The International Family Affluence Scale (FAS)

Charting 25 Years of Indicator Development, Evidence Produced, and Policy Impact on Adolescent Health Inequalities

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The international Family Affluence Scale (FAS): charting 25 years of indicator development, evidence produced, and policy impact on adolescent health inequalities

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INTRODUCTION

Studies that record the scientific development of a research method, whether a tool or a technique, provide a valuable historical perspective by tracking their evolution including improvements over time, evaluating the use of the method, and informing future development work (Lander, 2016). The premise of this paper is to describe the development of a measure of the socioeconomic status (SES) of adolescents, namely the 'Family Affluence Scale' or 'FAS'. FAS was developed within the 'Health Behaviour in School-Aged Children: WHO Collaborative Cross-National Study' (HBSC) which aims to collect comparative data on adolescent health and its determinants (www.hbsc.org). The HBSC Study currently has 50 member countries, all in the European Region of WHO and North America. This paper charts the development of FAS over time, its use in generating research evidence on adolescent health inequalities, and examples of how this evidence has been used to influence policy for the reduction of these inequalities. This paper uniquely charts the formulation, evolution, and use of an international indicator of adolescent health and its context over time and across countries.

In the last decade, there has been a concerted effort by the global research and policy community to agree on a set of indicators that enable the collection of internationally comparable data on adolescent public health and stimulate investment in this population group worldwide (Azzopardi et al., 2019; Guthold et al., 2019; Newby et al., 2021; Patton et al., 2012). To this end, the need for indicators of morbidity, health and well-being, as well as mortality became clear (Weiss & Ferrand, 2019), along with the requirement to harmonise measurement efforts and improve the quality of adolescent health data (Guthold et al., 2019). Addressing the remit of the Lancet Commission on adolescent health and wellbeing, Patton et al. (2012) produced a set of indicators relevant to adolescent public health, including health outcomes, behaviours, risk and protective factors, as well as health-service policy interventions. Azzopardi et al. (2019) demonstrate the power of such agreed indicators to enable tracking of changes in adolescent population health, which can inform the case for action. Using a set of 12 headline indicators, the latter authors report that from 1990 to 2016, remarkable shifts in adolescent health have occurred. They conclude that 'despite improvements in many settings, the adolescent health challenge is greater today than it was 25 years ago. The case for

comprehensive and integrated investments in adolescent health, growth, and development has never been stronger'.[1]

The work on indicator development has clearly demonstrated how methodological advances enable the production of robust comparable data on adolescent health outcomes that can drive national and international strategic work for prevention and improvement. However, there has been less consideration given to development of international indicators to produce an understanding of adolescent health inequalities across countries (Currie et al., 2008a). Research conducted to examine cross-national socioeconomic inequalities in adolescent health provides evidence that such disparities exist across countries and are increasing in recent times (Elgar et al., 2015). The rarity of studies recording the scientific development of indicators that help us highlight and understand these inequalities is remarkable given their indispensable value as mentioned. In line with the efforts to agree on indicators of adolescent health, behaviour, services and policy, the focus of this paper is to examine the development of the Family Affluence Scale and its use in research and policy.

METHODS

An historical overview of FAS

FAS originated in the national HBSC Study in Scotland based on Carstair's index of deprivation (Carstairs, 1995; Carstairs & Morris, 1991). It measured family wealth based on three items scored as follows: number of telephones in household, coded as 0, 1 or 2+; number of cars in family, coded as 0, 1 or 2+; and having own unshared bedroom, coded as 0 (no) or yes (1). Added together, composite FAS scores ranged from 0 - 4. There was very little missing data (Currie et al., 1997). In addition to being straightforward to answer, young people did not find the questions sensitive and were willing to answer them. The questionnaire responses were used to differentiate groups according to their scores on the three items, and FAS scores significantly correlated with a range of health and behaviour outcomes (Currie et al., 1997).

A number of papers and HBSC research protocols have been published that describe the rationale for developing FAS and its changes over the years from its first inception in the 1990s to the present (Boer et al., 2023; Boyce & Dallago, 2004; Boyce et al., 2006: Currie et al., 1997; 1998; 2000; 2004; 2008a, 2008ab; Hartley et al., 2016; Torsheim et al., 2016). These materials provide information which we drew upon to describe the development of FAS.

Research evidence on FAS-related inequalities

[1] Notably, their analyses were conducted pre-Covid 19 so do not consider adolescent health challenges arising from the pandemic.

We extracted evidence from FAS-based HBSC research and from studies outside of HBSC that used FAS to examine adolescent health inequalities. We used the Web of Science to search for papers published between 1994-2022 with the key words “family affluence scale” and “health”. For research within the HBSC context, we added the key word “HBSC”. We excluded studies if they had a sample other than adolescents and if they were validation studies, studies on the modification or adaptation of FAS, studies that only used FAS as a control variable, studies without detailed information about which version of FAS was used.

FAS based evidence use by policy makers

We conducted semi-structured interviews (Bernard, 2006; Leech, 2002) with a select group of policy makers with experience working with HBSC data to triangulate findings from the reviews of evidence and to begin to understand the role and strategic use of the FAS in the policy world. We used a short introduction and a set of prompt questions to stimulate discussion with participants about their organizational experience with using HBSC data on FAS-related health inequalities (see Appendix 1). We interviewed four policy makers at international agencies that work with data on children and adolescent health (Bakers and Edwards, 2012). We approached one participant at the Organisation for Economic Co-operation and Development (OECD), one participant at the United Nations International Children's Emergency Fund (UNICEF), and two participants at the World Health Organisation (WHO). These three international agencies were utilising many data sources for their strategic work and had collaborated with the HBSC Study in relation to the use of its data. This qualitative work gave a snapshot on the views of policy makers and provides the basis for more detailed, systematic and wide-ranging work in the future to understand the impact of FAS in policy work.

The authors individually read the interview material and collectively identified three main themes – influence, products, and effects. These themes closely relate to the listed questions and were defined in a codebook to allow for independent coding of the interview material. The themes provide a window into the participants understanding of the use of FAS data (Deterding and Waters, 2021). Influence relates to how FAS connects to some activity in the organisation or what FAS has encouraged in the areas of inequalities. Products described strategies, policies, practices, or publications that have drawn on FAS data. Effects referred to examples of what happened in response to their organisation’s use of FAS as well as their individual interpretations of changes in adolescence as seen through the lens of FAS. Key points were extracted and are presented in the Results below.

RESULTS

An historical overview of FAS

FAS was developed in the context of the HBSC Study and over the years has evolved within the study as described below. In the mid-1990s there was a lack of reliable and valid measures to assess the SES of schoolchildren in self-completed surveys. This lack was brought to light within the national HBSC survey in Scotland. Up to that point, the only SES measure used in the HBSC Study was based on a set of questions on parents' occupations. However, responses to these questions produced unreliable data in Scotland with high proportions that could not be coded (Currie et al., 1997). Other countries in the HBSC network reported the same problem with the data produced from questions on parents' occupational status (Currie et al., 1998). There were also variations between countries in the characteristics of the 'missing group'. Another problem with using parental occupation as a measure of SES was the comparability of the standard occupational categories used in different countries. When constructing the international data file for the 1993/94 survey, each country had to condense their categories into three as the lowest common denominator. This led in some cases to ad hoc grouping of categories, and therefore the usefulness of the final index was highly questionable for the purposes of cross-national comparisons of health inequalities.

At a national level, occupational indices were useful both to track demographic change in the population and to understand health variations but there were clearly several important technical problems with international comparability. Nevertheless, some comparative papers included parental occupation to assess SES, excluding countries that had highest levels of missing data on parental occupation; for example, Richter et al. (2009) excluded 7 out of 35 HBSC countries whose missing data was over 15% for parental occupation.

Introduction of FAS to the international HBSC survey and its adaptation

In order to determine appropriate items for a version of FAS that could be utilised cross-nationally, a survey of the national HBSC participating research teams was conducted in 1993/94. This revealed that telephone ownership would not differentiate SES levels in a significant number of countries as access to phone lines was not associated with economic factors. Car and bedroom items were agreed as common items that would differ according to the socioeconomic circumstances of the family and therefore these items were used to construct a four-point (0 – 3) family affluence scale (Currie et al., 1998). The process of testing these components of FAS in the 1993/94 cross-national study is described in detail in the international research protocol for the 1997/98 HBSC Survey (Currie et al., 1998) and summarised in Currie et al. (2008a). Data collected on FAS from the 1993/94 HBSC cross-

national survey of 25 countries in Europe and Canada, revealed a very low percentage of missing values for the car and bedroom items.

The distribution of scores on FAS items showed wide variation across countries, in line with their national economic profiles, indicating the items provided valid measures of family wealth (Boyce et al., 2006). Over time, further changes addressed redundancy of items, leading to the introduction of new items to increase differentiation in FAS scores (Currie et al., 2008a). Following a similar process to that used in the 1993/94 survey, in the 1997/1998 HBSC survey a new item, number of family holidays, was added to the scale (Currie et al., 2000); and in the 2001/2002 HBSC survey an item on the number of family computers was added (Boyce & Dallago, 2004). The 1997/1998 version of FAS was thereafter referred to as FAS-I, including car(s), bedroom and holiday(s); and the 2001/2002 version was referred to as FAS-II, which included FAS-I items plus computer ownership (Currie et al., 2004). A process of critical review of FAS continued after FAS-II came into use and in due course, analyses of international data revealed that FAS-II was no longer discriminatory within richest and poorest countries, where large proportions of children were categorised as high FAS or low FAS respectively (Currie et al. 2008a). It was concluded that a new version of FAS, namely FAS-III, was needed to take account of recent trends in family consumption patterns across the European region, the US and Canada where the HBSC Study is conducted.

FAS-III: a comprehensive review and development process

In 2012/2013, the 'FAS-III Development and Validation Study (DVS)' was undertaken. It involved a comprehensive review and developmental process to produce a new and valid version of FAS, comprising items that reflected market forces, economic trends, technological advances, as well as cultural, social and geographical norms in family consumption patterns across Europe and North America. All 43 HBSC member countries were consulted to generate new candidate items for FAS-III; and a smaller number of countries[2] volunteered for in-depth work, providing geographic and socioeconomic diversity. The Principal Investigators of HBSC member countries were invited to suggest new candidate items to be included in FAS-III, based on their knowledge and expertise about their country and the scientific area. In all, 19 countries, spanning Europe and North America proposed new items. A scan of the literature was also carried out (Hartley et al., 2016) and additional items were added to a running list. Following discussions within the HBSC Social Inequalities Focus Group, an international scientific group with relevant expertise, the list was shortened and sent out to all Principal Investigators for comment. This process produced 12 new items that were tested for inclusion in FAS-III. The suitability of these items was explored with young people both qualitatively and quantitatively. The qualitative research

[2] Denmark, Greenland, Italy, Norway, Poland, Romania, Scotland and Slovakia.

169 took place in Scotland, where resources were available, by means of focus groups and cognitive
170 interviews with 11, 13- and 15-year-old participants from 18 of the most- and the least-
171 economically deprived schools (Hartley et al., 2016). The study attempted to gain some
172 understanding of how these young participants were influenced by their own lived experiences
173 when they responded to items in the survey, and to try to discern the meanings which they
174 intended by their responses. By refining the wording in some items, or even rejecting them, the
175 recommendations sought to minimise ambiguity and subjectivity whenever possible, and to
176 maximise the validity and relevance of the items.
177
178 Apart from dealing with matters of interpretation and conceptual precision, the
179 recommendations were very careful to attend to the sensitivities of young people, particularly
180 with reference to those items that might reinforce or prompt a fuller awareness of poverty and
181 deprivation. These qualitative results, along with findings from the other participant countries
182 were used to inform the final FAS-III recommendations which included the original bedroom,
183 car, computers items and holiday (a revised version of item in FAS-II) items, plus two new
184 items: number of bath/ shower rooms, and whether not there is a dishwasher in the home
185 (Hartley et al., 2016). The quantitative psychometric validation of the revised FAS-III was carried
186 out in a selection of countries that had the capacity to conduct this work. In total of 7120
187 students from Denmark, Greenland, Italy, Norway, Poland, Romania, Scotland and Slovakia,
188 who reported on a list of 16 potential indicators of affluence (i.e., the 4 original FAS-II items
189 plus the 12 newly proposed items) (Torsheim et al., 2016). Responses were subject to item
190 screening and test of dimensionality – see Torsheim et al. (2016) for full details. Findings
191 supported a revision to six items in FAS-III. Table 1 presents a summary of the different versions
192 of FAS, and their component items.

193 **Table 1: Component items (X) of FAS versions used in each HBSC Survey**

Version of FAS and component items included	**FAS (Scotland only; 1990)**	**FAS (international; 1993/94)**	**FAS-I (international; 1997/98)**	**FAS-II (international; 2001/02, 2005/06, 2009/10)**	**FAS-III (International 2013/14, 2017/18, 2021/22)**
Number of telephones in household	X	–	–	–	–
Number of family cars [3]	X	X	X	X	X
Having own bedroom	X	X	X	X	X

[3] vehicles

Version of FAS and component items included	FAS (Scotland only; 1990)	FAS (international; 1993/94)	FAS-I (international; 1997/98)	FAS-II (international; 2001/02, 2005/06, 2009/10)	FAS-III (International 2013/14, 2017/18, 2021/22)
Number of family holidays	_	_	X	X	X
Number of family computers	–	–	–	X	X
Number of bath/shower rooms	–	–	–	–	X
Having a dishwasher	–	–	–	–	X

The most recent HBSC international survey in 2020/21 coincided with the Covid-19 pandemic. A paper examining the resulting changes in distribution and statistical properties of FAS-III has been prepared using survey data gathered before and during the pandemic (Boer et al., 2023). The key finding is that the pandemic had a limited impact on the measurement properties of FAS-III items and the scale is still a reliable measure of inequalities.

FAS has also been adopted as a measure of adolescent SES in other studies outside of HBSC in 12 countries within 7 continents outside of Europe and North America. Evidence generated is described in the Results.

Research evidence on FAS-related health inequalities

Studies from which FAS- related evidence was extracted are detailed in online supplementary Appendices - Appendix 2 includes papers from HBSC study and Appendix 3 includes papers from outside HBSC study.

a) Evidence from the HBSC Study (Supplementary Appendix 2)

The unequal distribution of family material resources, measured by FAS, both within and between HBSC countries, was first presented in the international report from the 2001/02 HBSC survey (Currie et al., 2004). All subsequent international reports have presented FAS- related inequalities in health, health behaviours, risk behaviours and social context across countries/regions (Cosma et al., 2023; Currie et al., 2008b, 2012; Inchley et al., 2016, 2020). There has also been a large number of scientific papers using national and international HBSC data reporting on such associations. Appendix 2 provides an overview of HBSC papers focusing

on the associations between FAS and adolescent health outcomes, health behaviours and the social context of health. While numerous HBSC papers have included FAS as a control variable , and the available evidence on associations between FAS and adolescent health and well-being is, thus, much larger than presented in Appendix 2, the studies listed focused explicitly on FAS as a predictor of adolescent health and well-being.

The papers in the Appendix 2 consistently show FAS to be an important predictor of young people's health and of the quality of social networks that support health. This finding applies to boys and girls and to most countries/regions included in the HBSC network (which spans Europe and North America). To illustrate, adolescents from more affluent families benefit from more supportive social relationships at school (Moor et al., 2014; Pierannunzio et al., 2022) and home (García-Moya et al., 2012), report greater life satisfaction (Pierannunzio et al., 2022; Zaborskis et al., 2022); better subjective health (Ahlborg et al., 2017; Holstein et al., 2009; Moor et al., 2015; Torsheim et al., 2018) and less often report multiple health complaints (Holstein et al., 2009) as compared to adolescents from less affluent families. More affluent adolescents are also more likely to have breakfast and family meals (Elgar et al., 2016), eat fruit and vegetables every day (Elgar et al., 2016; Fismen et al.,2014; Fismen et al., 2016; Rouche et al., 2019; Voráčová et al., 2016), have, in general, better diets (Simon et al., 2018), be more physically active (Belardinelli et al., 2022; Borraccino et al., 2009; Elgar et al., 2016; Pierannunzio et al., 2022; Sigmund et al., 2018; Sigmundová et al., 2019), and less likely to be overweight or obese (Belardinelli et al., 2022; Elgar et al., 2016; Sigmund et al., 2018; 2020). For physical activity, overweight, and psychosomatic complaints, inequalities by family affluence have increased over time (Elgar et al., 2015). School pressure is higher among more affluent adolescents (Moor et al., 2014). Family affluence is predictive of risk behaviours, such as drinking, in an inconsistent manner. For instance, high-affluence adolescents report higher levels of recent drunkenness, but differences are only significant in a minority of countries/regions (Currie et al., 2008b, 2012; Inchley et al., 2016; 2020). And while tobacco use, across countries, has been found to be more prevalent among adolescents from less affluent families (Moor et al., 2015), there are wide variations across countries in the significance and directions of FAS associations with tobacco use (Inchley et al., 2020).

b) Evidence from outside the HBSC Study (Supplementary Appendix 3)

Studies outside of HBSC generally confirm the cross-national study's findings on FAS-related inequalities. They have also dealt with health topics not covered by HBSC. These papers are listed in Appendix 3.

They found that adolescents from more affluent families report higher life satisfaction, better self-rated health (Cho and Khang, 2010; Jeon et al., 2013; Lin, 2011), and higher mental

wellbeing (Davison et al., 2022; Hutton et al., 2014). They also showed the association between poor mental health and lower affluence (Atilola et al. 2013; Lee et al., 2014) but no significant association between FAS and multiple health complaints (Lin, 2011). More affluent adolescents also have overall better eating habits and a healthier lifestyle (Costa-Tutusaus and Guerra-Balic, 2016; Yannakoulia et al., 2016) are more physically active (Lin, 2011; McCormack et al., 2011); are less likely to report overweight or obesity (Duarte-Salles et al., 2009; Rodríguez and Arbinaga, 2019); and have better oral health and oral health-enhancing behaviours (Perera and Ekanayake, 2010). On topics not covered by the HBSC Study, studies report that more affluent adolescents are: at lower risk of social networking sites addiction (Sun et al., 2021); at lower risk of suicidal ideation (Atilola et al. 2013; Lee et al., 2014); at higher risk for allergic diseases (Lee et al., 2016); less likely to eat meat (Davison et al., 2021); and with a lower cardiovascular risk profile (Dathan-Stumpf et al., 2016).

We found some inconsistencies with HBSC which may be related to the different national contexts in which these studies were conducted, for example, high versus low-income countries. For example, reports of risky behaviour such as smoking and drinking seem to follow a diverse socioeconomic pattern across countries. While there is evidence of higher levels of smoking among lower affluent adolescents in research conducted in the United Kingdom (Sweeting et al., 2012), higher levels of smoking are also reported among high affluent adolescents with low perceived socio-economic position in South Korea (Ko et al., 2014). Also, higher risky alcohol consumption is reported among more affluent adolescents in Spain (Obradors-Rial et al., 2018) but there is also evidence of little or no effect of family affluence on adolescent drinking in the United Kingdom (Sweeting et al., 2012). In addition, in South Korea, health compromising behaviours, such as current smoking, consumption of soft drinks, and eating sweets occur among adolescents from both very deprived and very affluent families (Jung et al., 2010).

FAS based evidence use by policymakers

The responses to the short interview questionnaire from stakeholders at WHO, UNICEF and OECD revealed ways in which FAS-related evidence had been influential in strategic work, stimulated debate and discussion internationally and prompted investment and further research. UNICEF said their work using FAS prompted their national partners to make formal inquiry into why children in the UK experience such strikingly low well-being compared to countries with less economic security. The WHO highlighted the role of FAS in the development of the European regional WHO strategy on child and adolescent health (WHO, 2014), and that it featured in a WHO high-level conference on action for health and well-being in the WHO European Region (WHO, 2017). The OECD also highlighted impact on country development of strategies to improve child wellbeing (e.g. Head, 2019). All three organisations have used FAS-

based evidence to lobby for action on adolescent health and highlighted its use in their strategies, reports, data portals, policy tools, and high-level events. FAS was influential in the OECD Health Policy Studies series, e.g. a report on childhood obesity (OECD, 2019), and used as an indicator in the OECD Child Well-Being Data Portal[4]. FAS was used in at least five flagship UNICEF Report Cards (Adamson, 2007, 2010, 2013; Brazier, 2017; Hudson & Kühner, 2016) to present inequalities in child wellbeing, and also influenced UNICEF's Multidimensional Overlapping Deprivation Analysis (MODA) policy tool (Chzhen et al., 2014). FAS data was used by WHO in its data gateway[5] and it was influential in its regional strategic work targeting children and adolescents (WHO, 2014).

FAS has become a 'go-to' indicator (tool) to draw attention to, communicate, and examine the effects of affluence and deprivation on child wellbeing with one respondent stating: "HBSC FAS-related research has been useful in helping WHO to understand more about socioeconomic inequalities in child and adolescent health, providing a platform for strategic action."

Discussion

There has been growing attention to agreed indicators of adolescent health for global use (Azzopardi et al., 2019; Guthold et al., 2019; Newby et al., 2021; Patton et al., 2012). These have enabled cross-national comparisons of key health measures and a consistent approach to tracking health in the context of interventions, programmes and policies globally (Azzopardi et al., 2019). Agreed indicators to measure socioeconomic inequalities in adolescent health have been relatively unconsidered. Our paper presents a broad-based examination of FAS as a measure of material conditions of the families of adolescents in different countries, reporting on why and how the measure was first developed, and then adapted for international use over time. We argue that recording such a history contributes to our learning about the scientific development of methods for research. We know of no other paper that charts the formulation and evolution of an international indicator of adolescent health and its context over time and across countries. This work can provide a template for the documenting of such scientific developments in adolescent health as well as other areas, and build a knowledge bank to inspire future researchers and serve as a reference.

FAS is robust and adaptable enough to evolve and retain its original purpose when taken from a national context at a particular point in time to be useful in a cross-national context and over time. It has proven to be highly flexible in this respect, with maintenance of concept integrity even though the tool had to evolve due to changes in society and technological developments reflected in family consumption patterns. FAS will continue to evolve in the future as family

[4] https://www.oecd.org/els/family/child-well-being/data/dashboard/
[5] country profiles: https://gateway.euro.who.int/en/country-profiles/

living conditions change and the technology they use advances. The HBSC Study's Social Inequalities Focus Group continuously monitors the usefulness of FAS and carries out validity studies to address this issue and spearhead its development. As such, the evolution of the scale remains an ongoing process, aligned with changes in social and economic contexts across countries.

Appropriate tools are needed to measure inequalities or these inequalities effectively 'do not exist', go neglected, and unaddressed – this is in line with Hayes and colleagues (2023) who state 'you can't manage what you do not measure'. Surveys like HBSC are valuable sources in developing cross-nationally comparable indicators (Currie and Alemán-Díaz, 2015). Investing in reliable measurements of inequality among children, within research infrastructures designed to collect such data, can shed light on the extent of this problem in countries. This work can provide robust evidence from which such countries can act. The supporting role that the WHO has played in the HBSC study must be acknowledged (Alemán-Díaz, 2018). WHO's institutional sponsorship enabled the growth of the HBSC as a cross-country survey over time, which facilitated the uptake and development of adolescent survey measures, like FAS, across countries and relevant international organizations. As shown in this analysis, another two major international organisations have drawn on FAS to issue analysis in support of investments in child and adolescent health. The use of HBSC in the 'policy room' attests to its value and acceptance across national contexts beyond academia.

There has been diffusion of innovation of FAS as a research tool beyond its use within the HBSC member countries of the European region and North America. FAS has been integrated into studies in 12 other countries in 7 other continents. FAS has also been used in studies in Europe and North America that are not part of HBSC. This spread in use of FAS beyond the HBSC Study indicates its utility and value as a research tool in inequalities' studies. There needs to be further investigation of how this work could inform the future development of FAS as a global indicator and more evidence to be amassed over continents, particularly in the global south. Attention to adolescents' views on their experience of inequality (Hartley et al., 2016) and in relation to global emergencies (Branquinho et al., 2020) is also needed. The inclusion of young people, beyond validation studies, in research and policy that affects them remains a priority globally (Council of Europe, 2012; United Nations, 1989).

FAS-related health inequalities have been powerfully evidenced showing that adolescents from families with fewer material resources fare worse across a wide range of health and social measures. Research directly focusing on the relationship between FAS and adolescent health especially accelerated after the scale had been through various rounds of adaptation (FAS-II and FAS-III). After more than twenty years of continuous development, FAS thus has become a

well-used and widely accepted instrument to measure health inequalities among adolescents. Having access to such an evidence base can help provide a robust case for investment in adolescent health and data-informed policy measures that nations can establish to make the case for addressing socioeconomic inequalities and inequities in adolescent health.

LIMITATIONS AND FUTURE WORK

FAS has been developed within the context of the HBSC Study whose member countries are in Europe and North America. It would be valuable to examine the utility and validity of FAS in low- and middle-income countries and gather evidence on any validation work already conducted in studies outside of HBSC. Collecting feedback on using FAS from different regions, including those where there is currently a lack of evidence, together with in-depth research including the Delphi process with experts from these regions, literature reviews, and analysis of economic trends, cultural, social factors and consumption patterns could be further steps in developing FAS as a global indicator measuring adolescent health inequalities.

Our overall intention in this paper was to provide a historical overview of the scientific development of FAS tracking its changes and progress over time to build a knowledge bank, inspire future researchers and serve as a reference. As regards the use of FAS in and outside the HBSC context, we showed that FAS has been indeed used worldwide to provide evidence on adolescent health inequalities with a brief overview of its most common use. The extraction of evidence was a scoping exercise. The breadth and depth of investigation that is typical for conducting a systematic review and metanalysis would require a separate paper but nevertheless would be a useful contribution for the future.

The policy section of this paper does not claim to be a comprehensive exercise of how international stakeholders have used FAS-related evidence of adolescent health inequalities. Albeit limited, it may form the basis for future work that examines more systematically how FAS-related evidence has been used by policy makers nationally and internationally.

CONCLUSIONS

FAS will continue to evolve and the HBSC study will continue to take a systematic approach to recording its development. In the future, there is a need to consider how responses to climate change affect consumption patterns of families – for example, will there be less air travel and therefore fewer or more local holidays? Will families give up on having a car in favour of greener public transport? Technological advances may reduce the cost of personal computer

equipment making it more affordable, and therefore less useful, as an economic asset that differentiates the affluence of families.

Within the European and North American context of HBSC research there has been a close inspection of FAS-related patterns of health and behaviour and they appear to be more or less consistent across countries and time. However, there is also a need to inspect the findings from non-HBSC studies across the globe, especially the global south, and develop a more systematic understanding of the FAS related patterns reported. Questions that arise are related to the fit of FAS to these contexts and the development of understandings about different patterns of inequalities in low and middle-income countries where family resources and consumption may vary from the largely high-income countries of HBSC. To understand the variation in FAS related health and social patterns among adolescents in different countries and cultural contexts is an important area for future research. There is a need for HBSC to share practical guidance about the use of FAS and, in particular, the different versions of FAS so that users can be more informed about the relevance of the indicator for their research. It would also be helpful to encourage feedback of experiences of using FAS to measure SES inequalities among adolescents in different parts of the world and in low- and middle-income settings so this intelligence can be part of FAS development. It is important to continue to understand how FAS-related evidence is used strategically by governmental and non-governmental organisations to inform agendas for the reduction of health inequalities among adolescents. There is a dearth of information about how research impacts policy making of this kind. Therefore, scientists, while being encouraged to think of the end user stakeholder, rarely find out whether they reach and influence such audiences. This feedback is crucial if the relationship between science and policy to be strong and meaningful.

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Highlights

- 25 years ago, the Family Affluence Scale (FAS) was developed to examine adolescent health inequalities
- While originally designed for use in Europe and North America within the HBSC study, it is now used in studies worldwide
- The evolution of FAS and evidence produced is charted over 25 years
- FAS research impact on strategic work of WHO, UNICEF and OECD is evidenced
- Social and technological changes impacting families require FAS to keep evolving

Abstract

In the absence of suitable indicators of adolescent socioeconomic status, the Family Affluence Scale (FAS) was first developed in Scotland 25 years ago. Since then, it has been adapted for use in the Health Behaviour in School-Aged Children (HBSC) Study to research inequalities in adolescent health in Europe and North America. FAS has also been used as an indicator of adolescent socioeconomic status in research studies outside of HBSC, worldwide. There has been a need for FAS to evolve and change its component items over time in order to take into account social and technological changes influencing the families of adolescents. This paper uniquely charts the development of FAS describing the methodological work carried out to validate the measure internationally and over time. It also presents an overview of the body of evidence on adolescent health inequalities produced over years from the HBSC Study and other research studies. Interviews conducted with policy stakeholders reveal that the evidence from FAS-related HBSC work has influenced their strategic work to raise awareness of inequalities and make the case for action to address these. Finally, the future of FAS is discussed with respect to its continual evolution in the context of technological, environmental and social change.

Keywords

Family Affluence Scale (FAS), adolescent health, socioeconomic inequalities, indicator development, policy impact, HBSC Study, family material deprivation, global health indicators

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: