Physical activity level and perceived stress among refugee school students - A descriptive and correlational study

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Sammanfattning

Bakgrund: Stress och låg grad av fysisk aktivitet (PA) är kopplade till ohälsa. Inga studier har påträffats som undersöker stress och PA hos flyktingar som deltar i svenskundervisning.

Syfte: Undersöka PA nivå och upplevd stress och sambandet däremellan hos skolelever med flyktingbakgrund.

Metod: Tvärsnittsstudie med deskriptiv, korrelerande design. Deltagarna fyllde i frågeformulär om upplevd stress: Perceived Stress Scale (PSS); och två frågeformulär om PA nivå: Saltin-Grimby Physical Activity Level Scale (SGPALS) och Socialstyrelsens indikatorfrågor om fysisk aktivitet (SIFA).


Konklusion: Drygt hälften av deltagarna i studien nådde WHO/FYSS rekommenderade PA nivå för vuxna och drygt en tredjedel uppgav att de var stillasittande på fritiden. Initiativ för att främja PA hos skolelever med flyktingbakgrund bör sättas in för att minska ohälsa och stillasittande.

Keywords: physical activity, perceived stress, refugee, students
Abstract

**Background:** Stress and low physical activity (PA) levels are linked to illness. No studies have been found examining them among refugee school students.

**Aim:** Investigate level of PA and perceived stress and the correlation between them among refugee school students.

**Method:** Cross-sectional study with a descriptive, correlative design. Refugee school students completed one questionnaire on perceived stress: Perceived Stress Scale (PSS); and two questionnaires on PA level: Saltin-Grimby Physical Activity Level Scale (SGPALS) and indicator questions for physical activity (SIFA) from the Swedish National board of health and welfare.

**Results:** Altogether 59 students were included. The adult WHO/FYSS recommended PA levels was met by 55.9%. Median SGPALS was 2 (some light physical activity for at least 4 hours/week) out of 4 with 35.6% reported being sedentary during leisure time. Median PSS is 22 out of 40. No significant correlation between SIFA, SGPALS and PSS was found in the population.

**Conclusion:** Over half of the refugee students met the adult WHO/FYSS recommended PA levels and over a third report being sedentary in their leisure time. Initiatives to promote PA among refugee students should be implemented to reduce illness and inactivity.

**Keywords:** physical activity, perceived stress, refugee, students
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Background

Introduction

Stress and low physical activity (PA) levels are linked to illness. A large number of refugees applying for asylum in Sweden are children and adolescents, many without caregivers. There is a lack of studies concerning physical activity levels, perceived stress and the correlation between them among refugee school students. As such these factors need to be further investigated.

Refugees

In 2015 Sweden had an immigration peak with 162,877 people applying for asylum. Altogether 35,569 of them were children and adolescents without caregivers, most of them 16-17 year old boys from Afghanistan. During 2016 Sweden adopted stricter asylum laws, decreasing the applicants in 2017 to 25,666, of which the most common nationalities were Syrian, Iraqi and Eritrean. Consequently also the reception of children and adolescents without caregivers decreased to totally 1336 in 2017, mainly arriving from Morocco, Afghanistan and Somalia (1).

One inclusions criteria of this study is that the participants are ≥15 years. However, many of them fled and arrived to Sweden before their adulthood. Each of them with their own mental and physical experience that needs to be taken into consideration, affecting their wellbeing and decisions in life. A group that the authors predict sooner or later might come in the care of physiotherapists, and healthcare in general.

Stress

Stress is a common complaint affecting a lot of people. This should be taken seriously as stress is related to a reduced quality of life (2) and is a cause of burnout (3). It is also related to illnesses like depression (4), anxiety (5) and cardiovascular disease (6,7). However, the definition of stress is debated since it has been referred to cognitive, behavioural and physiological reactions (8). Although for an event to be considered stressful, it must be perceived as stressful (8). In one study on Syrian refugees, 41.8% of respondents had psychological stress scores correlating to
posttraumatic stress disorder (9). Perceived Stress Scale is an example of a widely used questionnaire that is used to measure a person’s perceived stress (8,10).

**Physical activity**

Physical activity is any body movement produced by skeletal muscles resulting in energy expenditure (11). The amount of physical activity performed is to a large degree subject to personal choice and varies considerably from one individual to another as well as overtime for a specific individual (11). Therefore, physical activity is something that can be specifically manipulated and the results of such change monitored.

Previous studies indicate an inverse relationship between stress and physical activity, where increased stress impairs physical activity uptake (12,13). There are also studies which indicate that physical exercise alone (14) or as part of an intervention (15) can have positive effects on perceived stress. However, no studies were found on the effect of physical activity on stress specifically on refugees, and no studies were found examining relationships between physical exercise and perceived stress among refugees.

Two examples of questionnaires used to measure physical activity are the Saltin-Grimby Physical Activity Level Scale (16) and the indicator questions for physical activity (SIFA) from the Swedish National board of health and welfare (17).

**Gender differences**

Male and female students perceptions and reactions to stressors differ due to differences in how they appraise stressful situations (18). Female gender is also associated with greater mental stress (19, 20). Furthermore, several studies show that male students are physically more active than female students (21-24). This suggests that male and female students perceived stress and physical activity levels may differ, with a possible relationship between the variables. There are also studies showing that physical activity levels of children and adolescents vary across ethnic groups due to many factors such as cultural restrictions on female physical activity, lack of financial resources and academical pressure (25).
SPRINT

The language introduction program (SPRINT) at Lundellska skolan (school) in Uppsala, where the participants of this study were chosen from, is a school program for adolescents and young adults who are newly arrived to Sweden. The goal of the program is for the students to obtain a good grasp of the Swedish language and key primary school subjects so that they can apply for a national high school program (26).

Problem formulation

Prevalence of stress among some groups of refugees are high (9) but there is a lack of knowledge/studies concerning the correlation between physical activity level and perceived stress among refugee school students. Therefore, the authors considered it important to investigate whether there is a relationship between these parameters. Physiotherapists need to be equipped with knowledge about how to best meet the needs of this diverse group of potential patients. Furthermore, there are gender differences with regards to physical activity (19, 20) and mental stress (21-24), hence it is important to note the relationship between physical activity level and perceived stress among male and female refugee school students. Physical activity level can be measured from different contexts, therefore it is important to take into account in which context that physical activity level is being studied when looking at any relationship between physical activity level and other factors, like perceived stress. Physical activity can be measured within the context of your leisure time in the past year with the Saltin-Grimby Physical Activity Level Scale (16), alternatively it can be measured within the context of an ordinary week with the indicator questions for physical activity (SIFA) from the Swedish National board of health and welfare (17).

Increased knowledge about physical activity levels and stress among refugee school students could potentially lead to better preventative health efforts and thereby better societal benefit.

Aim

The purpose of this questionnaire study was to describe level of physical activity and perceived stress and to investigate the possible connection between grade of physical activity level and
perceived stress among a group of refugee school students at the language introduction program (SPRINT) at Lundellska skolan (school) in Uppsala.

Questions

1. What grade of physical activity level, measured with indicator questions for physical activity (SIFA) from the Swedish National board of health and welfare, is present among the students?
2. What grade of physical activity level, measured with the Swedish version of Saltin-Grimby Physical Activity Level Scale (SGPALS), is present among the students?
3. What grade of perceived stress, measured with the Swedish version of Perceived Stress Scale (PSS), is present among the students?
4. What is the relationship between the perceived stress and the grade of physical activity among the students?
5. What is the relationship between the perceived stress and the grade of physical activity among the male and the female students, respectively?

Method

Design

To answer the questions above a quantitative, cross-sectional study with a descriptive and correlative design was used. The study was descriptive, in that the grade of perceived stress and grade of physical activity where examined and described. The study was correlative as the correlation between the variables were analyzed. The questions were answered at one occasion without the purpose of manipulating variables, making it a non-experimental cross-sectional study (27).

Sample

The participants in the study were chosen from the language introduction programme (SPRINT) performed in Lundellska skolan, Uppsala according to a convenience sampling. The aim was to
receive at least 30 participants meeting the criteria, in order to increase the likelihood that the data processing of the sample is more representative of the target population.

Inclusion criteria: ≥15 years, has fled to Sweden, student at the language introduction programme (SPRINT) in Lundellska skolan, Uppsala.
Exclusion criteria: not applicable.

Data collection methods

Data was collected through three questionnaires at one occasion (see appendix 1,3,4). SIFA contains two questions, each with categorical answer modes about physical activity within an ordinary week. SGPALS is a four-level questionnaire to assess leisure time physical activity within the context of the past year. PSS contains 10 questions concerning feelings and thoughts during the previous month. The participants in the study answered the Swedish version of each questionnaire.

SIFA is intended to identify people who do not meet the recommended physical activity levels and to monitor physical activity post intervention (17). The questionnaire consists of two questions which can be answered in three different modes: categorical, open and table. The first question asks about how much time during a regular week the individual spends exercising at a level that makes the individual short winded, for example running, fitness class, or ball games. The second question asks about how much time during a regular week the individual is physically active in ways that are not exercise, in this case activities lasting at least 10 minutes for example walks, bicycling or gardening. Both the questions and the three different answer modes are validated and have been tested for inter-answer mode reliability (17). The categorical answer mode shows the strongest validity and is in line with other extensively used physical activity questionnaires (17), therefore the categorical answer mode is used in this study. All three answer modes were significantly correlated when tested for inter-answer mode reliability (17). When calculating the total physical activity level from SIFA the mean value of the range in each individual’s categorical answer will be used (see appendix 2). To get an ”activity minutes” value for a typical week for which the individual is physically active, the value from question one will be multiplied by two (to account for the higher intensity) and then added with the value from
question two. This means that the activity minutes scale range is from 0-540, with a higher values indicating more minutes of physical activity.

SGPALS is based on one of the oldest existing questionnaires about physical activity (16), first published by Saltin and Grimby in 1968 (28), designed to estimate physical activity both occupationally and during leisure time. The SGPALS-questionnaire, used in this study, is a slightly modified version adding some practical examples of activities to the original Saltin and Grimby version. The questionnaire contains one question concerning the individual’s level of leisure time physical activity, which can be answered in four levels, each level with examples of pertaining activities. For data processing purposes, each of the four levels were given a score ranging from 1-4. Where 1=sedentary, 2= some physical activity, 3= regular physical activity and training, and 4= regular hard physical activity for competition sports. Meaning the higher the score the higher the individual’s physical activity. The concurrent validity for SGPALS, concerning aerobic capacity and movement analysis, as well as the predictive validity concerning various risk factors for health conditions and for morbidity and mortality, has been shown to be good (16). SGPALS has proved to reliably categorize individuals into four different physical activity level groups (16).

The PSS used in the study is the Swedish version of the widely used Perceived Stress Scale questionnaire, which appraises stressful life situations (8) and is intended to measure the degree to which someone perceives aspects of their life as unpredictable, uncontrollable and overloading (10). The PSS used consists of 10 questions in Swedish about the person’s thoughts and feelings during the last month. The person is given 5 alternatives per question on how often the person has thought or felt a certain way, on a scale of 0-4 where 0=never and 4=very often. The perceived stress of the individual is then given a score by reversing the response score of questions 4, 5, 7 and 8, and then adding all the response scores to give the total PSS score. This means that the total PSS score has a range of 0-40, where a higher value indicates more perceived stress. The Swedish version PSS has good internal reliability and good construct validity with depression, anxiety and mental/physical exhaustion (8).
Implementation

A first contact was established with one of the students teacher in February 2018 as well as with the head of SPRINT in Lundellska skolan, whom were positive to the study. The questionnaires were handed to one of the teachers to prepare the school concerning possible language barriers.

The data collection was carried out in September 2018 in Lundellska skolan, Uppsala by the researchers of the study with the help of teachers from Lundellska skolan. The students were informed, before completion of the questionnaires, that only the answers from students who have fled to Sweden would be included in the study. Students who did not come to Sweden as refugees were welcome to complete the questionnaires, although their answers were not used in the data processing of the study.

SPRINT in Lundellska skolan had 110 students, of which 77 were attending when the questionnaires were answered. The students were divided into two groups which gathered in the school assembly room at different times, meaning one group at a time filled in the questionnaires.

Data Processing

The data analysis was performed using the statistical tool R (30). Ordered categorical data was collected from the questionnaires SIFA, SGPALS and PSS. Gender composed non-ordered categorical data as well as covariates.

For question 1-3 (SIFA, SGPALS, PSS) the median, range and interquartile range was calculated and histograms were used to visualize the spread of data (28). The mean and the confidence interval around the mean were also calculated to investigate differences between the mean and the median.

For question 4 and 5 scatter plots were used to illustrate the correlation between the different outcome variables. Spearman's rank correlation coefficient, assessing the relationship between ordinal variables, was calculated for each set of variables (27).
Ethical Considerations

The participation in the study was voluntary and the details regarding the participants were handled confidentially. The participants are not presented by names, personal identity number or any other personal information.

Consent from the head of SPRINT was obtained before the start of the study. Originally the participants were to receive the first information about the study from their teachers. However, due to the teachers workload in August and September the participants received oral information from the researchers of the study and the head of the school about the study in connection with, but before, filling in the questionnaires. In conjunction with the filling of questionnaires the participants also received a letter of information (appendix 6) about the aim and conditions of the study, an informed consent form (appendix 7) and background questions (appendix 8). Since the participants are more or less newly arrived to Sweden, and attending a language introduction program, they received help with interpretation of the questionnaires from assistant teachers that speak their language. Present when filling in the questionnaires, to answer questions and assisting with interpretation, were also the researchers of the study and the head of SPRINT.

Results

The questionnaires were handed out to 77 students, of which the answers from 59 of them were used in the data processing of the study. The answers from the remaining students, who had received the questionnaires, were either incomplete or could not be included because they did not fulfill the inclusion criteria “has fled to Sweden”. The number of participants whose answers were incomplete were 11 and the number who did not fulfill the inclusion criteria were 6. One student attending at the occasion did not want to participate in the study.
Participants

Of the 59 participants, with complete answers and fulfilling the inclusions criteria, 18 (31%) of them were female and 41 (69%) were male. The mean and median age of the students were 17.7 and 18, respectively, with the age range being from 16-20 years.

Grade of physical activity level measured with SIFA

The grade of physical activity level measured with SIFA displays a slight bimodality in the population. There is a distinct difference between a minority of respondents that have a high physical activity level and the majority with lower to medium levels. This can be seen in figure 1. This is also visible in the difference between the mean and the median where the mean is higher due to the minority group. See the summary statistics for the composite scores and SGPALS for the population in table I.

The spread of physical activity is large, ranging from no physical activity to the maximum measurable by the scale. However, the majority of the population cluster around the median with a relatively high inter quartile range. Altogether 55.9% of the sample population reached ≥150 activity minutes/week.

Figure 1. Distribution of the SIFA composite score.
Table I. Summary statistics for composite SIFA, SGPALS and composite PSS.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard deviation</th>
<th>95% CI of the mean</th>
<th>Median</th>
<th>Range</th>
<th>Inter quartile range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIFA composite</td>
<td>216.6</td>
<td>150.8</td>
<td>[177.3, 255.9]</td>
<td>180</td>
<td>540</td>
<td>202.5</td>
</tr>
<tr>
<td>SGPALS</td>
<td>2.3</td>
<td>1.2</td>
<td>[2.0, 2.6]</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>PSS composite</td>
<td>21.1</td>
<td>6.0</td>
<td>[19.5, 22.6]</td>
<td>22</td>
<td>24</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Grade of physical activity level measured with SGPALS

The SGPALS scale has much less granularity than the composite SIFA scale (Table I). The bimodality is also visible using this scale, figure 2, but the levels of physical activity appear to be much more evenly distributed. The level of physical activity most frequently answered in this study was 1) sedentary, with 35.6% of the students answering they were sedentary in their leisure time.

![SGPALS Distribution](image)

Figure 2. Distribution of the SGPALS score.
Grade of perceived stress measured with PSS

The mean and median (shown in table I) of the composite PSS score of the population is slightly above the center of the scale. The spread around the mean displays something similar to a normal distribution with a dense peak and lower tails, meaning that most stress levels are around the center of the scale or slightly higher with a few individuals with high or low stress levels, see figure 3.

![PSS composite distribution](image)

**Figure 3.** Distribution of the PSS composite score.

Relationship between perceived stress and grade of physical activity level

The spearman correlation showed a weak correlation between level of physical activity and stress level, see table II. No strong connection can be seen between the PSS value and either of the physical activity values, see figures 4 and 5. The p-values (p>0.05) indicate that the correlation between PSS composite score and both SGPALS and SIFA composite score is non-significant.
Table II. Correlation between exercise scores and perceived stress (Spearman correlation coefficients and p-values in parentheses).

<table>
<thead>
<tr>
<th></th>
<th>SGPALS</th>
<th>SIFA composite score</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSS composite score</td>
<td>0.141 (p=0.29)</td>
<td>0.176 (p=0.18)</td>
</tr>
</tbody>
</table>

Figure 4. The diagram shows the relationship between SGPALS and PSS composite score. Each point represents one individual.

Figure 5. The diagram shows the relationship between SIFA composite and PSS composite score. Each point represents one individual.
Relationship between perceived stress and grade of physical activity level stratified on sex

Table III displays the correlation between physical activity and perceived stress stratified on sex using the Spearman’s rank correlation coefficient. The p-values (p>0.05) indicate that the correlation between PSS composite score and both SGPALS and SIFA composite score for both sexes is non-significant.

Table III. Correlation between physical activity scores and perceived stress stratified on sex (Spearman’s rank correlation coefficient with p-values in parentheses).

<table>
<thead>
<tr>
<th>Sex (number)</th>
<th>SGPALS</th>
<th>SIFA composite score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female= 18</td>
<td>0.028 (p=0.91)</td>
<td>0.121 (p=0.86)</td>
</tr>
<tr>
<td>Male= 41</td>
<td>0.029 (p=0.63)</td>
<td>0.116 (p=0.47)</td>
</tr>
</tbody>
</table>

Figure 6. The diagram displays the relationship between SGPALS and PSS composite stratified on sex. Each point represents one individual.
Discussion

Summary of results

Altogether 55.9% of the participants reached $\geq 150$ activity minutes/week, with a mean and median of 216.6 respective 180 activity minutes/week measured with SIFA. The SGPALS level of physical activity most frequently answered in this study was 1) sedentary, with 35.6% of the students answering they were sedentary in their leisure time. The mean and median PSS score was 21.1 and 22, respectively. Spearman correlation showed low correlation between 0.03 and 0.18 for the relation between perceived stress and level of physical activity in the whole group and for men and women respectively.

Discussion of results

Grade of physical activity level measured with SIFA

The mean and median activity minutes among the sample students was 216.6 minutes/week and 180 minutes/week, respectively. The mean and median age of the students were 17.7 and 18,
respectively, with the age range being from 16-20 years. Both WHO (30) and FYSS (31) recommends a minimum of 150 minutes of moderate physical activity for adults aged 18 and above. Regarding physical activity for young people, a minimum of 60 minutes daily of moderate to vigorous physical activity is recommended by both WHO for children aged 5-17 (32) and FYSS (33) for children aged 6-17. The mean and median activity minutes of the sample students was above the minimum recommended physical activity level recommended for adults aged 18 and above by both FYSS and WHO, yet below the minimum recommended physical activity level recommended for adolescents aged 17 and below by both FYSS and WHO, assuming a recommended weekly physical activity level for adolescents aged under 17 of 420 minutes/week (60 minutes/day multiplied by 7).

In this study, 55.9% of the participants reached ≥150 activity minutes/week. This is in comparison to an adult Swedish population where 65% of the total population reached ≥150 activity minutes/week (34). In this same population, 70% of those between the ages of 16-29 years and 45% of those born outside Europe reached ≥150 activity minutes/week. These two subpopulations probably best approximate the sample population of the current study since the age range of this study is 16-20 years and the majority of refugees in Sweden had citizenship from countries outside of Europe when arriving to Sweden (1). This suggests that just over half of the refugee students probably reach the recommended activity levels recommended for adults by WHO and FYSS, they are probably less active than the total adult Swedish population, the total Swedish population in their age group but more active than the adult Swedish population who were born outside of Europe.

**Grade of physical activity level measured with SGPALS**

The grade of physical activity level measured with SGPALS in this study sample (mean 2.3, median 2) is similar to a previous study in Swedish healthcare workers (35) which measured physical activity level with SGPALS on four different time points, with the lowest mean SGPALS score being 2.19 at one time point and the highest mean SGPALS score being 2.26. However the mean age of the Swedish healthcare workers in the study was 46.9 years (35), which is a lot higher than 17.7 years, the mean age of the students in this study sample. No SGPALS physical activity levels where found for young adults, high school students or individuals with a refugee background.
The SGPALS level of physical activity most frequently answered in this study was 1) sedentary, with 35.6% of the students answering they were sedentary in their leisure time, this is in contrast to other studies in older Swedish populations (36,37) showing that the SGPALS level of physical activity most frequently answered was 2) some physical activity, with no more than 15% of the sample population in those two studies answering 1) sedentary. This suggests while on average the sample refugee student regularly do some light physical activity in their leisure time which is similar to an older Swedish population, over a third of the sample population of refugee students are sedentary and this number may be more than double that found in other Swedish population groups.

Grade of perceived stress measured with PSS
A previous study to provide normative data for the PSS in the Swedish population (8) gave a mean PSS of 15.6 in the young age group of 18-34 years. This is significantly lower than in the present study where students aged 16-20 years had a mean PSS of 21.1 (median PSS of 22). The higher PSS score among refugee students may be due to potentially more stressful life experiences as previous studies have found many refugees have psychological stress scores correlating to posttraumatic stress disorder (9), furthermore a large proportion of refugees in Sweden arrived as children and adolescents without caregivers (1).

Relationship between perceived stress and grade of physical activity level
This study showed a minimal non-significant positive correlation of $r=0.176$ and $r=0.141$ between perceived stress measured by PSS and grade of physical activity measured by SIFA and SGPALS, respectively. This is in contrast to a previous study of a population of high school students in Scotland (12) showing a correlation of $r=-0.61$ between the PSS and the Physical Activity Questionnaire for High School (PAQA) score. Although this population was not done specifically on refugees it did include high school students and it did include a highly stressed group of adolescents of low socioeconomic status backgrounds. Furthermore, a study done on a Swedish population of healthcare workers and social insurance officers showed that as physical activity level in the SGPALS increased from sedentary to light physical activity to moderate-vigorous physical activity the percentage of participants who were highly stressed decreased (36). Although the mean age of the participants in that study at baseline was 47. Furthermore, a study review (13) found that whilst most studies (72.8%) supported an inverse relationship between physical activity and stress, some studies (17.2%) found that stress was associated with
higher physical activity. Overall the results suggest that there is no significant correlation between level of physical activity and perceived stress among the refugee students.

Relationship between perceived stress and grade of physical activity level stratified on sex

This study showed a very minimal non-significant positive correlation between PSS and SGPALS for both males ($r=0.029$) and females ($r=0.029$). There was a minimal non-significant positive correlation between PSS and SIFA for both males ($r=0.116$) and females ($r=0.121$). A study done on a Swedish population (37) which separated the results of men (mean age 52) and women (mean age 51) found that physically inactive men reported increased levels of perceived stress compared with more active men, with no big differences being found between physically inactive and physically active women with regards to perceived stress. No other studies were found comparing physical activity and stress level on men and women separately. Overall the results suggest that there is no significant correlation between level of physical activity and perceived stress in male and female refugee students.

Discussion of method

The response of the study was very good. With only one student declining to take part in the study. Of the 76 students who answered the questionnaire, 17 of the students answers weren’t used in the result of the study because of either incomplete answering of one or more of the questionnaires or not fulfilling the inclusion criteria.

There were translators in attendance who helped the students with understanding the Swedish language questionnaires since many of the students had difficulty with the Swedish language, this probably helped increase the response rate and accuracy of the questionnaires. Although translators for many of the most common languages spoken by the students were in attendance to help the students with the questionnaires, possibly not all languages were represented which may have negatively impacted the accuracy of the answers to the questionnaires, furthermore misunderstandings can be made when translating the questionnaires potentially making the answers less valid and reliable. Also there was a large number of students competing for the attention of a limited number of translators making translation of every question time consuming.
and difficult. Ideally having reliable and valid versions of the same questionnaires in different languages may have been a better option.

In this study a quantitative, cross-sectional study with a descriptive and correlative design was used to answer the 5 proposed questions and meet the aim of describing the level of physical activity and perceived stress and to investigate the possible connection between grade of physical activity level and perceived stress among a group of refugee school students. All the three questionnaires used in the study have good reliability and validity (8,16,17) and are considered suitable for measuring perceived stress or grade of physical activity. However, a significant number of students did not answer all of the PSS questions and many students did not understand that they were to answer by choosing only one of the four options in the SGPALS questionnaire. The students who did not completely answer all the questionnaires or answered a questionnaire incorrectly were not included in the results. Possible reasons for not answering all the questions or not answering the SGPALS questionnaire correctly are not understanding the question/instructions due to difficulties with Swedish, not reading the instructions for the questionnaire, unwillingness to answer the question or missing to answer the question. The misunderstanding regarding the last SGPALS questionnaire could possibly have been avoided by more clear verbal instructions regarding how to answer the questionnaires in the beginning. Instead of using the PSS questionnaire for perceived stress, in order to get more complete answers and avoid possible misunderstandings due to language difficulties a simpler and shorter questionnaire could be used such as a single-item measure of stress symptoms: "Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of stress these days?" With the response being recorded on a 5 point Likert scale ranging from “not at all” to “very much”. This single-item measure has shown satisfactory criterion, content and validity for group-level analysis (38).

This study used two questionnaires to measure the students grade of physical activity. However, subjects completing self-reports of physical activity have been shown to underestimate sedentary activities and overestimate aerobic activities, with males overestimating their activity levels compared to females (39). In order to obtain more objective measures of physical activity, a device such as an accelerometer could be used (40), however, that is outside the scope of this study and would require significantly more time and resources.
Reliability and generalizability of the results

While all the three questionnaires used in the study have good reliability and validity (8,16,17) and are considered suitable for measuring perceived stress or grade of physical activity, there are a couple of points which reduce the reliability of the results. Namely that many students had difficulty with the Swedish language, the need for and use of a limited number of translators to answer the questionnaires, and misunderstandings regarding how to answer the SGPALS questionnaire. These points reduce the reliability of the results. However, when comparing the results of SGPALS and SIFA in Figure 2 and Figure 1 respectively, both have similar shapes with a bimodality in the results suggesting that the physical activity levels answered via the 2 questionnaires seem to correspond well to each other.

While the number of participants in the study was not very low, it was not large either. Furthermore, only students in a specific language programme in one school were included with the students being ≥15 years of age. Thus reducing the generalizability of the results to all refugee students in Sweden. Larger number of participants of all ages from different schools throughout Sweden would ensure greater generalizability of the results regarding refugee students in Sweden.

Clinical and societal relevance

Refugees are a significant portion of the Swedish population many having fled and arrived to Sweden before their adulthood, often without caregivers. Many refugees have undergone stressful experiences prior to fleeing to Sweden. Stress has been shown to be related to a reduced quality of life (2), is a cause of burnout (3) and is related to illnesses like depression (4), anxiety (5) and cardiovascular disease (6,7). Thus measuring the level of stress of patients/populations and treating high stress is imperative to maximize quality of life, wellbeing and health. In a study on Syrian refugees, 41.8% of respondents had psychological stress scores correlating to posttraumatic stress disorder (9). The results of this study show that the refugee school students had higher measured perceived stress levels than a Swedish population in the age range of 18-34 (8). With refugee students showing higher stress levels it is important for the healthcare
professional to be aware of this so they can better screen for and treat high stress when dealing with refugee students.

Furthermore, just over half (55.9%) the refugee students meet the adult WHO and FYSS recommended activity levels to reduce risk of non-communicable diseases and promote health and wellbeing. This is significantly lower than the 70% of a sample adult Swedish population in the 16-29 years age range (34). Also 35.6% of the students report being sedentary in their leisure time, thus potentially putting them at increased risk of non-communicable diseases and psychological illness. It is therefore important for health care professionals and other relevant caregivers to be aware of this, so that they can screen for low physical activity and promote increased physical activity in this patient group.

Ethical considerations and further studies

From an ethical standpoint, the participants of the study were informed in advance of answering the questionnaires about the aims of the study, that the information they provide will be held confidential and taking part in the study is voluntary. None of the participants were deemed to be injured or put at risk by taking part in the study, and therefore the authors deem the study to be ethical.

With the undertaking of this study, no studies were found specifically looking at stress and physical activity in refugee high school students. Whilst this study showed no significant correlation between physical activity and perceived stress, other studies have shown a negative correlation between stress and physical activity (12,13) thus highlighting the need for further studies to be done regarding physical activity and perceived stress in this population group.

A qualitative design might be suitable for further studies of the concerned population. This would give each participant more time to, in a calmer setting, individually describe and enable their thoughts, apprehensions and experiences about stress and physical activity to be displayed in a more vivid way. A qualitative study could also enable further parameters to be investigated such as specific difficulties they face, views on physical activity and stress, experiences moving to a new environment with different customs, problems with residence permit, and their living
and family situation. This may enable a greater understanding of the specific problems and barriers the concerned population may experience, enabling better and more specific quantitative studies to be conducted in the future. Further studies with larger number of participants from schools throughout Sweden would ensure greater generalisability of the results regarding refugee students in Sweden. Furthermore, it may be a better option to conduct studies with reliable and valid versions of the same questionnaires in the student’s preferred language for better accuracy of the results. Finally, in order to get more complete answers and avoid possible misunderstandings due to language difficulties, simpler and shorter questionnaires could be used.

Conclusion

Just over half of the refugee students met the adult WHO and FYSS recommended activity levels. Just over one-third (35.6%) of the students report being sedentary in their leisure time. Perceived stress is higher than the young age group of the general Swedish population. There was no significant correlation between level of physical activity and perceived stress in male, female, and all refugee students. The results should be interpreted with caution, as the sample was small and coming from a specific program in a specific school. There were also misunderstandings with the SGPALS questionnaire and many participants had difficulty with the Swedish language in the questionnaires, hence further larger studies of refugee school students of all ages throughout the country are needed to make more reliable and generalizable conclusions. Initiatives to promote physical activity among refugee school students should be implemented to reduce risk of illness and inactivity.
References


Socialstyrelsens indikatorfrågor om fysisk aktivitetsnivå

1. Hur mycket tid ägnar du en vanlig vecka åt fysisk träning som får dig att bli andfådd, till exempel löpning, motionsgymnastik eller bollsport?

□ 0 minuter/Ingen tid  
□ Mindre än 30 minuter  
□ 0–60 minuter (0,5–1 timme)  
□ 0–90 minuter (1–1,5 timmar)  
□ 0–120 minuter (1,5–2 timmar)  
□ Mer än 120 minuter (2 timmar)


□ 0 minuter/Ingen tid  
□ Mindre än 30 minuter  
□ 30–60 minuter (0,5–1 timme)  
□ 60–90 minuter (1–1,5 timmar)  
□ 90–150 minuter (1,5–2,5 timmar)  
□ 150–300 minuter (2,5–5 timmar)  
□ Mer än 300 minuter (5 timmar)
Minutes of physical activity used in Activity Minutes calculation from SIFA

<table>
<thead>
<tr>
<th>Categorical answers from SIFA</th>
<th>Number of minutes used in Activity Minutes calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 minutes</td>
<td>0</td>
</tr>
<tr>
<td>Less than 30 minutes</td>
<td>30</td>
</tr>
<tr>
<td>30-60 minutes</td>
<td>45</td>
</tr>
<tr>
<td>60-90 minutes</td>
<td>75</td>
</tr>
<tr>
<td>90-120 minutes</td>
<td>105</td>
</tr>
<tr>
<td>more than 120 minutes</td>
<td>120</td>
</tr>
<tr>
<td>90-150 minutes</td>
<td>120</td>
</tr>
<tr>
<td>150-300 minutes</td>
<td>225</td>
</tr>
<tr>
<td>more than 300 minutes</td>
<td>300</td>
</tr>
</tbody>
</table>
Saltin-Grimby Physical Activity Level Scale (SGPALS)

**FYSISK AKTIVITET och MOTION**

Kryssa endast i **EN** ruta!

**Hur mycket rör Du Dig och anstränger Dig kroppsligt på fritiden?**

Om Din aktivitet varierar mycket mellan t ex sommar och vinter, så försök att ta ett genomsnitt.

Frågan gäller det senaste året.

1. **Stillasittande fritid**
   
   Du är nästan helt fysisk inaktiv: läser, ser på TV och film, använder dator eller har annan stillasittande sysselsättning på fritiden.................................................................□

2. **Någon fysisk aktivitet på fritiden under minst 4 timmar per vecka:**
   
   Du cyklar eller promenerar exempelvis till arbetet, promenerar eller åker skidor med familjen, trädgårdsarbete, fiske, bordtennis, bowling etc. .................................................................□

3. **Regelbunden måttlig fysisk aktivitet och träning under minst 2 till 3 timmar per vecka:**
   
   Du ägnar Dig åt t.ex. tungt trädgårdsarbete, löpning, simning, motionsgymnastik, tennis, badminton eller liknande aktiviteter .................................................................□

4. **Regelbunden hård träning och tävlingsidrott (aktivitet med hög intensitet):**
   
   Du ägnar Dig åt löpning, orientering, skidåkning, simning, fotboll, handboll etc. flera gånger i veckan .................................................................................................................□
Uppfattad stress-10
(Perceived Stress Scale-10)

Frågorna i denna enkät handlar om dina känslor och tankar under den senaste månaden. Du ska fylla i hur ofta du känt eller tänkt på ett visst sätt.

<table>
<thead>
<tr>
<th>Under den senaste månaden, hur ofta har du:</th>
<th>Aldrig</th>
<th>Nästan Ibland</th>
<th>Ganska</th>
<th>Väldigt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aldrig</td>
<td>ofta</td>
<td>ofta</td>
<td></td>
</tr>
</tbody>
</table>

1. varit upprörd över något som hände helt oväntat? 0 1 2 3 4
2. känt att du var oförmögen att kontrollera de viktiga sakerna i ditt liv? 0 1 2 3 4
3. känt dig nervös och "stressad"? 0 1 2 3 4
4. litat på din förmåga att hantera dina personliga problem? 0 1 2 3 4
5. känt att saker och ting har gått din väg? 0 1 2 3 4
6. känt att du inte kunnat hantera allt som du måste göra? 0 1 2 3 4
7. klarat av att kontrollera irritationsmoment i ditt liv? 0 1 2 3 4
8. känt att du haft kontroll? 0 1 2 3 4
9. varit arg över sådant som hänt och varit utanför din kontroll? 0 1 2 3 4
10. känt att svårigheter hopat sig så att du inte kunnat hantera dem? 0 1 2 3 4
Till skolledare för Sprintgymnasiet Uppsala


För att kunna utföra studien behöver vi samla in data genom att lämna ut enkäter till eleverna i september 2018. Vi kommer att använda oss av Socialstyrelsens indikatorfrågor om fysisk aktivitet (SIFA), Saltin-Grimby Physical Activity Level Scale (SGPALS) samt Perceived Stress Scale (PSS-SV). Deltagarna kommer att vara anonyma.

I egenskap av skolledare för Lundellska skolans språkintroduktionsprogram efterfrågar vi nu ditt tillstånd att genomföra studien.

Härmed beviljar jag att datainsamling får genomföras från eleverna vid språkintroduktionsprogrammet enligt ovan.

Uppsala den ____________

_______________________ __________________
Underskrift Namnförtydligande
Skolledare Skolledare
Lundellska skolans språkintroduktionsprogram
Uppsala Kommun
Uppsala

Med vänliga hälsningar

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Information till dig om deltagande i studie

Vi är två studenter i fysioterapi vid Uppsala Universitet. Vi ska skriva examensarbete om sambandet mellan fysisk aktivitet och upplevd stress hos elever på SPRINT vid Lundellska skolan i Uppsala. Titeln på examensarbetet är Relationship between physical activity level and perceived stress among refugee school students (Samband mellan fysisk aktivitetsnivå och upplevd stress bland flyktingelever).


För att vara med i studien ska du ha kommit till Sverige som flykting. Om du inte kom till Sverige som flykting får du gärna svara på frågorna ändå, men dina svar kommer då inte att användas i studien.


Jim och Therese kommer sedan att analysera svaren.

Om du vill behålla det här informationsbladet så går det bra.

Med vänlig hälsning

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Handledare
Legitimerad sjukgymnast
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INFORMERAT SAMTYCKE

Jag har tagit del av den skriftliga beskrivningen av enkäterna för examensarbetet *Relationship between physical activity level and perceived stress among refugee school students* (Samband mellan fysisk aktivitetsnivå och upplevd stress bland flyktingelever) och den har förklarats för mig med ord som jag förstår. Jag har haft möjlighet att ställa frågor och alla mina frågor har besvarats på ett sätt som jag förstår.

Jag samtycker till att:
- Frivilligt delta i studien
- Jim Carlsson och Therese Åkerstedt samlar in och analyserar mina svar, på det sätt som beskrivs i den skriftliga informationen.

……………………………
Namn                          Namnförtydligande                          Datum
……………………………

Vi, de undertecknande, har till fullo förklarat relevant information om studien för den person som anges ovan och kommer att ge henne eller honom en kopia av denna undertecknade och daterade samtyckesblankett.

……………………………..
Ansvarig för insamling av data Namnförtydligande Datum
…………………..
Jim Carlsson

……………………………..
Ansvarig för insamling av data Namnförtydligande Datum
…………………..
Therese Åkerstedt

……………………………..
Ansvarig för insamling av data Namnförtydligande Datum
…………………..
INLEDANDE FRÅGOR

Kön: Man □ Kvinna □ Annat □

Ålder: ______

Har du flytt till Sverige? Ja □ Nej □