**Assessment of Physical Activity among Security guards in Navi Mumbai**

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**Signature:**

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**Signature of the Dean:**

**Study type:** Observational Study.

**Study design:** Cross-Sectional Study.

**Duration of the study:** 6 months.

**Study subjects:** Security Guards between 18 to 65 years of age.

**Sample size:** 60.

**Inclusion Criteria:**

1. Individuals between 18-65 years of age.
2. Both Female and Male.
3. Security guards working for more than 6 hours a day.
4. Security guards with the length of Employment more than 2 months.

**Exclusion Criteria:**

1. Individuals with any systemic or any psychological illness.
2. Any history of recent fracture or surgery.
3. Pregnant females.

**Introduction and Rationale**

Security denotes the state of being secure, devoid of fear, harm, or loss. Initially, security needs were straightforward, but with advancing civilization, they grew more intricate. Over time, individuals employed workers and equipment to safeguard their well-being and possessions. Threats prompted further protection measures for families and individuals, leading to the emergence of security personnel, watchmen, or commonly known as security guards.3

A security guard encompasses individuals providing personal services to secure various establishments like residences, businesses, or healthcare centres. Security guards undertake diverse daily tasks depending on their position or workplace. Some common activities include ensuring space safety, enforcing rules, managing security checkpoints, detaining violators, communicating with peers, and assisting visitors for positive experiences.

Security guards face significant risks at work, including exposure to crime and violence, impacting their well-being. Thus, compromising a security guard's functional performance is unacceptable, necessitating adequate training and exercise programming for their daily tasks.

Physical Activity is vital for security guard’s roles, involving extensive walking and observation. They must endure prolonged standing and possess good eyesight, whether corrected or not. Additionally, they might need to handle various tasks on busy days. As the initial point of contact for visions and security guards play a crucial role, requiring comprehensive training and motivation to perform duties effectively.

Physical Activity encompasses activities individuals engage in daily, influencing mental, physical, and social well-being while affecting the aging process. Diminished physical activity can lead to health issues like hypertension and heart disease, affecting both individuals and society. Participation in activities like walking or running can enhance functional status. It comprises skill-related, health-related, and physiological components, representing an individual's maximum capacity across physical, psychological, social, and spiritual domains. Assessing security guards’ physical activity is essential, given its potential implications on health. BMI, Waist Hip Ratio, International Physical Activity Questionnaire (IPAQ-SF) and ACSM risk stratification screening questionnaire will be taken to evaluate their Physical Activity among security guards.

**Need of study:**

Security guard is highly demanding job in terms of physical fitness. Their profession demand is longer working hours and alertness.

Studying Physical Activity in security guards is crucial for understanding their physical capabilities in tracking emergency situation at work place.

It will help in identifying areas of improvements, enhancing job performance, reducing injuries, and optimizing security operations. It helps in designing effective training programs tailored to specific tasks and environments, ultimately ensuring better security outcomes. These training programs can be included in their daily routine to maintain fitness levels.

**Aim of the study:**

To assess the level of physical activity amongst security guards.

To assess risk stratification criteria of security guards.

**Objectives of the study:**

1. To assess the Body Mass Index (Quetelet Index) of Security Guards using Weight and Height measurements.
2. To assess Waist Hip Ratio.
3. To assess the Physical Activity levels in security guards using IPAQ-SF
4. To assess ACSM risk stratification screening questionnaire.

**Review of Literature:**

**1) Shivani Y. Patel et.al. Assessment of Physical Health among Security Guards Working in Krishna Hospital, Karad-A Cross-Sectional Study (Jan 2019)**

The purpose of the study was to assess body anthropometry, flexibility, agility, muscular strength, muscular power, muscular endurance and aerobic capacity in security guards of age group 30-45 years working in Krishna hospital, Karad. In this cross-sectional study 36 security guards were assessed for body anthropometry by body mass index and body fat percentage, flexibility by sit and reach test, agility by modified-t test, muscular strength by bench press and leg press, muscular power by vertical jump test, muscular endurance by partial curl-up test and push up test and aerobic capacity by six-minute walk test. The body anthropometry- body mass index was found to be 52.8% and body fat percentage was 97.2%. The flexibility was found to be 38.9% and agility was 52.8%. Muscular strength of upper body was found to be 58.3% and lower body was 91.7%. Muscular power was 94.4% and endurance of abdominal was 52.8% and endurance of upper body was 50%. The study concluded that there is lack of physical fitness amongst the security guards which provides a future scope to assess and intervene in improving the health status of the guards in view of the high demanding jobs.

**2) Aishwarya Bhandare et.al Prevalence of Low Back Pain in Security Guards in MGM Institute of Health Sciences, Aurangabad (Sept 2020)**

The aim of this study was to find out the prevalence of low back pain among security guards as their occupation comprises of prolong standing. There were 130 security guards of MGM institute of health science Aurangabad were included in the study. Both male and female guards selected according to the inclusion criteria of having experience of more than six month of age 18 to 60 years and all the guards were assessed using Oswestry Disability Index questionnaire, and subjective assessment of pain done using VAS. The result is calculated on the basis of percentage of male & female guards who are having low back pain according to Oswestry Disability Index it reveals out of 73% male 29% are affected by low back pain and among 26% of female 19% are affected by low back pain. The study concludes that the prevalence of LBP among the guards is 48%. Different components ODI score among which standing, walking, travelling are mostly affected. There are 48% guards comes under middle age are more prone to low back pain because of sacroiliac joint dysfunction and facet joint.

**3) Sandeep Kaur et.al To Study the Prevalence of Musculoskeletal Disorders in Security Guards (Dec 2015)**

The prevalence of musculoskeletal disorders has increased markedly with promotion of industrial life. It is one of the causes of absenteeism of employees from their work and significantly affecting their quality of life. The prevalence is not known in profession such as security guards, whose occupation comprises of prolonged standing mainly 100 security guards included in the study were in the age group of 30-50 years. 58% of the guards were alcoholic while only 19% were smokers. Out of 100 respondents, 68% had complained of MSDs in different areas while 32% did not complain of any musculoskeletal discomfort. Out of 68 security guards who had MSDs, majority of the guards had back pain42.6%. Higher prevalence of MSDs, 97.1% (33/34) had been found in 46-50 years of age, followed by age group of 41-45 years where the prevalence was 76.2% (16/21). The most common risk factor in our study identified was opening the gate again and again (98.5%) which could be due to the nature of their duty. Most common used coping strategy (69.9%) was to change from standing to sitting position when MSDs aggravates. It can be concluded that there is significant (68%) prevalence of MSDs in security guards. Demographic variables such as age, smoking and alcohol consumption have been found out to be contributing risk factors.

**4) Nisha Yadav et.al Occupational Stress among Security Guards (Aug 2015)**

Occupational stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Occupational contributes not only to life stresses, but has an impact on health among security guards. Occupational stress among security guards was assessed in the study. Occupational stress of security guards has a strong impact on the physical health and their performance at job. The study was carried out in Lucknow on the male and female security guards using multistage sampling technique. Total samples of 180 security guards were selected from three areas- Banks, academic institutions and residential security. Modified version of occupational stress scale developed by Srivastava A.K. (1976) was used. From the findings of the study, it can be concluded that the security guard’s profession is very difficult. Security guards suffer from high stress and face problem and dissatisfied with their job and salary. Female security guards have high occupational stress in comparison to male security guards.

**5) Akanksha Prakash Karande et.al Relationship between Musculoskeletal Disorders and Anthropometric Measurements in Security Guards Working in Krishna Hospital, Karad (July 2021)**

MSDs are formed gradually in people who have inappropriate position while working. In view of the fact that the security guards continuously stand in a static posture for most of the time, MSDs are progressively formed over time, and this may have considerable impact on their personal and social life. This study was helpful to find out the level of health problems and stress associated with MSDs and techniques to reduce these risk factors among security guards which are related to work. The obtained results revealed that out of 90 subjects, 96.6% had musculoskeletal disorders in various areas while 3.3% did not complain of any musculoskeletal discomfort in any area. There is positive correlation between body mass index, height, weight, age and the musculoskeletal disorders and anthropometric measurements in security guards.

**Materials:**

International Physical Activity Questionnaire (IPAQ short form).

Weighing scale.

Measuring tape.

**Methodology:** The Security Guard is a demanding Job with musculoskeletal and Cardiopulmonary Fitness. IPAQ will be used to assess their Physical Activity for efficient functioning of the job demand.

1. **The Body Mass Index (BMI)** serves as a healthcare tool to gauge body fat based on height and weight measurements, aiding in the assessment of potential health risks. Healthcare professionals utilize BMI by dividing weight in kilograms (kg) by the square of height in meters (m²) to estimate body fat levels accurately.

BMI Classification (As per WHO classification)

* Underweight: BMI less than 18.5
* Normal Range: BMI 18.5 to 24.9
* Overweight: BMI 25 to 29.9
* Class I Obesity: BMI 30 to 34.9
* Class II Obesity: BMI 35 to 39.9

1. **Waist Hip Ratio (WHR)**

Waist Hip Ratio is a simple technique for determining body fat distribution. Waist circumference measurement divided by Hip circumference measurement. Waist circumference (WC) will be measured midway between the lower rib and iliac crest on the midaxillary line, and Hip circumference at the level of the widest circumference over the great trochanters.

|  |  |  |
| --- | --- | --- |
| Health Risk | Women | Men |
| Low | <0.80 | <0.95 |
| Moderate | 0.81-0.85 | 0.96-1.0 |
| High | 0.86> | 1.0> |

1. **The International Physical Activity Questionnaire (IPAQ short form)**

* IPAQ was developed to facilitate surveillance of physical activity based on a global standard.
* The IPAQ has since become the most widely used physical activity questionnaire [13], with two versions available: the 31-item long form (IPAQ-LF) and the 9-item short form (IPAQ-SF).
* The short form records the activity of four intensity levels:
  + 1. vigorous-intensity activity such as aerobics,
    2. moderate-intensity activity such as leisure cycling,
    3. walking, and
    4. sitting
  + This measure assesses the types of intensity of physical activity and sitting time that people do as part of their daily lives are considered to estimate total physical activity in MET-min/week and time spent sitting.
  + Reliability - Test-retest reliability indicated good stability High reliability (α <80)
  + Validity - Predictive validity Concurrent validity Convergent validity Criterion validity Discriminant validity

1. **ACSM risk stratification screening questionnaire**

The ACSM (American College of Sports Medicine) risk stratification questionnaire is a tool used to assess an individual's risk level before starting an exercise program. This questionnaire helps determine whether a person should undergo medical clearance or proceed with caution based on their health status and risk factors. Here’s a typical outline of what the ACSM risk stratification questionnaire covers:

* Personal Information: Basic details such as age, gender, and medical history.
* Current Health Status: Questions about current medical conditions such as heart disease, diabetes, asthma, and musculoskeletal problems.
* Family History: Any family history of heart disease, stroke, or other relevant conditions.
* Lifestyle Factors: Inquiries about smoking habits, alcohol consumption, and current level of physical activity.
* Symptoms: Questions regarding any symptoms experienced during physical activity, such as chest pain, dizziness, shortness of breath, or joint pain.
* Medications: Information on current medications, particularly those that may affect exercise tolerance or cardiovascular function.
* Previous Medical Tests: Whether the individual has had any recent medical tests (e.g., ECG, stress test) that may influence exercise recommendations.

**Plan of the Study:**

**Results:**

|  |  |  |
| --- | --- | --- |
| Age groups | No of study subjects | % of study subjects |
| 20-29yrs | 16 | 26.67 |
| 30-39yrs | 15 | 25.00 |
| 40-49yrs | 24 | 40.00 |
| >=50yrs | 5 | 8.33 |
| Total | 60 | 100.00 |
| Mean | 37.40 | |
| SD | 9.80 | |

Table: Age wise distribution of study subjects

Figure: Age wise distribution of study subjects

|  |  |  |
| --- | --- | --- |
| Gender | No of study subjects | % of study subjects |
| Male | 34 | 56.67 |
| Female | 26 | 43.33 |
| Total | 60 | 100.00 |

Table: Gender wise distribution of study subjects

Figure: Gender wise distribution of study subjects

Table: Age by gender

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Age groups | Male | % | Female | % | Total | % |
| 20-29yrs | 5 | 31.25 | 11 | 68.75 | 16 | 26.67 |
| 30-39yrs | 8 | 53.33 | 7 | 46.67 | 15 | 25.00 |
| 40-49yrs | 17 | 70.83 | 7 | 29.17 | 24 | 40.00 |
| >=50yrs | 4 | 80.00 | 1 | 20.00 | 5 | 8.33 |
| Total | 34 | 56.67 | 26 | 43.33 | 60 | 100.00 |
| Mean | 39.94 | | 34.08 | | 37.40 | |
| SD | 9.11 | | 9.85 | | 9.80 | |

Figure: Age by gender

Table: Summary of all numerical parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Summery | Minimum | Maximum | Range | Mean | Std.Dev. |
| Age | 20.00 | 56.00 | 36.00 | 37.40 | 9.80 |
| Height | 1.35 | 1.98 | 0.63 | 1.61 | 0.12 |
| Weight | 42.00 | 96.00 | 54.00 | 64.52 | 11.69 |
| BMI | 17.63 | 37.31 | 19.68 | 24.98 | 4.78 |
| Waist | 62.00 | 107.00 | 45.00 | 86.02 | 9.88 |
| Hip | 71.00 | 124.00 | 53.00 | 95.17 | 10.69 |
| Waist/Hip | 0.77 | 1.13 | 0.36 | 0.91 | 0.07 |

Table: Association between BMI with physical activity levels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BMI | Physical activity levels | | | | |
| High level | % | Moderate level | % | Total |
| Under weight | 6 | 100.00 | 0 | 0.00 | 6 |
| Normal | 17 | 94.44 | 1 | 5.56 | 18 |
| Over weight | 29 | 80.56 | 7 | 19.44 | 36 |
| Total | 52 | 86.67 | 8 | 13.33 | 60 |
| Chi-square=3.0290, p=0.2200 | | | | | |

No significant association between BMI with physical activity levels (Chi-square=3.0290, p=0.2200)

Figure: Association between BMI with physical activity levels

Table: Association between BMI with risk factor satisfaction

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BMI | Risk factor satisfaction | | | | |
| Low satisfaction | % | Moderate satisfaction | % | Total |
| Under weight | 5 | 83.33 | 1 | 16.67 | 6 |
| Normal | 16 | 88.89 | 2 | 11.11 | 18 |
| Over weight | 34 | 94.44 | 2 | 5.56 | 36 |
| Total | 55 | 91.67 | 5 | 8.33 | 60 |
| Chi-square=1.0910, p=0.5800 | | | | | |

No significant association between BMI with risk factor satisfaction (Chi-square=1.0910, p=0.5800)

Figure: Association between BMI with risk factor satisfaction

Table: Correlation between BMI scores with Risk factor satisfaction scores by Spearman's rank correlation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | n | Spearman R | t-value | p-value |
| BMI scores and Risk factor satisfaction scores | 60 | 0.1197 | 0.9182 | 0.3623 |

No significant correlation between BMI scores with Risk factor satisfaction scores (Spearman R=0.1197, p=0.3623)

Table: Association between Physical activity levels  with risk factor satisfaction

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Physical activity levels | Risk factor satisfaction | | | | |
| Low satisfaction | % | Moderate satisfaction | % | Total |
| High Physical activity | 47 | 90.38 | 5 | 9.62 | 52 |
| Moderate Physical activity | 8 | 100.00 | 0 | 0.00 | 8 |
| Total | 55 | 91.67 | 5 | 8.33 | 60 |
| Chi-square=0.8390, p=0.3600 | | | | | |

No significant association Physical activity levels  with risk factor satisfaction (Chi-square=0.8390, p=0.3600)

Figure: Association between Physical activity levels  with risk factor satisfaction

Table: Comparison of Physical activity levels with MET values by independent t test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Physical activity level | Mean | SD | SE | t-value | P-value |
| High Physical activity | 8688.46 | 3332.10 | 462.08 | 5.5091 | 0.0001\* |
| Moderate | 2131.50 | 698.39 | 246.92 |  |  |

\*p<0.05

A significant difference was observed between Physical activity levels with mean MET values (t=5.5091, p=0.0001). It means that, the mean MET is significantly higher with High Physical activity as compared to Low Physical activity

Figure: Comparison of Physical activity level with MET values

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