionals. [18] Stupar M et al in his study support the hypothesis that frequent computer operation is associated with neck pain.[19]

Bhanderi D et al suggests that MSDs are a common problem among those who use computer intensively. It seems likely that long hours of working on computers and presence of refractive error may result in these problems.[20]

2.5 **METHODOLGY**-

2.5.1 *Study Design*- Cross Sectional Study

2.5.2 *Study Population*- Employees of ZS Associates

2.5.3 *Study Area*- ZS Associates New Delhi Office

2.5.4 *Sampling Method*- Self Selection

2.5.5 *Sample Population*- Knowledge Management Team of ZS Associates

2.5.6 *Sample Size* – 64 (out of 120)

2.5.7 *Data Collection Time Period* - 1st March 2016- 15th March 2016

2.5.8 *Data Collection Tool*- Standardised Nordic questionnaire (for the analysis of musculoskeletal symptoms in neck); sent through mail

2.5.9 *Study Time Period*- March –April 2016

2.5.10 *Data Analysis Tool*- SPSS 16.0

2.5.11 *Variables*- Presence of pain, Neck Accident, Change of job, Duration of pain in last 12 months, Presence of pain in last 7 days, Visit to doctor for pain

2.6 **AIM**

To study the prevalence of neck pain in employees of Knowledge Management Team of ZS Associates

2.7. **OBJECTIVES**

2.7.1 To determine self reported point prevalence and period prevalence(past 12 months) of neck pain in KM team

2.7.2 To determine whether neck pain caused any hindrance in normal routine work

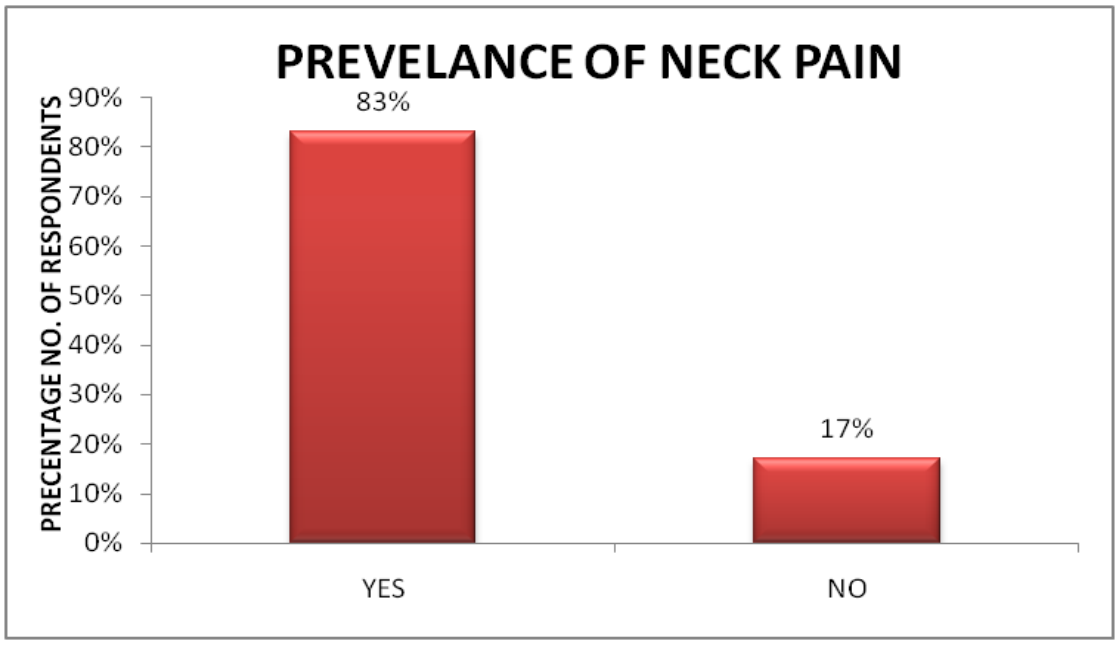
2.7.3 To assess any association between years of working and prevalence of neck pain

2.8 **RESULTS**

Sample size considered for the survey was 120 which included the whole KM team. However, only 64 employees responded. Therefore, the analysis is based on the 64 responses received during the study period.

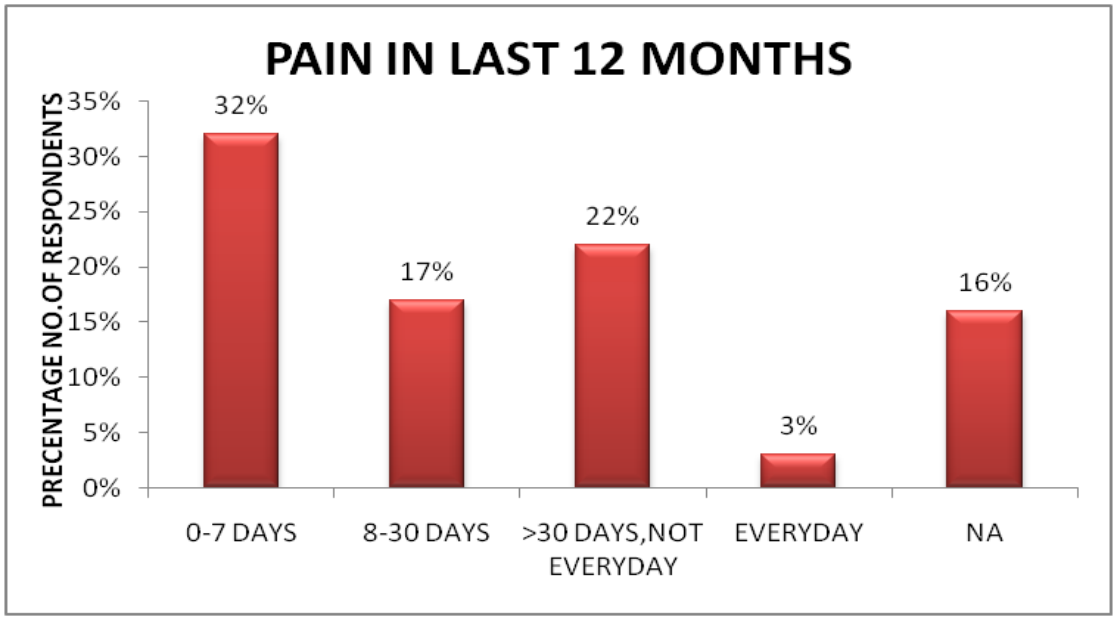
Out of the total 64 respondents, 83% employees reported pain in neck region (Figure 1)

Figure 1



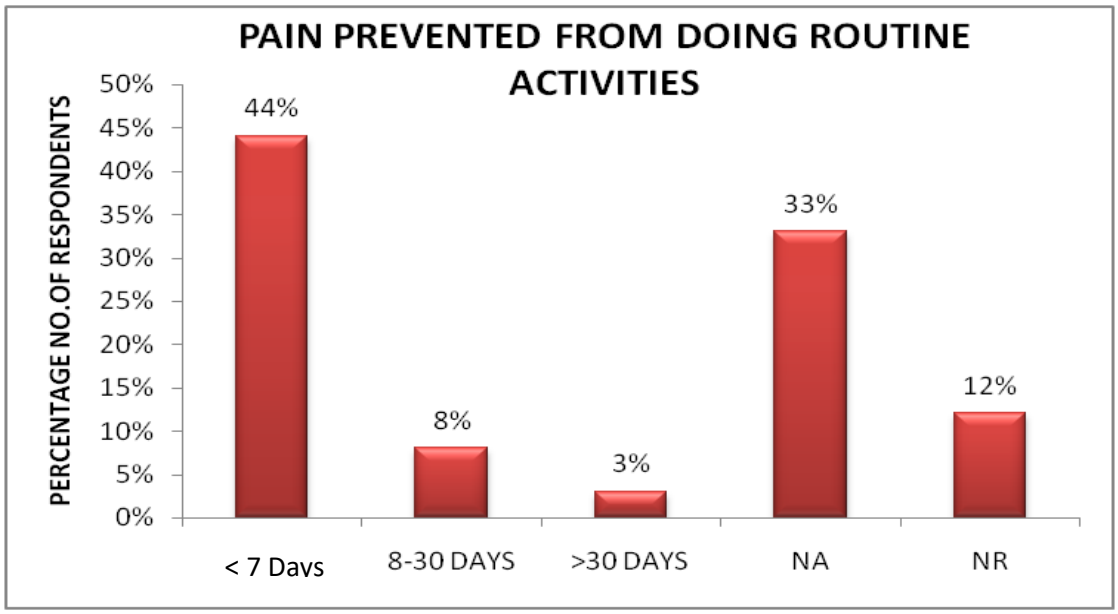
Amongst the respondents, 49% of the employees suffered from pain for less than 30 days and 22 % employees for more than 30 days (Figure 2)

Figure 2



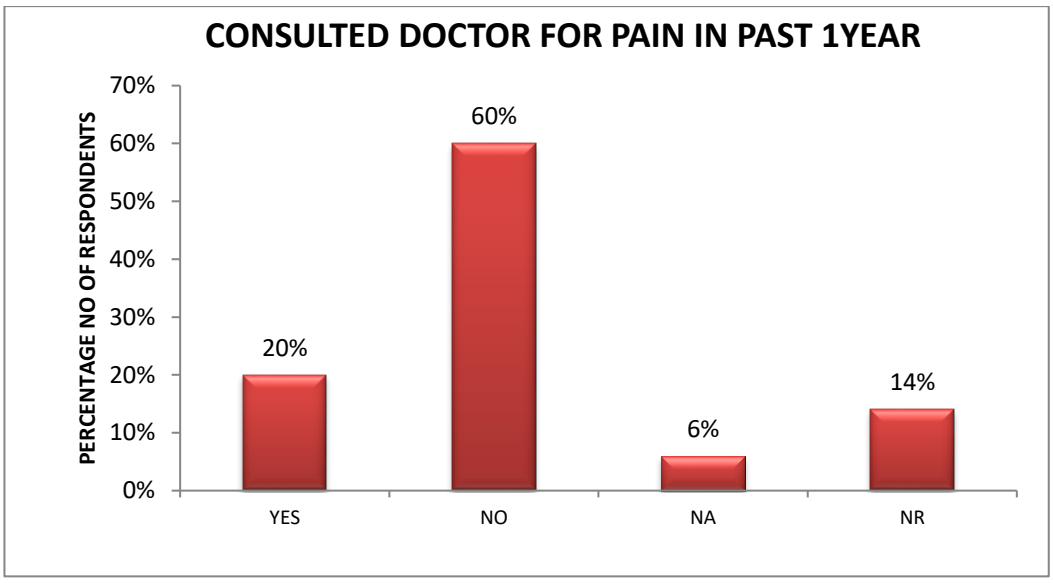
Out of the 64 employees, 44% employees stated that they couldn't do their routine activities at home or at any other place apart from the office because of the neck pain (Figure 3)

Figure 3



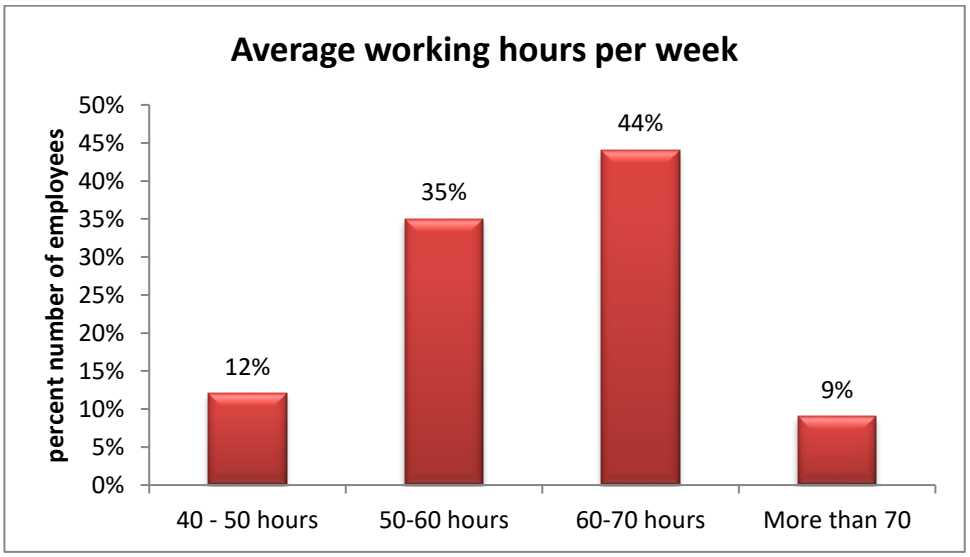
Amongst the 64 respondents, 60% of them did not see Doctor/ Physiotherapist in spite of having neck pain (Figure 4).

Figure 4



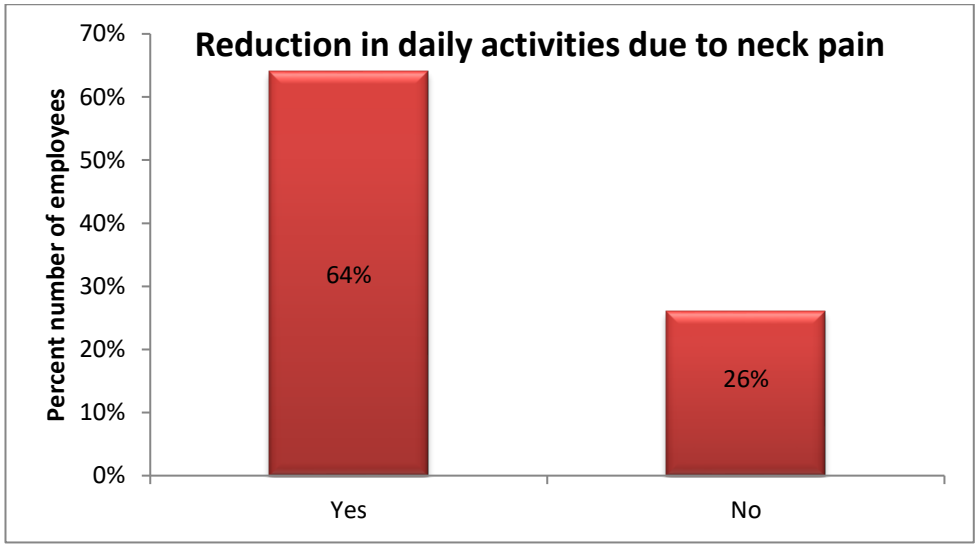
The Average working hours for an employee in ZS - Nearly 44% of the employees stated that they work for 60-7- hours per week which means they work for an average of 10-12 hours per day. (Figure 5)

Figure 5



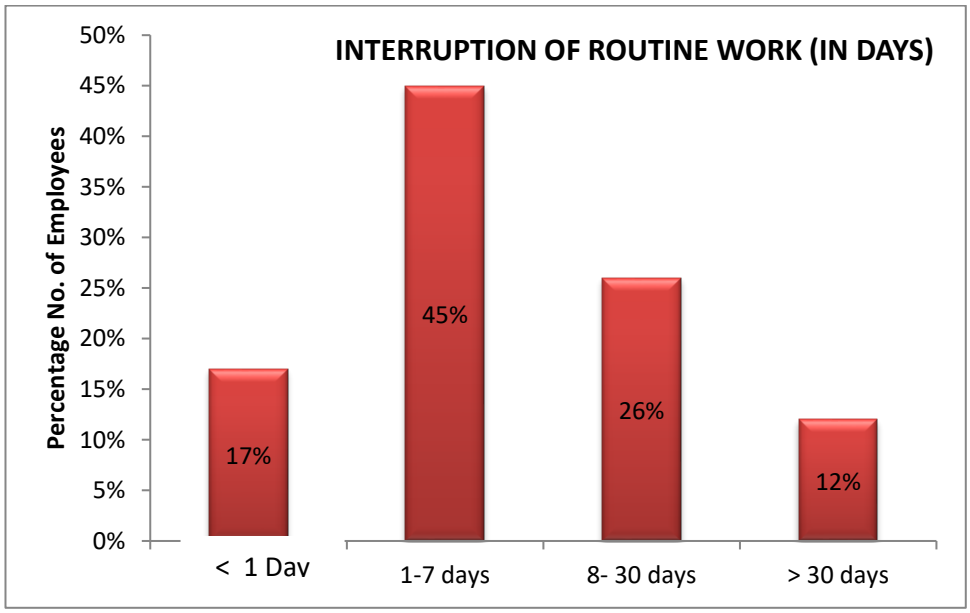
64% employees in ZS stated that they had to reduce their routine daily activities at work or leisure due to their neck trouble.(figure 6)

Figure 6



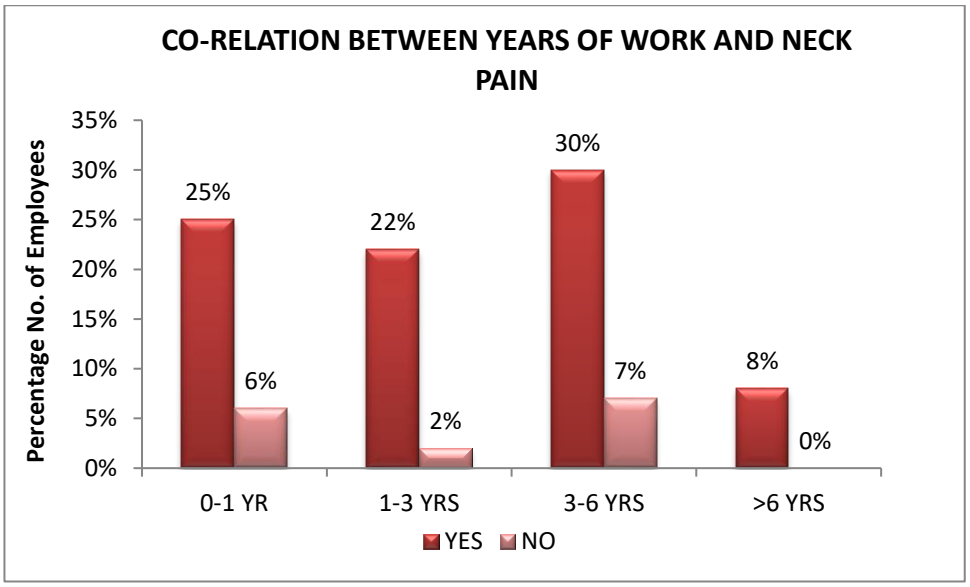
45% of the employees reported that 1-7 days of their normal routine work was affected due to their neck pain.(figure 7)

Figure 7



It was seen that as the number of years in the profession at ZS increased; more and more number of employees reported presence of pain.

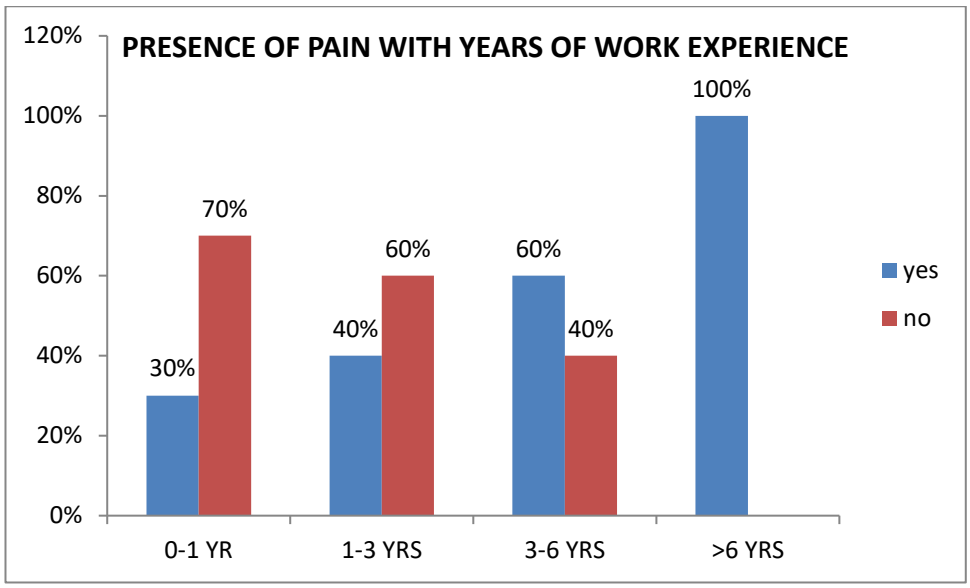
Out of 31% of Employees with 0-1 year years of work; 25% reported presence of pain {80%}
Out if 24% of employees with 1-3 years of work; 22% reported pain {91%}
Out of 37% employees with 3-6 years of work; 30% reported pain {81%}
Out of 8% of employees with more than 6 years of work; all reported pain {100%}



Total employees in each category (out of 64)
0-1 year : 31% - 20 (16 + 4)
1-3 years : 24% - 15 (14+1)
3-6 years : 37% - 24 (19+5)
>6 years : 8% - 5 (5+0)

After these results were obtained 10 persons from first 3 categories were picked RANDOMLY by chit system so as to compare from each category.

Duration	Pain Present	No Pain	Total Employes picked
<1 year	30%	70%	10
1-3 years	40%	60%	10
3-6 years	60%	40%	10
>6 years	100%	0%	5



2.9 STUDY FINDINGS

1.Prevalence of pain was 83% in ZS KM team

2.Emloyees with neck pain do not visit any doctor/physician for their treatment

3.An employee at KM works for an average 60-70 hours per week

4.With increasing number of years of work experience, the pain reported by employees has increased

2.10 **LIMITATIONS**

2.10.1 Responses can be said to be subjective as perception of neck pain can be different for different people

2.10.2 Sample chosen only from KM team

2.10.3 No detailed description of daily activites in Nordic Questionnaire

2.10.4 Some Data was missing as respondents didn't reply to all the questions asked

- For Question "Pain experienced in past 12 months – 11 respondents skipped the question

- For Question " Pain prevented normal routine activities- 8 respondents skipped the question

2.11 **SUGGESTIONS**

The work environment at ZS involves working on computers. The following suggestions can be considered by the management to deal with the problem

1. Identify employees with incorrect posture and take proactive action to guide them to adopt a better posture.
2. Ergonomic modification of the workplace like the chairs, desk (see annexure).
3. Encourage employees to do exercises suggested by Physiotherapist
4. Hands on workshops for employees where they actively participate and learn good ergonomic posture

Future Suggestionsfor further study -

- A future study with large sample size from different offices of ZS Associates
- Sample can be divided by work ex, age, type of work, levels of hierarchy etc
- Modifiable and non-modifiable risk factors can be analysed and strategies can be derived for modifiable factors to prevent occurrence of neck pain.
- The strength of association between dependent and independent variables can be studied.
- Remedies like physiotherapy, NSAIDS, Muscle relaxants, ergonomic modification can be given and can be compared to assess the effects

2.12 **CONCLUSION**

IT industry in India is the second largest IT industry in the world. The youth today is thus prone to work for long hours on computers and laptops. This leads to necdk pain if correct ergonomic postures are not adopted. This study also proves the fact that neck pian is highly prevalent in IT industry.

The employees must take proactive actions to address their neck problems otherwise in severe cases it leads to degeneration of cervical spine which can only be treated by surgical procedures. In extreme cases, one might have to shift his/her entire job to a new industry.

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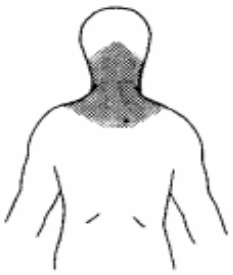
2.9.10 **Annexure**

STANDARD NORDIC QUESTIONNAIRE



NECK

How to answer the questionnaire: By neck trouble is meant ache, pain or discomfort in the **shaded area. Please** concentrate on this area, ignoring any trouble you may have in **adjacent** parts of the body. There is a **separate** questionnaire for shoulder trouble.

Please answer by putting a cross in the appropriate box — one cross for each question. You may be in doubt as to how to answer, but please do your **best** anyway.

1. Have you **ever** had neck trouble (ache, pain or discomfort)?
   1 ☐ No 2 ☐ Yes

If you **answered No** to Question 1, do not answer the questions 2—8.

2. Have you **ever** hurt your neck in an **accident?**
   1 ☐ No 2 ☐ Yes

3. Have you **ever** had to change **jobs** or **duties** because of neck trouble?
   1 ☐ No 2 ☐ Yes

4. **What** is the **total** length of time that you have had neck trouble during the **last** 12 **months?**
   1 ☐ 0 days
   2 ☐ 1—7 days
   3 ☐ 8—30 days
   4 ☐ **More** than 30 days, but not every day
   5 ☐ Every day

If you **answered 0 days** to Question 4, do not answer the questions 5—8.

5. Has neck trouble caused you to **reduce** your activity during the **last 12 months?**
   a. Work activity (at home or away from home)?
      1 ☐ No 2 ☐ Yes
   b. Leisure activity?
      1 ☐ No 2 ☐ Yes

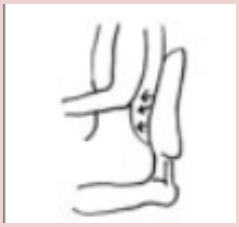
6. What is the **total** length of time that neck trouble has prevented you from doing your normal work (at home or away from home) during the **last 12 months?**
   1 ☐ 0 days
   2 ☐ 1—7 days
   3 ☐ 8—30 days
   4 ☐ More than 30 days

7. Have you **been seen** by a doctor, physiotherapist, chiropractor or other such person because of neck trouble during the **last 12 months?**
   1 ☐ No 2 ☐ Yes

8. Have you had neck trouble at any time during the **last 7 days?**
   1 ☐ No 2 ☐ Yes

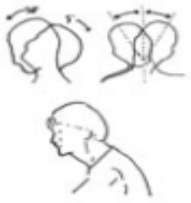
2.9.10 Ergonomic Modification

A. Chair

Ergonomic Hazard	Corrective Options
Feet cannot rest flat on floor 	1. Raise/lower chair to allow feet to rest comfortably flat on floor. 2. Use footrest if keyboard/desk height requires an elevated chair.
Unable to sit with thighs parallel to the floor, or with a slight downward angle from hips to knees	1. Adjust chair height so that feet remain flat on floor or footrest but thighs are also parallel to floor.
Chair lumbar support NOT supporting the small of the back (i.e. the curve of the lumbar spine). 	1.Raise/lower the back rest so the small of the back is in contact with the most outward curved areas of the back support. 2.Place a rolled up towel or attach a removable back support cushion to existing back support.
Space exists between spine and back rest. 	,1..Arrange workstation to allow proper back support. (i.e. position keyboard closer to user, bring monitor closer to user). 2. Remove or lower arm rests which may prevent sitting back fully due to contact with front of desk or keyboard tray. , Replace the seat pan if it's too long and doesn't allow
Armrests provide inadequate forearm support when keying or mousing. **Hunched shoulders - armrests too high; learning to one side – armrests too low; elbows away from the body – armrests too wide.**	1.If armrests are too low/too high: , - Add padding to bring them up to a comfortable level. - Only use the armrest during short pauses from typing. - Replace with armrests that can be adjusted to the correct height. 2.If armrests are too wide: - Adjust to bring them closer together.

	- Replace seat pan on chair with a narrower one. - Replace with width-adjustable armrests.

B. Monitor related ergonomics

Ergonomic Hazard	Corrective Options
Head tilted up/down, repeatedly or for a long time, while working at desk	1.Raise/lower monitor so that eyes are in line with top line of text. Monitor may need to be lowered for bifocal wearers if they look at the monitor through the bottom of their lenses. 2.If using a number of paper documents, use document holder that sits between the worker and the monitor.
Head turned to the side, repeatedly or for a long time, when working.	1.Position monitor directly in front of user. , 2.Place documents on holder located in line with the computer.
Neck tilted to the side, (i.e. holding phone between ear and shoulder).	1. Maintain one hand on phone. 2. Use a hands-free system (e.g. headphone).
Head is not directly over spine (i.e. the head is forward and the chin is out). 	Arrange workstation to allow for proper posture, (e.g. sit back in chair, pull keyboard to user, change location/height of monitor).
Twisting of torso (e.g. reaching behind or	1.If user is right-handed, arrange accessories

across the body). 	(except telephone) to the right of the computer. 2.Locate telephone on the left in order to answer with the left hand and take notes with the right. Opposite set-up if left handed. 3.Determine which accessories are used most frequently and locate them closest to the user. , 4.Encourage users to stand up when retrieving items behind them.

C. Environmental

Ergonomic Hazard	Corrective Options
Too much/too little light.	1.Reduce the amount of light in work area, especially from ceiling-mounted light fixtures. , 2.Use low gloss, off-white colour on surfaces. , 3.Use appropriate task lighting.
Glare on monitor.	1.Prevent source of glare from reaching monitor, (i.e. use opaque vertical blinds, use glare screens). 2.Place monitor at right angles to windows.