JOURNAL OF THEORY AND PRACTICE IN SPORT
MUĞLA SITKI KOÇMAN UNIVERSITY FACULTY OF SPORT SCIENCES
AÇIK ERİŞİM
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To cite this article: Dimech, S. & Muscat-Inglott, M. (2023). Exploring the relationship between socioeconomic status and sport participation in Maltese children: A cross-sectional short survey of mothers in relatively affluent households *Journal of Theory and Practice in Sport, 2*(1), 1-22.

Received: 22.02.2023

Accepted: 04.05.2023

Published: 30.06.2023

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Exploring the relationship between socioeconomic status and sport participation in Maltese children: A cross-sectional short survey of mothers in relatively affluent households

Abstract

The study aimed to explore the relationship between socioeconomic status and sport participation as a component of broader physical activity patterns in Maltese children. In light of generally low physical activity levels and high prevalence of adverse health outcomes like overweight and obesity in Malta by international standards, researchers and stakeholders have been keen to identify key operative factors and remedial long-term solutions. Trends towards low activity rates may also help to explain relative under-performance by Maltese athletes in international sports. With an interest in both sports performance and national health, therefore, a cross-sectional short survey was administered among a convenience sample of mothers in relatively affluent Maltese households, to survey sports participation in their children as a function of household socioeconomic status, from a sociological perspective. A series of non-parametric statistical procedures were used to test a range of hypotheses that ultimately revealed significant effects of household income, parental educational level, and gender on children's sports participation as the main findings. Throughout the article, we develop the argument that small nations simply cannot afford application of further restrictions on the population pool from which potentially talented future sports performers may be drawn. More commitment is recommended, in this sense, to concerted initiatives and policies designed to limit inequality of access to sport as a component of physical activity, along class, gender, or indeed any other lines.

Keywords: Socioeconomic status, sports participation, physical activity, children, Malta, Mediterranean

Maltalı çocuklarda sosyoekonomik durum ile spora katılım arasındaki ilişkinin araştırılması: Nispeten varlıklı hanelerdeki annelere ilişkin kesitsel kısa bir tarama

Özet

Bu araştırma, Maltalı çocuklarda daha geniş fiziksel aktivite kalıplarının bir bileşeni olarak sosyoekonomik durum ile spora katılım arasındaki ilişkiyi araştırmayı amaçlamaktadır. Uluslararası standartlara göre Malta'da genel olarak düşük fiziksel aktivite seviyeleri ve aşırı kilo ve obezite gibi olumsuz sağlık sonuçlarının yüksek prevalansı ışığında, araştırmacılar ve paydaşlar, temel işlevsel faktörleri ve iyileştirici uzun vadeli çözümleri belirleme konusunda istekli olmuştur. Düşük aktivite oranlarına yönelik eğilimler, Maltalı sporcuların uluslararası sporlardaki görece düşük performanslarını açıklamaya da yardımcı olabilir. Hem spor performansına hem de ulusal sağlığa ilgi duyan bu nedenle, çocukların spora katılımını hanenin sosyoekonomik durumunun bir fonksiyonu olarak sosyolojik bir bakış açısıyla araştırmak için nispeten varlıklı Malta hanelerindeki annelerden oluşan bir örneklem arasında kesitsel kısa bir anket uygulanmıştır. Bir dizi parametrik olmayan istatistiksel prosedür, nihai olarak hane gelirinin, ebeveyn eğitim düzeyinin ve cinsiyetin çocukların spor katılımı üzerindeki önemli etkilerini ortaya çıkaran bir dizi hipotezi test etmek için kullanılmıştır. Makale boyunca, küçük ulusların, potansiyel olarak yetenekli geleceğin spor sanatçılarının çekilebileceği nüfus havuzuna daha fazla kısıtlama uygulamayı göze alamayacağı argümanını geliştirdik. Bu anlamda, fiziksel aktivitenin bir bileşeni olarak spora erişim eşitsizliğini sınıf, cinsiyet ve aslında diğer açılardan sınırlamak için tasarlanmış uyumlu girişimler ve politikalar için daha fazla kararlılığa ihtiyaç vardır.

Anahtar Kelimeler: Sosyoekonomik durum, spora katılım, fiziksel aktivite, çocuklar, Malta, Akdeniz

Introduction

In terms of their performance in international sport, nations will typically strive to identify and call upon those athletes with the highest probabilities of success in their respective disciplines. Unnecessarily excluding segments of the population due to arbitrary (from the perspective of objective sporting success), and essentially artificial, characteristics like socioeconomic status (SES), appears increasingly problematic and unsustainable in the context of international sports performance. This is particularly true of small countries, where population size already represent a fairly substantial barrier. Studies on unequal access/opportunity to participate in sport in the UK (Collins & Buller, 2003; Rowley & Graham, 1999), US (Book et al., 2022; McGovern, 2021), and Asia (Li et al., 2014), have reported particular concerns about under-representation of children from lower class backgrounds. Children from more affluent families are, in this sense, increasingly likely to practice sport and receive more tangible support. Little research on the effects of SES on sport participation has been carried out specific to the small nation context, and no studies of which we are aware, have investigated the phenomenon either in Maltese or broader Mediterranean settings. The present study aimed to address this important gap. Philosophically and theoretically, our approach combines a normative performance-based perspective in its concern for sporting success as a function of unencumbered talent identification, with elements of social justice theory through the conceptualisation of physical activity, sports participation and the benefits they confer, as material rewards subject to inequitable distribution across particular social strata.

Sport for competitive success and better general health

While better performance in international sport is a welcome aim, the problem of lagging participation in sport can also be conceptualised from a health perspective. General physical activity (PA) levels have been found to correlate with body mass index (BMI) in children and adolescents (Sulemana et al., 2006), and in turn with potentially adverse health outcomes like the onset of overweight and obesity. A rationale for promoting sports participation, therefore, aside from promoting success in the competitive sphere, rests on the assumption that more active children, are also healthier. As a form of PA, regular formal sport participation can be considered an important component of total PA in children and youths. A major limitation in most studies on total PA and BMI, however, is that they are mostly observational, making causality difficult to infer (Rauner et al., 2013). In other words, it is unclear whether low PA causes increases in BMI, having a high BMI causes low PA, or the extent to which bi-

directionality or extraneous variables might be in play. More controlled experimental studies are needed to test causal claims surrounding the relationship between PA and BMI.

Hemmingsson and Ekelund (2007) showed that PA was more strongly associated with BMI particularly in obese participants, calling into question the status of PA (or lack thereof) as an a priori causal factor for increased BMI, overweight, or obesity. In other words, if PA interacts with BMI to a lesser extent in children of a healthy weight, it is unlikely that a child will *become* overweight and obese as a result of being less active. Meanwhile, genetics and poor diet are also known to predict childhood obesity (Sahoo et al., 2015), further reducing the likely proportion of variation in BMI attributable exclusively to PA. It is a similarly reasonable assumption that the relationship between PA and BMI is bidirectional (Cairney & Veldhuizen, 2017; Lee et al., 2018). Being more active and participating in sport can lower BMI, but simply having a lower BMI likewise can increase the likelihood of getting/being involved in structured PA or organised sport. Nevertheless, an excessive focus on obesity in the context of children's general health, might be unfounded. PA carries distinctive health benefits regardless of its interaction with BMI (Hills et al., 2011), or, for that matter, its relationship with adverse health outcomes like overweight or obesity. Strategies for maintaining good health in children typically combine healthy eating *and* PA programmes (Hills et al., 2011), suggesting that increased activity through organised sport is ultimately a good thing for children's health.

Unequal access to sport

Given the potential benefits of sport on general health, unequal access is rendered cause for concern. Researchers have found that children in low SES households exhibit more screen time and sedentary behaviours than high SES households, and by extension, do less PA (Lioret et al., 2007; Tandon et al., 2012). In a systematic review of the literature on adolescent PA, Stalsberg and Pedersen (2010) also argued that SES and PA are inversely correlated. Lower PA levels among children of low SES likewise suggests a decreased propensity for children of low SES to participate in structured sporting activities. If this is the case, then sport is rendered increasingly a preserve of the middle class, or at least of segments of the population representing higher relative SES (McVeigh et al., 2004; Stalsberg & Pederson, 2010; Wilson et al., 2004). Lack of resources in poorer areas mean that access to facilities and services dedicated to children's sport or general PA is increasingly restricted among disadvantaged segments of populations (Bhurosy & Jeewon, 2014). Add to this, global wealth inequality is generally considered to be rising (Piketty & Saez, 2014; Zucman, 2019). This means that future sports participants are destined to be drawn from ever-diminishing population pools as wealth is

transferred into ever smaller segments of the population. The consequences for countries like Malta are at least twofold. First, the problem of talent identification is exacerbated in small nations with populations that are already inherently restrictive, and second, the inexorable link between wealth and health inequality is also exacerbated. Unequal access to PA and sport, in other words, subjects children of low SES to lower likelihood of living actively and healthily.

The national body for the promotion of sport in Malta under the remit of the Maltese Ministry for Education and Sport launched a number of programmes aimed at including "every child, […] regardless of the resources of their parents or carers ..." (SportMalta, 2021). Such initiatives take the form of low-cost provision of opportunities to practice sport, yet more research is still needed to ascertain its effects. Although general PA has reportedly decreased relatively homogeneously in Western countries since the 1980s, Salmon et al. (2005) noted a compensatory increase in school-based and other organised forms of sport. Once again, whether any such compensation has taken place in Maltese schools is yet to be ascertained. Nevertheless, the remaining hours of a child's day spent outside of school are an important window of opportunity to engage in sport or PA, subject to facilitation by parents or guardians. As early as the 1990s, evidence in Europe showed a correlation between parents' education level and the PA levels of male children, with father's own prior PA levels being a significant predictor in the case of male offspring (Yang et al., 1996). Parent's education level is typically taken, along with financial income, as an integral constituent measure of SES in studies of this nature.

Socioeconomics, obesity, and sport in Malta

The European Gender Equality Index (EIGE, 2020) report showed that Maltese working mothers, despite their employment status, tend to retain the majority of work duties in the household, including care of immediate and extended family members. McVeigh et al. (2004) meanwhile cited mothers' education level as a significant positive predictor of PA in children, showing at least one way in which characteristics associated with mothers are influential to children's PA behaviours. The question arises, therefore, notwithstanding possibly strained familial relations brought about by mothers working both full-time and in the household, how unequal distribution of time-intensive household responsibilities might affect other outcomes like children's sport participation. Other notable idiosyncrasies in the Maltese context include alarming childhood obesity rates by international standards (Cauchi et al., 2015).

Although lagging sports participation is unlikely to be a direct causal factor leading to obesity, overweight and obese children are known to engage in less PA and sport, so high rates of obesity nonetheless place additional strain on selection pools in the context of early talent identification

and later sports performance at all levels. Grech et al. (2017) and Aquilina et al. (2019) showed in a series of representative nationwide studies, that the prevalence of obesity in Maltese children aged approximately 5 to 17 years of age was as high as 40%. Given a total population of approximately half a million inhabitants, Maltese sports administrators already face severe restrictions in identifying available talent without additional exclusion of children due to obesity, SES or indeed any other factors. Vella et al. (2013), in this sense, argued that gender inequality has also emerged in access to sport, in that Maltese boys tend to participate more than girls, further unnecessarily eliminating additional prospective successful sports performers. Various local studies have acknowledged that even when controlling for population size, Maltese sport still suffers a trend of under-performance in international competition (Grech et al., 2022; Muscat-Inglott & Vella White, 2021), rendering additional restrictions on the availability of potentially talented sports performers appears, increasingly untenable.

Our interest in lagging sports performance as an important component of PA is not limited, however, merely to the context of sport performance. In terms of safeguarding children's general health, the Maltese setting presents additional causes for concern. For instance, genetic variations and environmental influences are also known to influence adverse health outcomes like overweight and obesity status in children and youngsters (Sulemana et al., 2006). If there is a genetic component to overweight and obesity, then Malta's obesity rates may be compounded by genetic drift. Loss of genetic diversity is a predictable characteristic of small populations, leaving natural selection to act on genes associated with higher BMI, and their consequent phenotypic expression in prevalent overweight and obesity. This places more, not less, urgency on Maltese policy-makers when compared to those in larger countries, to prioritise any means of remedial action through strategies known to positively impact children's health, like structured PA programmes and sport participation. A socioeconomic component to PA and sport participation only serves to worsen the broader effects of SES exerts on precipitating adverse health outcomes (Cuschieri et al., 2017).

Questions

Various Maltese researchers have observed effects on health along geographical lines, with traditionally low-income areas being associated with increased incidence of adverse health outcomes including overweight and obesity (Aquilina et al., 2019; Camilleri et al., 2010; Cuschieri 2020; Grech et al., 2017). If SES and obesity are correlated, and obesity in turn predicts a decreased likelihood of participating in sport, then existing studies collectively support the existence of a direct link between SES and sports participation, even though such a

link has not been awarded due direct attention by researchers. Our primary aim was to investigate and explain such a relationship quantitatively. In an influential local study, Decelis et al. (2014) used an ANCOVA (Analysis of Covariance) model in their study of screen time and obesity, with SES included as a covariate. In other words, the primary relationship between screen time and obesity was analysed, while statistically controlling for SES. Since covariates are typically selected because they correlate with a principal outcome of interest, the Decelis et al. study serves as additional evidence for SES as a significant factor affecting health-related behaviours among Maltese children, even though this was not the focus of their study. In the present study, therefore, SES was considered as a primary factor in its own right. Impelled by the problems of prevalent overweight and obesity in the relatively small Maltese population, an ever-diminishing pool of potentially successful sports performers, and other nuances highlighted in the local and international literature, we sought to address the following questions:

1) How does SES correlate with sports participation in Maltese children?

2) How does mother's full-time working status affect children's PA?

3) How does SES interact with awareness of SportMalta and sport participation?

4) How does sport participation vary by sex in Maltese children?

Methods

The study took the form of a cross-sectional short survey. Ethical approval was given by the institutional review board at the Malta College of Arts, Science & Technology in December 2022, with the data collection period subsequently spanning the months of January and February 2023. An online questionnaire was developed as the main instrument using *Google Forms*.

Data Collection

Table 1. The main constructs and accompanying questionnaire items, as well as how these were coded and operationalised as the main variables driving the study.

Variable		***Measurement***
	Socioeconomic status	
INCOME	Highest household income	Multiple choice for yearly income brackets in thousands of Euros up to 1, 10, 15, 20, 30, 40, 50, 60 (Mid-point of each category was taken to treat data on the scale level)
EQF	Highest household education level (EQF)	Multiple choice (EQF levels 2 to 8)
LOCALITY	Region of residence	Dummy code (*Southern Harbour* or *South Eastern* or *Gozo & Comino* region = 0, Other = 1) *
	Sport participation	
SPORTFREQ	Frequency of sport participation	Multiple choice (Sessions per week 0 to 7) **
FOOTBALL	Attends football	Dummy code (Yes = 1, No = 0) ***
DANCE	Attends dance	Dummy code (Yes = 1, No = 0) ***
GYM	Attends gymnastics	Dummy code (Yes = 1, No = 0) ***
	Physical activity level	
PA	Parental assessment of physical activity lifestyle status	Four-point linear scale (Sedentary = 0, Light Activity = 1, Moderate Activity = 2, High Activity = 3) **
PAFAM	Time spend physically active together as a family	Multiple choice by 60-minute brackets up to 60, 120, 180, 240, 360 (Highest value of each category taken to treat data on the scale level)
	Body Mass Index	
BMI	*Estimated BMI*	Self-reported Weight / Self-reported Height^2 **
	Mother's Employment Status	
FULLTIME	Mother in full-time employment	Dummy code (Yes = 1, No = 0)
	National Sports Programme Awareness	
SPORTMALTA	Familiarity with "Sport Malta"	Five-point linear scale, single item
	Sex of Child	
SEXofCHILD	Reported sex of child	Dummy code (Female = 1, Male = 0)

*Notes: * Among the six official regions of Malta according to national statistics, these were the regions associated with lower general socioeconomic status. ** Measure averaged by household to adjust for multiple children. *** Dummy variables created post hoc based on emerging three most popular sports.*

Participation in sport was measured by frequency of sessions per week, per child. Estimated BMI was taken as a metric for added context in understanding children's health-related behaviours and extrapolated from self-reported height and weight values in *m* and *kg*, respectively. These items were accompanied by instructions for obtaining accurate height and weight measurements to encourage parents to provide quality data. SES was taken as a combination of income and education level as in similar studies (Tandon et al., 2012; Yang et al., 1996). These were taken as distinctive variables and hypothesised about separately. Indeed, residence in the national districts with lower SES was also taken as a socioeconomic marker more generally. Household income was solicited using a dropdown menu consisting of the income categories indicated in Table 1. These data were then transformed into a scale variable by taking the mid-point of each selected category. The remaining variables were operationalised as indicated in Table 1 and included in the hypotheses shown in Table 2. A total of 117

responses were received, although 21 rows in the final data set had to be deleted due to missing or corrupted data points, resulting in a final total sample size of $N = 96$ parents each representing a single household. The average number of children per household was 1.51 (Mode = 1), translating to a total of $N = 147$ children between the ages of 5 and 16 years ($M = 9.96$, $SD = 3.23$), 75 of whom (51%) were female. Only 3 of the 96 participating parents/guardians completing the questionnaire were male. They were included in all hypotheses except for those concerning full-time working status of mothers. The mean age of participating parents was 39.83 years ($SD = 5.55$).

Grech et al. (2017) and Aquilina et al. (2019) showed that approximately 40% of Maltese children aged approximately 5 to 17 are obese. Only 19 (12.9%), however, of the children in the present study had an estimated BMI of 25 or more, showing that the sample systematically differed from the general population. Furthermore, mean income of the highest earner in each participating household was €32,580 ($SD = 15,449$, *Median* = 35,000), meaning the sample was representative of relatively high SES in terms of income when compared to the nationwide average annual salary of €19,594 according to latest estimates from the National Statistics Office (NSO, 2021). The median education status of EQF 6 also meant that the sample consisted of a high degree of parents with a graduate level of education. A majority of the participants were resident in the Western, Northern and Northern Harbour regions, which have been associated with higher SES among the six national districts of Malta according to regional income, unemployment, risk of poverty, crime rates, and average property prices (Muscat-Inglott, 2021).

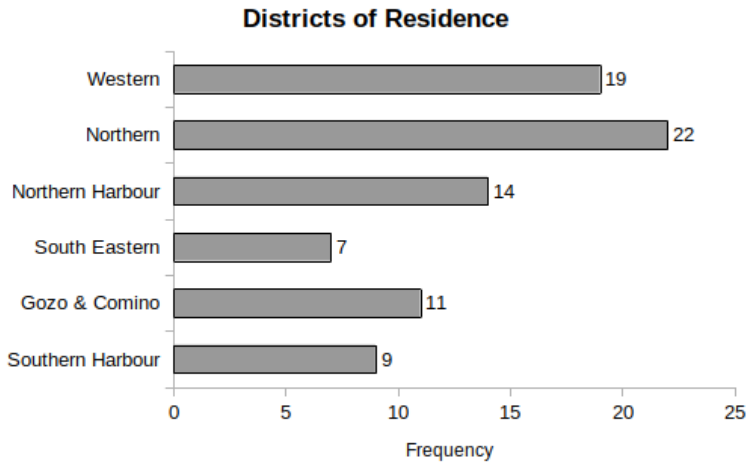

Figure 1. Distribution of parents across the six districts, ordered according to their SES.

The sampling process therefore favoured not only parents of relatively high SES, but also those households biased in favour of sport and physical activity participation, since only 12 (12.5%) of the respondents reported no sport participation. The convenience sampling strategy likely led to an increased number of respondents with existing interest in health, physical and sport, given the advertised topic. The perspectives of families' representative of lower levels of physical activity and sport participation were thereby excluded. Collins & Buller (2003) reported the same phenomenon based on their use of social media for sampling in a study on SES and sport participation, reporting a majority of respondents from middle class and relatively affluent households. These deviations from expectations, given known national norms, ultimately suggest that the sample was above average in terms of SES, and biased in favour of sports participation. Nevertheless, the study was predicated on the assumption that within group differences and variations in sport participation in the sample might yield interesting findings with respect to the hypotheses outlined in Table 2. In terms of quantiles, it should be noted that 25% of the participants reported highest annual household earnings of €25,000, and 10% reported earning less than €17,750, indicating that sufficient data were included to make inferences dependent on variations on SES, accounting for income brackets that were on par with the national average or lower.

Data analysis

Highest household income and educational level were taken as the main scale variable measures of SES, and the primary explanatory factors of interest in the study. The distribution of these data was therefore examined using a visual inspection of the histograms and the Kolmogorov-Smirnov test statistic.

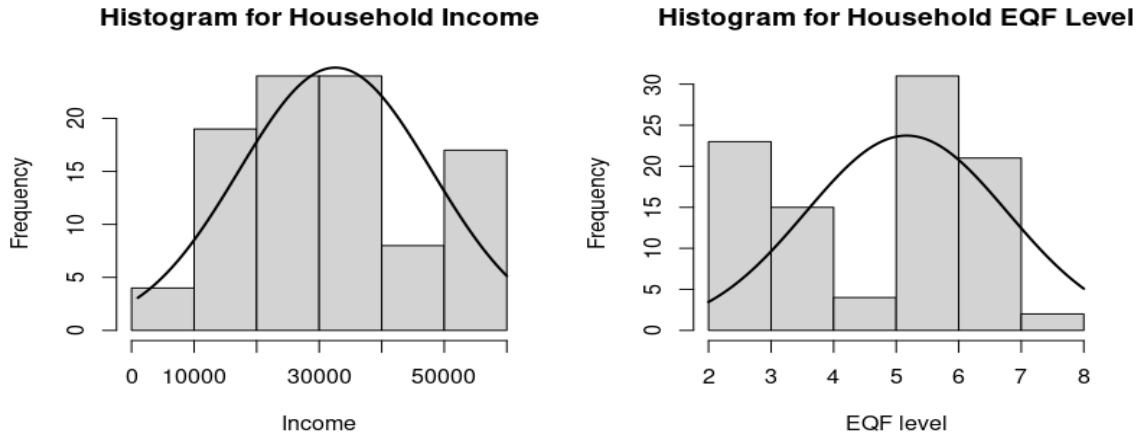

Figure 2. Histograms showing non-normal distributions of household income and education level.

Table 2. All hypotheses and statistical procedures.

Hypothesis	***Shorthand Interaction***	***Null***	***Statistical procedure***
H_{1a}	SPORTFREQ by INCOME	There is no relationship between household income and frequency of sport participation	Spearman rank correlation
H_{1b}	SPORTFREQ by EQF	There is no relationship between household educational level and frequency of sport participation	Spearman rank correlation
H_{1c}	SPORTFREQ by LOCALITY	Frequency of sport participation does not vary according to residence in districts of traditionally low or high socioeconomic status	Wilcoxon rank sum (Mann Whitney)
H_{1d}	INCOME by FOOTBALL, DANCE, GYM	The mean income is equal in each sport	95% Confidence Intervals *
H_{2a}	PA by INCOME	There is no association between household income and children's physical activity status	Spearman rank correlation
H_{2b}	PA by EQF	There is no association between household educational level and children's physical activity status	Spearman rank correlation
H_{2c}	PAFAM by INCOME	There is no association between household income and physical activity participation as a family	Spearman rank correlation
H_{2d}	PAFAM by EQF	There is no association between household educational level and physical activity participation as a family	Spearman rank correlation
H_{3a}	BMI by INCOME	There is no association between household income and BMI	Spearman rank correlation
H_{3b}	BMI by EQF	There is no association between household educational level and BMI	Spearman rank correlation
H_{4a}	SPORTFREQ by FULLTIME	Frequency of sport participation does not vary according to mother's full-time work status	Wilcoxon rank sum (Mann Whitney)
H_{4b}	PA by FULLTIME	Physical activity levels do not vary according to mother's full-time work status	Wilcoxon rank sum (Mann Whitney)
H_{4c}	PAFAM by FULLTIME	Physical activity participation as a family does not vary according to mother's full-time work status	Wilcoxon rank sum (Mann Whitney)
H_{4d}	BMI by FULLTIME	BMI does not vary according to mother's full-time work status	Wilcoxon rank sum (Mann Whitney)
H_{5a}	SPORTFREQ by SPORTMALTA	There is no association between frequency of sport participation and awareness of Sport Malta	Spearman rank correlation
H_{5b}	INCOME by SPORTMALTA	There is no association between household income and awareness of Sport Malta	Spearman rank correlation
H_{6a}	SPORTFREQ by SEXofCHILD	Frequency of sport participation does not vary according to sex of child	Wilcoxon rank sum (Mann Whitney)
H_{6b}	PA by SEXofCHILD	General physical activity levels do not vary according to ses of child	Wilcoxon rank sum (Mann Whitney)
H_{6c}	BMI by SEXofCHILD	BMI does not vary according to sex of child	Wilcoxon rank sum (Mann Whitney)

*Notes: * Confidence intervals were selected over the Kruskal Wallis test since the sport categories were not mutually exclusive, with several sports represented in some individual households with more than one child.*

The data for maximum household income ($D = 1$, $p < .001$), and maximum household education level ($D = .98$, $p < .001$), were deemed to be not normally distributed. Based also on the use of single-item ordered, and Likert data for the main variables of interest, non-parametric statistical

procedures were chosen for more robust results. The selected statistical procedures are shown in conjunction with all hypotheses in Table 2. The data were downloaded from *Google Forms*, cleaned and coded numerically using *LibreOffice*, and finally imported into *RStudio (v2022.07.2)* open-source statistical analysis software, running on a *Linux* open-source operating system. The hypotheses are shown in abbreviated, schematic form in Table 2, and elaborated logically in the results section.

Results

Table 3. Descriptive statistics for main variables.

Variable	*Median*	*Mean*	*SD*	*Frequency*	*Proportion*	*95% CI*
INCOME	35000	32581	15449	NA	NA	29450, 35711
EQF	6	5.17	1.61	NA	NA	4.85, 5.49
LOCALITY	0	.28	NA	27	.28	.19, .38
SPORTFREQ	2	2.16	1.47	NA	NA	1.87, 2.46
FOOTBALL	0	.36	NA	35	.36	.27, .47
DANCE	0	.22	NA	21	.22	.14, .31
GYM	0	.17	NA	16	.17	.10, .26
PA	2	2.10	0.74	NA	NA	1.94, 2.25
PAFAM	60	87.50	43.46	NA	NA	78.70, 96.30
BMI	18.14	19.75	5.44	NA	NA	18.65, 20.85
FULLTIME	1	.72	NA	69	.72	.62, .81
SPORTMALTA	0	.13	NA	12	.13	.07, .21
SEXofCHILD	1	.51	NA	75	.51	.43, .59

Table 4. Hypothesis testing results

Hypothesis	*Shorthand Interaction*	*Test statistic and significance*
H_{1a}	SPORTFREQ by INCOME	r_s = .26, p = .01 *
H_{1b}	SPORTFREQ by EQF	r_s = .24, p = .02 *
H_{1c}	SPORTFREQ by LOCALITY	W = 1023.5, p = .45
H_{1d}	INCOME by FOOTBALL, DANCE, GYM	(*Results in Table 6*)
H_{2a}	PA by INCOME	r_s = .03, p = .74
H_{2b}	PA by EQF	r_s = .03, p = .77
H_{2c}	PAFAM by INCOME	r_s = .29, p < .01 **
H_{2d}	PAFAM by EQF	r_s = .23, p = .02 *
H_{3a}	BMI by INCOME	r_s = -.22, p = .03 *
H_{3b}	BMI by EQF	r_s = -.19, p = .07
H_{4a}	SPORTFREQ by FULLTIME	W = 957, p = .46
H_{4b}	PA by FULLTIME	W = 957, p = .44
H_{4c}	PAFAM by FULLTIME	W = 746, p = .21
H_{4d}	BMI by FULLTIME	W = 879, p = .95
H_{5a}	SPORTFREQ by SPORTMALTA	r_s = -.21, p = .04
H_{5b}	INCOME by SPORTMALTA	r_s = -.24, p = .02
H_{6a}	SPORTFREQ by SEXofCHILD	W = 3616, p < .001***
H_{6b}	PA by SEXofCHILD	W = 3200, p = .02*
H_{6c}	BMI by SEXofCHILD	W = 2697, p = .89

*Notes: * Denotes significance at the 95% confidence level, ** at 99%, and *** at 99.9%.*

On the interaction between SES, sport participation, PA and BMI

The children sampled attended an average of 2.16 sessions of organised sport per week (*Median* = 2, *SD* = 1.47). The most popular sports were football, dance and gymnastics, distributed by sex as shown in Table 5. An overwhelming preference for football in boys, and dance or gymnastics in girls was evident. In terms of income, SES did not vary across the particular sporting disciplines selected in the households sampled (Table 6).

Table 5. Sex differences as they emerged in the three most frequently cited organised sport disciplines.

	Female	***Male***
Football	3 (4%)	40 (56%)
Dance	26 (35%)	0
Gymnastics	18 (24%)	0
Other	28 (37%)	32 (44%)

Table 6. Highest household earnings by household, according to formal sports practiced by at least one child in that household (H_{1d}).

Sport	***n***	***Mean***	***95% Confidence Interval***
Football	35	32,553	27,965 - 35,142
Dance	21	33,480	29,842 – 37,118
Gymnastics	16	34,109	30,652 – 37,567
All	96	32,581	29,450 - 35711

With respect to H_{1a} and H_{1b} concerning the main effect of SES on sport participation overall as per the main aim of the study, the evidence suggests a statistically significant, yet relatively mild effect. This was the case both in terms of highest household income (r_s = .26, p = .01), as well as highest household education level (r_s = .24, p = .02). The findings support the emerging consensus in the literature that SES is significantly associated with inactivity and adverse health outcomes more generally, both at the local and international levels (Aquilina et al., 2019; Camilleri et al., 2010; Cuschieri 2020; Grech et al., 2017; Stalsberg & Pedersen, 2010). Squaring the correlation coefficient yields an R^2 value of .07 for income, and .06 education level. This means that, according to our findings, SES explains between 6% and 7% of the total variation in frequency of sport participation among Maltese children. Residents in the areas associated with lower SES, however, did not report significantly lower sports participation in their children (W = 1023.5, p = .45). This is not necessarily surprising, given that the sample was reflective of relatively high SES overall, meaning that expected variations in SES *within*

each district likely resulted in a bias towards atypical households in poorer areas, with significantly higher SES than respective district norms.

With respect to H_{2a} and H_{2b}, SES was not associated with general PA levels. In other words, however active parents generally rated their children to be, did not appear influenced by their SES. In terms of both income ($r_s = .29$, $p < .01$) and education level ($r_s = .23$, $p < .02$), however, a significant relationship did emerge between SES and amount of PA performed together as a family (H_{2c} and H_{2d}). The higher the SES according to both metrics, the more likely children were to engage in PA together with their parents and siblings. With respect to H_{3a} and H_{3b}, there was an association between estimated BMI and income ($r_s = -.22$, $p = .03$), but not education level ($r_s = -.19$, $p = .07$). To put the above associations, or lack thereof, in further context, Table 7 shows a complete correlation matrix for the main variables and their covariance.

Table 7. Correlation matrix for main variables with Spearman rank correlation coefficients and significance values.

	INCOME	***EQF***	***SPORTFREQ***	***PA***	***PAFAM***
EQF	$r_s = .45$ $p < .001$***				
SPORTFREQ	$r_s = .26$ $p = .01$*	$r_s = .24$ $p = .02$*			
PA	$r_s = .03$ $p = .74$	$r_s = .03$ $p = .77$	$r_s = .43$ $p < .001$***		
PAFAM	$r_s = .29$ $p < .01$**	$r_s = .23$ $p = .02$*	$r_s = .12$ $p = .25$	$r_s < .01$ $p = .98$	
BMI	$r_s = -.22$ $p = .03$*	$r_s = -.19$ $p = .07$	$r_s = .04$ $p = .66$	$r_s = -.14$ $p = .17$	$r_s = .05$ $p = .64$

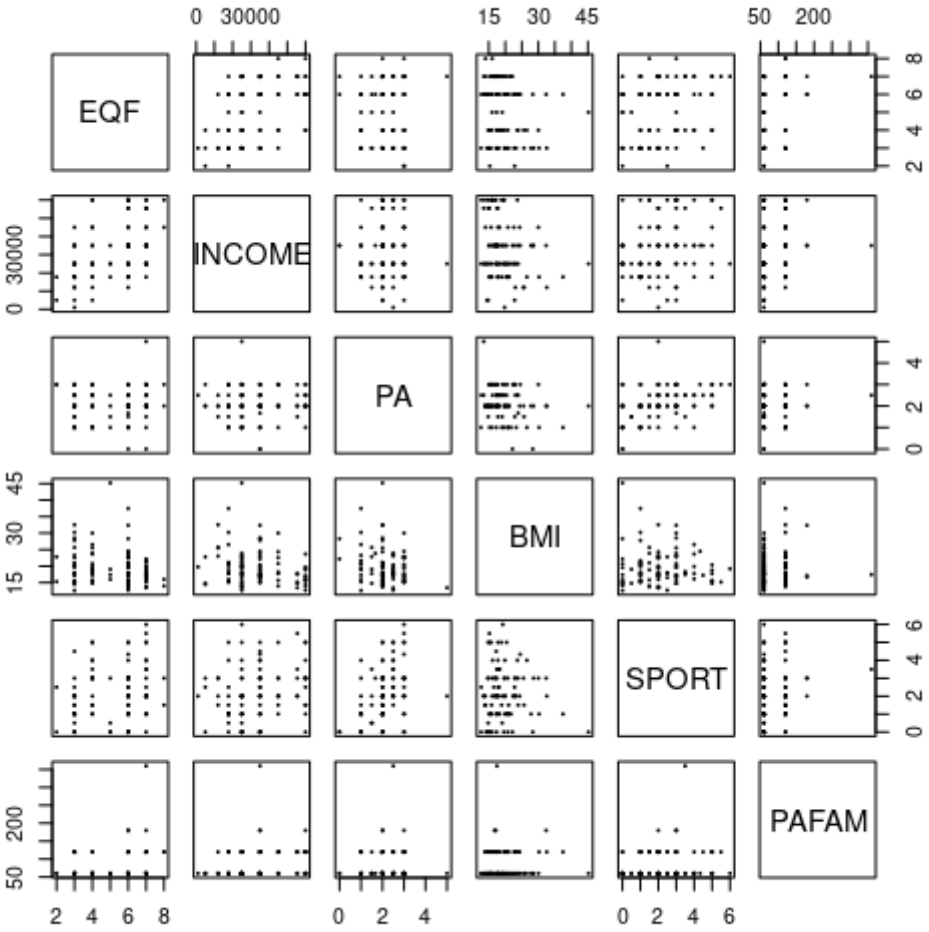

Figure 3. Scatter plot matrix for main variables.

The moderately strong correlation between sport participation and PA (r_s = .43, p < .001) suggests that, at least in affluent Maltese families, sport participation accounts for a majority of childen's PA. Income was the strongest predictor of estimated BMI, more so than sport participation or general PA. The claim that income predicts BMI but not PA (r_s = .03, p = .74), combined with a lack of direct association between sport participation and BMI (r_s = .04, p = .66), precipitates the involvement of absent yet key extraneous variables, likely to include healthy eating as a key absent component, estimation of which lay beyond the scope of the present study. Indeed, Cauchi et al. (2015) attributed Malta's obesity rates to limitations in infrastructure for physical activity combined with an energy-dense food supply. Pereira-da-Silva et al. (2016) further pointed out that the effects of unhealthy eating on the prevalence of obesity was exacerbated by SES, at least in the form of education level, providing further evidence of the multifaceted influence SES appears to have on children's health in Malta.

Furthermore, the effects of income on sport participation (r_s = .26, p = .01) and family PA (r_s = .29, p < .01) appear to be independent, given that sport participation and family PA are not in themselves directly correlated (r_s = .12, p = .25). This suggests that families representative of higher SES engage in either one or the other, being more likely, either way, to demonstrate attribution of value to the general principle of active living, corroborating a long-standing relationship discussed in the literature between SES and health in children (Bradley & Corwyn, 2002; Chen et al., 2006; Curry & Goodman, 2020; Hanson & Chen, 2007). Azevedo (2021) showed, among a sample of white and blue collar workers, that the blue collar workers were more active during work time in their roles on the factory floor, while the white collar workers engaged in predominantly office-based roles, were more active in their leisure time. It stands to reason that more physically active work would necessitate physical rest outside of work hours, while being "cooped up" in the office would contrarily engender more active forms of recreational leisure. Assuming Maltese parents with lower incomes are working more physically active jobs, then awareness of such a trend may help all parents to recognise that their leisure choices have a significant impact on their children's PA, and by extension more generally, on their general health.

On the full-time working mothers, Sport Malta, and gender norms

A total 69% of mothers (n = 64) declared they were in full-time employment. Test statistics for hypotheses H_{4a}, H_{4b}, H_{4c} and H_{4c} concerning the influence of full-time work status of mothers on children's activity did not yield any statistically significant results. If a mother works full-time, therefore, the evidence does not suggest children's activity is affected in any way, neither positively nor negatively. More research is needed, however, given that such a relationship is likely complex. Buehler and O'Brien (2011) showed, for instance, that mothers working part-time (as opposed to full-time or being unemployed), engaged in more effective parenting at least from a psychological perspective. Brown et al. (2010) also found a mild correlation between mother's working hours and children's weight, suggesting that more work is not necessarily a positive factor in promoting children's general health.

Only 13% (n = 12) of the respondents were familiar with SportMalta as an organisation. With respect to H_{5a} and H_{5b}, familiarity with SportMalta was inversely correlated with frequency of sport participation (r_s = -.21, p = .04), as well as income (r_s = -.24, p = .02). The higher the participation of children in sport within the sampled households, the less likely parents were to be familiar with SportMalta. The inverse correlation with income further suggests that more affluent families are less likely to make use of the services offered by SportMalta. These

relationships can also be interpreted such that *lower* income families are *more* likely to be familiar with SportMalta, which generally supports the stated goals of the organisation to promote sport for all. To properly substantiate this claim, however, more research is needed specifically on populations representing lower SES.

The final set of hypotheses were designed to explore if sport participation, PA and BMI vary according to the stated sex of Maltese children. The evidence (for H_{6a}, H_{6b} and H_{6c}) supported the existence of a gender difference among Maltese children, most notably in their participation in sport (W = 3616, p < .001), and their general PA levels (W = 3200, p = .02). No evidence emerged in favour of any association between sex and estimated BMI. Table 8 shows the mean values of the three main outcomes organised by sex, including the effect sizes. The results generally support previous claims by Decelis et al. (2014), and show that boys, on average, engage in more PA (via sport) than girls, approximately by one more session per week (r_s = -.28, p < .001). They are also marginally more likely to be assessed as active by their parents (r_s = -.17, .02). This finding supports the general assertion that sport participation in Malta indeed faces systematic exclusionary forces serving ultimately to exert a negative effect on both level of competitive sporting success, and public health outcomes more generally.

Table 8. Mean values for main outcomes by sex of child

Outcome	***Female***	***Male***	***Difference (Effect Size)***
SPORTFREQ	1.87 (1.60)	2.85 (1.68)	0.98 (d = 0.59, r = -.28)
PA	2 (0.90)	2.28 (0.72)	0.28 (d = 0.34, r = -.17)
BMI	19.59 (4.87)	20.13 (6.32)	*Not significant*

Conclusion

This study was based on self-reported questionnaire data. Particularly in the case of estimated BMI, which was calculated using reported height and weight, precision was necessarily compromised. All results pertaining to estimated BMI should therefore be interpreted in this light, even though BMI was not the primary focus of the study. Non-parametric procedures were selected to add robustness to resulting statistical claims. Parametric procedures, on the other hand, would have permitted more nuanced statistical analyses, as well as the possibility to statistically control for additional variables. Future research might curtail issues of precision in both measurement and analysis, through more specialised field measurements of children's BMI, fitness, or participation in sport through primary attendance data rather than self-report, in conjunction with more powerful parametric statistical approaches like general linear

modeling, or structural equation modeling. Nevertheless, the present study sought to explore and posit general trends, and ultimately encourage more sociological research in Maltese sport and exercise for health. Most importantly, it aimed to encourage more acknowledgement of SES as an important factor affecting sport and PA outcomes in Malta. In this sense, we offer the following conclusions for consideration by policy-makers, stakeholders, and researchers.

The findings support the main hypothesised relationship between SES and participation in organised sports in Malta. Our evidence suggest that SES exerts a statistically significant effect on sports participation among Maltese children (p = .02), and more specifically, that SES explains up to 7% of the variation in sports participation (R^2 = .07). This is disconcerting, both in terms of potential improvements in international sports performance, given the diminishing effect of exclusionary practices on the pool of available talent, as well as in terms of adverse health outcomes more generally associated with lowered childhood PA. An association between SES and sport participation in the context of widening global wealth and income inequality, moreover, increases the risk that practicing sport may become the sole reserve of an ever-shrinking, increasingly privileged, minority segment of the population. The findings also show that households representative of higher SES are more likely to engage in PA together as a family (p = <.01), further rendering SES and class as important factors in the development of unequal access to PA more generally. In terms of work and leisure choices among parents, the findings also showed that full-time work status among mothers had no effect on sport participation, general PA or estimated BMI.

An inverse correlation between SES and sport participation renders SportMalta a crucial means of access and promotion of sport for all. The findings indeed suggest that use of their services inversely correlates with income (p = .02). SportMalta shoulder heightened responsibility, in this sense, to ensure children attending their programmes are afforded the same quality of service and opportunities enjoyed by children of higher SES practicing sport elsewhere. And finally, the findings show that boys engage in more sports activity than girls in Malta (p < .001). The effect size was relatively mild (r_s = -.32), equivalent to approximately one extra session of sport per week. In conclusion, the study provides impetus for the timely acknowledgment that SES affects sport participation as an important component of overall PA in Malta. In the interests of long-term improvement in sports performance on the international stage, as well as in the interests of cultivating a stronger culture for healthier and more active Maltese children and youths, more inclusive sports and PA participation infrastructures and policies are needed,

combined with additional research on existing exclusionary practices in Maltese sport and PA from the sociological perspective.

Author Contribution

Stephania Dimech (Conceptual framework, data collection, revisions), Matthew Muscat-Inglott (Conceptual framework, data analysis, write-up, revisions)

Conflict of Interest

We declare no conflicts of interest.

Ethical Statement

Ethical review was carried out by the Institutional Review Board at the Institute of Community Services, Malta College of Arts, Science & Tecnology.

References

Aquilina, S., Camilleri, E., Spiteri, K., Busuttil, M. L., Sant-Angelo, V. F., Calleja, N., & Grech, V. (2019). Regional differences in Childhood BMI data-The Malta Childhood National Body Mass Index Study. *Malta Medical Journal*, *31*(3), 24-29.

Azevedo, L. M., Chiavegato, L. D., Carvalho, C. R., Braz, J. R., Nunes Cabral, C. M., & Padula, R. S. (2021). Are blue-collar workers more physically active than white-collar at work?. *Archives of Environmental & Occupational Health*, *76*(6), 338-347.

Bhurosy, T., & Jeewon, R. (2014). Overweight and obesity epidemic in developing countries: a problem with diet, physical activity, or socioeconomic status? [online] *The Scientific World Journal, 14*(1).

Book Jr, R. T., Henriksen, K., Stambulova, N., & Storm, L. K. (2022). "All they have seen is a model for failure:" Stakeholder's perspectives on athletic talent development in American underserved communities. *Journal of Applied Sport Psychology*, *34*(6), 1037-1057.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, *53*(1), 371-399.

Brown, J. E., Broom, D. H., Nicholson, J. M., & Bittman, M. (2010). Do working mothers raise couch potato kids? Maternal employment and children's lifestyle behaviours and weight in early childhood. *Social science & medicine*, *70*(11), 1816-1824.

Buehler, C., & O'Brien, M. (2011). Mothers' part-time employment: associations with mother and family well-being. *Journal of family psychology*, *25*(6), 895.

Cairney, J., & Veldhuizen, S. (2017). Organized sport and physical activity participation and body mass index in children and youth: A longitudinal study. *Preventive medicine reports*, *6*, 336-338.

Camilleri, N., Grech, A., & Taylor, R. (2010). Socio-economic status and population density risk factors for psychosis: prospective incidence study in the Maltese Islands. *International Psychiatry*, *7*(3), 69-71.

Cauchi, D., Rutter, H., & Knai, C. (2015). An obesogenic island in the Mediterranean: mapping potential drivers of obesity in Malta. *Public health nutrition*, *18*(17), 3211-3223.

Chen, E., Martin, A. D., & Matthews, K. A. (2006). Socioeconomic status and health: do gradients differ within childhood and adolescence?. *Social science & medicine*, *62*(9), 2161-2170.

Collins, M. F., & Buller, J. R. (2003). Social exclusion from high-performance sport: Are all talented young sports people being given an equal opportunity of reaching the Olympic podium?. *Journal of Sport and Social Issues*, *27*(4), 420-442.

Currie, J., & Goodman, J. (2020). Parental socioeconomic status, child health, and human capital. In *The economics of education* (pp. 239-248). Academic Press.

Cuschieri, S., Vassallo, J., Calleja, N., Pace, N., & Mamo, J. (2017). The effects of socioeconomic determinants on hypertension in a cardiometabolic at-risk European country. *International journal of hypertension*, *2017*.

Cuschieri, S. (2020). The characteristics of an obesogenic small European country: results from a Malta cross-sectional study. *Perspectives in Public Health*, *140*(6), 327-337.

Decelis, A., Jago, R., & Fox, K. R. (2014). Physical activity, screen time and obesity status in a nationally representative sample of Maltese youth with international comparisons. *BMC public health*, *14*(1), 1-11.

EIGE (2020). Gender equality index: Malta. *European Institute for Gender Equality [online]*. Available at: https://eige.europa.eu/publications/gender-equality-index-2020-malta

Grech, A., Toering, T., & Collins, D. (2022). The fairy tale of Maltese professional sport: Exploring obstacles and hindrances in local elite sport development. *MCAST Journal of Applied Research & Practice*, *6*(3), 53-72.

Grech, V., Aquilina, S., Camilleri, E., Spiteri, K., Busuttil, M. L., Sant'Angelo, V. F., & Calleja, N. (2017). The Malta childhood national body mass index study: a population study. *Journal of Pediatric Gastroenterology and Nutrition*, *65*(3), 327-331.

Hanson, M. D., & Chen, E. (2007). Socioeconomic status and health behaviors in adolescence: a review of the literature. Journal of behavioral medicine, 30, 263-285.

Hemmingsson, E., & Ekelund, U. (2007). Is the association between physical activity and body mass index obesity dependent?. *International journal of obesity*, *31*(4), 663-668.

Hills, A. P., Andersen, L. B., & Byrne, N. M. (2011). Physical activity and obesity in children. *British journal of sports medicine*, *45*(11), 866-870.

Lee, J. E., Pope, Z., & Gao, Z. (2018). The role of youth sports in promoting children's physical activity and preventing pediatric obesity: a systematic review. *Behavioral Medicine*, *44*(1), 62-76.

Li, C., Wang, C. J., & Pyun, D. Y. (2014). Talent development environmental factors in sport: A review and taxonomic classification. *Quest*, *66*(4), 433-447.

Lioret, S., Maire, B., Volatier, J. L., & Charles, M. A. (2007). Child overweight in France and its relationship with physical activity, sedentary behaviour and socioeconomic status. *European journal of clinical nutrition*, *61*(4), 509-516.

McGovern, J. (2021). The intersection of class, race, gender and generation in shaping Latinas' sport experiences. *Sociological Spectrum*, *41*(1), 96-114.

McVeigh, J. A., Norris, S. A., & De Wet, T. J. A. P. (2004). The relationship between socio-economic status and physical activity patterns in South African children. *Acta Paediatrica*, *93*(7), 982-988.

Muscat-Inglott, M. (2021). Curricular brood parasitism in Malta: An empirical study of vocational education and the reproduction of social inequality. *The SOJO Journal: Educational Foundations and Social Justice Education*, *7*(2), 53-66.

Muscat-Inglott, M. & Vella White, C. (2021). Factors influencing Maltese international sports performance in the pan-European and microstate contexts: An empirical study. *MCAST Journal of Applied Research & Practice*, *5*(2), 43-57.

NSO (2021). Regional statistics Malta 2021 edition – The Maltese National Statistics Office [online]. Available at: https://nso.gov.mt/en/nso/Media/Salient-Points-of-Publications/Pages/2021/Regional-Statistics-MALTA-2021-Edition.aspx

Pereira-da-Silva, L., Rêgo, C., & Pietrobelli, A. (2016). The diet of preschool children in the Mediterranean countries of the European Union: A systematic review. *International journal of environmental research and public health*, *13*(6), 572.

Piketty, T., & Saez, E. (2014). Inequality in the long run. *Science*, *344*(6186), 838-843.

Rauner, A., Mess, F., & Woll, A. (2013). The relationship between physical activity, physical fitness and overweight in adolescents: a systematic review of studies published in or after 2000. *BMC pediatrics*, *13*, 1-9.

Rowley, S. R., & Graham, P. J. (1999). Intensive training in youth sport: An example of unequal opportunity. *Children & society*, *13*(2), 119-129.

Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., & Bhadoria, A. S. (2015). Childhood obesity: causes and consequences. *Journal of family medicine and primary care*, *4*(2), 187.

Salmon, J., Timperio, A., Cleland, V., & Venn, A. (2005). Trends in children's physical activity and weight status in high and low socio-economic status areas of Melbourne, Victoria, 1985–2001. *Australian and New Zealand journal of public health*, *29*(4), 337-342.

SportMalta (2021). SportMalta launches #onthemove programme and #beactive campaign [online]. Available at: https://sportmalta.mt/sportmalta-launches-onthemove-programme-and-beactive-campaign/

Stalsberg, R., & Pedersen, A. V. (2010). Effects of socioeconomic status on the physical activity in adolescents: a systematic review of the evidence. *Scandinavian journal of medicine & science in sports*, *20*(3), 368-383.

Sulemana, H., Smolensky, M. H., & Lai, D. (2006). Relationship between physical activity and body mass index in adolescents. *Medicine and Science in Sports and Exercise*, *38*(6), 1182-1186.

Tandon, P. S., Zhou, C., Sallis, J. F., Cain, K. L., Frank, L. D., & Saelens, B. E. (2012). Home environment relationships with children's physical activity, sedentary time, and screen time by socioeconomic status. *International journal of behavioral nutrition and physical activity*, *9*(1), 1-9.

Vella, S. A., Cliff, D. P., Okely, A. D., Scully, M. L., & Morley, B. C. (2013). Associations between sports participation, adiposity and obesity-related health behaviors in Australian adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 1-9.

Wilson, D. K., Kirtland, K. A., Ainsworth, B. E., & Addy, C. L. (2004). Socioeconomic status and perceptions of access and safety for physical activity. *Annals of Behavioral Medicine*, *28*(1), 20-28.

Yang, X. L., Telama, R., & Laakso, L. (1996). Parents' physical activity, socioeconomic status and education as predictors of physical activity and sport among children and youths-A 12-year follow-up study. *International review for the sociology of sport*, *31*(3), 273-291.

Zucman, G. (2019). Global wealth inequality. *Annual Review of Economics*, *11*, 109-138.