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Measurement of socioeconomic status in the German Health Interview and Examination Survey for Adults (DEGS1)

Over the last few years, a health monitoring at the federal level in Germany has been established at the Robert Koch Institute. This programme ensures regular provision of health data [1, 2]. On the occasion of the start of health monitoring, the previous operationalisation of socioeconomic status—which was based on a suggestion of Winkler and Stolzenberg (WSI Stratification Index) [3]—was subjected to critical assessment and developed further, taking into account the requirements for monitoring data [4, 5]. These requirements include the analysis of developments and trends over time, international comparability of data, and the transfer of research results in the context of politics and practical constraints. The revised method was first implemented in connection with the study German Health Update (GEDA) [4] and is, in a comparable fashion, now realised in the German Health Interview and Examination Survey for Adults ("Studie zur Gesundheit Erwachsener in Deutschland", DEGS1).

The DEGS1 study is based on the German National Health Interview and Examination Survey 1998 (GNHIES98), an interview-based survey with a medical examination component. The results of this survey have already been widely adopted at both the national and international level. On the basis of this study, socioeconomic health differences have also been comprehensively analysed. The results show that for the findings of the GNHIES98 there were pronounced socioeconomic differences in terms of health behaviour, the existence of health risks and health impairments, disease burden and the use of medical services in Germany in the year 1998 [6, 7, 8]. In addition, further studies incorporating the GNHIES98 showed that these differences are in the middle of the range compared to other European states and that they have widened over time in some areas [9, 10]. Using the data of DEGS1, the previous analyses using the GNHIES98 can be updated. This includes the possibility to analyse time trends regarding health inequalities, if the changes in the measurement of the SES are correctly taken into account.

In this study, the operationalisation of socioeconomic status for DEGS1 is presented. We also present comparative values between the old and new operationalisation of the SES for GNHIES98. An allocation table for the individual dimensions of the SES enables reproduction of the SES index using other data records, provided that all information required for index formation are available.

Data and methods

The German Health Interview and Examination Survey for Adults (DEGS1) forms an integral part of the health monitoring of the Robert Koch Institute (RKI). The concept and design of DEGS1 are described in detail elsewhere [1, 2, 11, 12, 13]. The first data collection phase (DEGS1) was carried out between 2008 and 2011 and comprised interviews, examinations and tests [14, 15]. The target group was the population living in Germany aged between 18 and 79. DEGS1 incorporates a mixed design which enables both cross and longitudinal section analysis. As part of the study, residents' registration office samples were complemented by participants of the German National Health Interview and Examination Survey 1998 (GNHIES98). In total, 8,152 persons participated, including 4,193 first-time participants (response 42%) and 3,959 former participants of the GNHIES98 (response 62%). There were 7,238 persons who visited one of the 180 examination centres, whereas 914 were only interviewed. The net sample [13] enables representative cross analyses and trend statements for the age group from 18–79 years compared to the GNHIES98 (n=7,988, out of whom 7,116 in examination centres). The data of repeat participants can be used for longitudinal section analysis. The cross and trend analyses are carried out with a weighting factor which corrects deviations of the sample from the population structure (as at 31 Dec 2010) in terms of age, sex, region and nationality as well as municipality type and education [13]. For the examination part, a special weighting factor was designed. In calculating the weighting factor for former participants in GNHIES98, the probability of a person participating again was taken into account, based on a logistic model. For the purpose of conducting trend analyses, the data of the German National Health Interview and Examination Survey 1998 are age-adjusted for the population level as at 31 Dec 2010. A non-responder analysis and a comparison of individually determined indicators with official statistical data indicate a high degree of representativeness of the sample in the resident population of Germany [13].

Tab. 1	Calculation basis for the index of the socioeconomic status (SES Index) in DEGS1 (2012) For information on how points are awarded, cf. Lampert et al. [4]		
Points	**School and professional qualification**	**Professional status of respondents or of the head of household**	**Net equivalent income**
1.0–1.9	No school *and* no professional qualification (1a: 1.0) Certificate of Primary Education ("Hauptschulabschluss") *and* no vocational qualification (1b: 1.7)	Farmer: 10 ha and more (1.0) Farmer, no details provided (1.0) Farmer: Under 10 ha (1.1) Unskilled workers (1.3) Semi-skilled workers (1.8) Workers, no details provided (1.9)	≤491 € (1.0) 492–683 € (1.5)
2.0–2.9	Certificate of Secondary Education ("Mittlerer Schulabschluss", "Realschulabschluss") or POS certificate and no vocational qualification (2b: 2.8)	Foreman, group leader (2.0) Skilled or specialist tradesmen (2.1) Master, site foreman, overseer, (2.4) Employees with executing responsibilities (2.4) Others, no details provided (2.9) Civil servants in Lower Service (2.9)	684–815 € (2.0) 816–921 € (2.5)
3.0–3.9	No school or primary certificate *and* training/apprenticeship/ vocational school (1c: 3.0) Certificate of Secondary Education, POS *and* training/apprenticeship/vocational school (2a: 3.6) Technical college qualification ("Fachhochschulreife"), University Entrance Qualification ("Abitur"), EOS *and* no vocational qualification (2c-gen: 3.7)	Self-employed: no staff (3.5) Employees doing qualified work (3.6) Self-employed: 1–4 staff (3.6) Employees, no details given (3.7) Self-employed in trading, business etc. (3.9)	922–1082 € (3.0) 1083–1188 € (3.5)
4.0–4.9	Technical college qualification, University Entrance Qualification, EOS *and* training/apprenticeship/vocational school (2c-voc: 4.8)	Self-employed or freelancer, no details given (4.0) Civil servants in Intermediate Service (4.1) Employees in a position of responsibility (4.2) Self-employed: 5 or more employees (4.2) Self-employed: PGH member (4.2) Employees with extensive leadership responsibilities (4.7)	1189–1310 € (4.0) 1311–1417 € (4.5)
5.0–5.9	Category not taken	Civil servants, no details given (5.0) Civil servants in Higher Service (5.2) Freelancers: no employees (5.8)	1418–1619 € (5.0) 1620–1833 € (5.5)
6.0–7.0	Technical college qualification, University Entrance Qualification, EOS *and* Bachelor, Technical College Diploma (3a: 6.1) Technical college qualification, University Entrance Qualification, EOS *and* Master/Magister/Diploma, PhD (3b: 7.0)	Freelance academics (6.2) Civil servants in Highest Service (6.4) Freelancers: 1–4 employees (6.8) Freelancers: 5 or more employees (7.0)	1834–2125 € (6.0) 2126–2692 € (6.5) ≥2693 € (7.0)

POS Polytechnic Secondary School ("Polytechnische Oberschule"), *EOS* Extended Secondary School ("Erweiterte Oberschule"), *PGH* Craftmen's Production Cooperatives ("Produktionsgenossenschaften des Handwerks").

German National Health Interview and Examination Survey 1998 (GNHIES98) is the predecessor study of DEGS1, and it was carried out between October 1997 and March 1999 [16, 17]. As part of the GNHIES98, 7,124 persons aged between 18 and 79 were interviewed on health-relevant topics and subjected to a medical examination. The response rate amounted to 61%. It was possible to replicate the revised SES index using the GNHIES98 by incorporating the methodology described below. This enabled a comparison with the originally used WSI Stratification Index.

For the operationalisation of the socioeconomic status, information on the age and sex of respondents, on their academic and professional training, their occupational position and activity, their income status, household net income, household composition and their place of residence was taken into account. The statistical analyses are conducted with Stata SE 12.1 and replicated with SPSS Statistics 20. For this purpose, a standard weighting factor from DEGS1 supplied by the data holder was used. All analyses take participants who did not complete the examination part in account.

Operationalisation of the index components

In revising the operationalisation of the socioeconomic status, the basic concept of the previously used WSI Stratification Index was retained [3]. The revised SES index is also based on the three status dimensions education, occupation and income. They have equal weight in the resulting score. The dimension education is operationalised as an individual characteristic on the basis of the academic and professional qualification of respondents, whereas the dimensions occupation and income are considered as household characteristics. In each dimension, a minimum of one and a maximum of sev-

en points are awarded, with in-between values also being possible. The differences in point values reflect differences with regard to external criteria. This means that metric scaling of the individual dimensions can be assumed. The categories and corresponding point values of the index are presented in ◘ **Tab. 1**.

For classifying educational qualifications, groups based on the international classification Comparative Analyses of Social Mobility in Industrial Nations (CASMIN) were used [18]. The classification makes a distinction between nine educational groups which are the result of combinations of academic and professional qualifications. The point values standardised for the range of 1–7 reflect the average salaries earned in Germany by persons with the same qualifications.

Professional status was operationalised as a household characteristic. For this purpose, the professional status of respondents and the professional status of the principal earner in the household were compared. The higher value was then assigned to the household. The International Socio-Economic-Index of Occupational Status (ISEI) according to Ganzeboom et al. [19] was used as the criterion for assigning point values. The ISEI Index refers to occupational activities which are coded in accordance with the professional classification ISCO-88. The point values with a variation range from 1–7 were generated on the basis of data from the study GEDA 2009 [4].

In terms of income, the need-weighted household net income (net equivalent income) was, in line with the specifications on poverty and affluence reporting of the Federal Government and the European recommendations for reporting on social cohesion in Europe, used as the indicator [20]. Missing values for household net income were imputed by means of a regression model [4]. In addition, the information provided by respondents on their age, education, and professional status as well as regional statistical data of the Federal Statistical Office on the medium household net income for the residential area of respondents were used. To determine the point values, 13 equally large income groups (quantiles) were created statistically.

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Abstract

Socioeconomic status (SES) constitutes a central analysis category of epidemiological research and health reporting. As part of the German Cardiovascular Disease Prevention Study 1984–1991, a multi-dimensional aggregated index was developed for the purpose of measuring SES. This index continues to be used in numerous studies to this day. For the purpose of health monitoring at the Robert Koch Institute (RKI), the index was fundamentally revised following critical assessment. This article describes the basic concepts underlying the revision and how they were implemented in relation to the German Health Interview and Examination Survey for Adults (DEGS1). In addition, the results of the age and sex-specific distribution of the values of the revised SES index and those relating to the connection with other measurements of socioeconomic status are reported. The results are based on the data of DEGS1 2012 and the German national health interview and examination survey 1998 (GNHIES98).

Keywords

Socioeconomic status · Social inequality · Health inequality · Health survey · Health monitoring

Messung des sozioökonomischen Status in der Studie zur Gesundheit Erwachsener in Deutschland (DEGS1)

Zusammenfassung

Der sozioökonomische Status (SES) stellt eine zentrale Analysekategorie der epidemiologischen Forschung und Gesundheitsberichterstattung dar. Im Rahmen der Deutschen Herz-Kreislauf-Präventionsstudie 1984–1991 wurde zur Messung des SES ein mehrdimensionaler aggregierter Index entwickelt, der bis heute in vielen Studien verwendet wird. Für das Gesundheitsmonitoring am Robert Koch-Institut (RKI) wurde der Index nach einer kritischen Überprüfung grundlegend überarbeitet. Der Beitrag beschreibt, welche Überlegungen der Überarbeitung zugrunde lagen und wie diese in Bezug auf die „Studie zur Gesundheit Erwachsener in Deutschland" (DEGS1) umgesetzt wurden. Zudem werden Ergebnisse zur alters- und geschlechtsspezifischen Verteilung der Werte des überarbeiteten SES-Index und zum Zusammenhang mit anderen Maßen des sozioökonomischen Status berichtet. Die Ergebnisse basieren auf den Daten von DEGS1 2012 und des Bundes-Gesundheitssurveys 1998 (BGS98).

Schlüsselwörter

Sozioökonomischer Status · Soziale Ungleichheit · Gesundheitliche Ungleichheit · Gesundheitssurvey · Gesundheitsmonitoring

The interval from one income group to the next amounts to a point value of 0.5 points, starting by a value of 1.0 for the first group.

Calculation of the multidimensional SES index

The revised SES Index is calculated as a total points score on the basis of the point values assigned in the individual dimensions of education, occupation and income. Since three subscales with the same weight and range are included in the calculation, the SES Index can have values between 3.0 and 21.0. The SES Index can be included in analyses as a metric variable. Alternatively, a categorisation into several status groups can be performed. For this purpose, a distribution-based demarcation into five equally strong groups (quintiles) is suggested, with the three middle groups (2nd to 4th quintile) combined into a large "medium SES" group. This three-stage scale (low, medium and high SES) enables a comparison—measured by the accumulation of educational qualifications, professional status and income—between the bottom and top 20% of the population with a broadly defined centre which comprises 60% of the population. These categories, limit values, and the associated proportion of respondents in DEGS1 are represented in ◘ **Tab. 2**. The proportion of participants with missing values is 3.4%. For participants who

Tab. 2 Socioeconomic status (*SES*) in DEGS1 (n=7,876)

Category designation	SES Quintile	Lower limit	Upper limit	Proportion weighted (%)
Low	1st quintile	3.0	7.7	19.9
Medium	2nd quintile	7.8	9.6	19.3
	3rd quintile	9.7	11.7	21.1
	4th quintile	11.8	14.1	19.6
High	5th quintile	13.9	21.0	20.1

Tab. 4 Correlation coefficients for the connection between the scores of the individual dimensions and the total score of socioeconomic status for persons working full time (German National Health Interview and Examination Survey 1998, n=3.539)

	SES	WSI	Income	Education	Profession	MPS	ISEI	HZA
SES	1.00							
WSI	0.87	1.00						
Income	0.79	0.60	1.00					
Education	0.77	0.73	0.32	1.00				
Profession	0.78	0.75	0.41	0.54	1.00			
MPS	0.66	0.64	0.38	0.64	0.58	1.00		
ISEI	0.63	0.61	0.37	0.59	0.56	0.83	1.00	
HZA	0.68	0.73	0.41	0.54	0.69	0.60	0.60	1.00

SES Total score for socioeconomic status, *WSI* Index according to Winkler and Stolzenberg [3], *Income* partial score for the SES dimension Income, *Education* partial score for the SES dimension Education, *Profession* partial score for the SES dimension Profession. *MPS* Magnitude Prestige Score according to Wegener [21], *ISEI* International socioeconomic index of the professional status in accordance with Ganzeboom et al. [19], *HZA* Autonomy of professional activities in accordance with Hoffmeyer-Zlotnik [22].

Tab. 3 Socioeconomic status in the study DEGS1 (2012) by age group and sex (n=7,876)

	Socioeconomic status		
	Low	Medium	High
Women			
18–29 years	24.6	60.8	14.6
30–44 years	14.0	62.2	23.8
45–64 years	17.0	62.8	20.2
65+ years	31.0	59.7	9.3
Total	20.6	61.6	17.8
Men			
18–29 years	21.9	63.8	14.2
30–44 years	17.0	53.7	29.3
45–64 years	18.3	58.5	23.2
65+ years	21.6	58.0	20.4
Total	19.3	58.2	22.5
Total			
18–29 years	23.2	62.4	14.4
30–44 years	15.5	57.9	26.6
45–64 years	17.6	60.6	21.7
65+ years	26.7	58.9	14.4
Total	19.9	59.9	20.1

completed both the examination and the interview part it is only 2.6%.

In ◘ **Tab. 3,** the corresponding proportions for 18–29, 30–44, 45–64 and 65 year olds and older persons are presented, differentiated by sex. According to this table, slightly more men than women have a high socioeconomic status. In addition, the proportion of men and women with a high status is higher in the middle age groups than in the younger and older age groups. The age-specific distribution of socioeconomic status corresponds to values published for the GEDA study 2009 [4].

Like the previously used WSI Stratification Index [3], the SES Index shows high concordance with other dimensions of socioeconomic status. Based on the data of GNHIES98, ◘ **Tab. 4** presents the correlation between the SES and WSI score, the individual dimensions of SES and other values of socioeconomic status for full-time respondents established in the social structure analysis. A comparison on the basis of DEGS1 was not possible at the time this manuscript was drafted.

Discussion

Socioeconomic status constitutes a central analysis category of epidemiological research and health reporting. Results on status-specific differences in health condition, health behaviour and in health care highlight social problems and indicate target groups for interventions in health, social and political policy at the same time. As a result, the socioeconomic status is taken into account in many epidemiological studies or is even the focus of the research. A comparison of the results across different studies requires socioeconomic status to be measured in a standardised way. An important reference for Germany is the suggestion by Winkler and Stolzenberg. The suggestion was developed in the course of the DHP study (1984–1991) and also provided the basis for the recommendations of the German Association of Epidemiology for measuring sociodemographic characteristics in epidemiological studies [23]. This multidimensional aggregated index was also used in the German National Health Interview and Examination Survey 1998 and the telephone

health interviews in 2003 and 2006 which were all conducted by the RKI. The calculation basis was adjusted for this health survey in order to accommodate income inflation, increased educational participation and structural occupational changes [5].

The establishment of the federal health monitoring at the RKI was taken as an opportunity to test and improve the index formation process. The most important differences to the previous procedure are the operationalisation and categorisation of the status-forming characteristics education, professional status and income as well as the demarcation of status groups on the basis of the index calculated as a total points score. In contrast to the suggestion by Winkler and Stolzenberg [3] the initial variables education, professional status and income are not converted into ordinal but rather into metric scales. This results in a differentiated gradation and in advantages in the calculation of the SES Index and the distribution-based demarcation of the status groups. In addition, in categorising the variables and assigning point values to the categories, internationally tried and tested instruments and criteria were used. This has the ad-

vantage that even when the scores for the individual dimensions are used, reliable results can be achieved which are comparable to other studies.

Another difference to the WSI Stratification Index is that the index formation was based on a distribution-based demarcation of the status groups. In this way, five equally large status groups can be distinguished, each of which comprises 20% of the population. The demarcation suggested over and above that, i.e. for the 1st, 2nd to 4th and 5th quintile of the index values (status groups with low, medium and high SES), supports statements on the difference with regard to the health indicators considered in each case between the 20% of the population under investigation which are situated at the bottom and top end of the status hierarchy, the middle being more broadly defined. One advantage of the distribution-based demarcation of the status groups becomes clear in the analysis of developments and trends over time. Thus it is possible, using the SES Index, to analyse the extent of relative health inequalities between two points in time, even if income distribution, participation in education of the population or the occupational hierarchy have changed since the last analysis.

A multidimensional SES index is a suitable instrument for describing the extent and development of health inequalities, for example due to the simpler way of communicating its results in contrast to a single indicator approach (e.g. income, education). Equally, the SES Index can be used in epidemiological analyses, for example for determining risk profiles for certain chronic diseases. This applies to both the analyses of independent influencing factors and for confounder control. However, it must be taken into account that the informative value of results obtained by means of a multidimensional SES Index is subject to limitations. This becomes especially clear in situations where detailed explanations of interrelations for the observed health inequality are sought or where the concrete target groups are to be identified for interventions. Analyses with the individual indicators education, professional status and income could be more informative in this context, since they make it eas-

ier to draw conclusions about the significance of health-relevant attitudes and behaviours, occupation-related stress factors and resources or material living conditions [23, 24].

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References

1. Kurth BM, Lange C, Kamtsiuris P, Hölling H (2009) Health monitoring at the Robert Koch-Institute. Status and perspectives. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 52:557–570
2. Kurth BM (2012) Das RKI-Gesundheitsmonitoring – was es enthält und wie es genutzt werden kann. Public Health Forum 20(76):4.e1–4.e3
3. Winkler J, Stolzenberg H (1999) Der Sozialschichtindex im Bundes-Gesundheitssurvey. Gesundheitswesen 61(Special Edition 2):178–183
4. Lampert T, Kroll L, Müters S, Stolzenberg H (2013) Measurement of the socioeconomic status within the German Health Update 2009 [GEDA]. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56(1):131–143
5. Lampert T, Kroll LE (2009) Messung des sozioökonomischen Status in sozialepidemiologischen Studien. In: Richter M, Hurrelmann K (Eds) Gesundheitliche Ungleichheit Grundlagen, Probleme, Konzepte. 2. überarbeitete Aufl. VSVerlag für Sozialwissenschaften, Wiesbaden, pp 309–334
6. Knopf H, Ellert U, Melchert H-U (1999) Sozialschicht und Gesundheit. Gesundheitswesen 61(Special Edition 2):169–177
7. Mielck A (2000) Soziale Ungleichheit und Gesundheit. Empirische Ergebnisse, Erklärungsansätze, Interventionsmöglichkeiten. Huber, Bern
8. Lampert T, Saß A-C, Häfelinger M, Ziese T (2005) Armut, soziale Ungleichheit und Gesundheit. Expertise des Robert Koch-Instituts zum 2. Armuts- und Reichtumsbericht der Bundesregierung. Beiträge zur Gesundheitsberichterstattung des Bundes. Robert Koch-Institut, Berlin
9. Kunst AE, Bos V, Lahelma E et al (2005) Trends in socioeconomic inequalities in self-assessed health in 10 European countries. Int J Epidemiol 34:295–305
10. Kroll LE (2010) Sozialer Wandel, soziale Ungleichheit und Gesundheit. Die Entwicklung sozialer und gesundheitlicher Ungleichheiten in Deutschland zwischen 1984 und 2006. VS, Wiesbaden
11. Gößwald A, Lange M, Kamtsiuris P, Kurth BM (2012) DEGS: German Health Interview and Examination Survey for Adults. A nationwide cross-sectional and longitudinal study within the framework of health monitoring conducted by the Robert Koch-Institute. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 55:775–780
12. Scheidt-Nave C, Kamtsiuris P, Gößwald A et al (2012) German Health Interview and Examination Survey for Adults (DEGS)—design, objectives and implementation of the first data collection wave. BMC Public Health 12:730
13. Kamtsiuris P, Lange M, Hoffmann R et al (2013) The first wave of the German Health Interview and Examination Survey for Adults (DEGS1). Sampling design, response, sample weights and representativeness. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56:620–630
14. Robert Koch-Institut (ed) (2009) DEGS: Studie zur Gesundheit Erwachsener in Deutschland – Projektbeschreibung. Beiträge zur Gesundheitsberichterstattung des Bundes. RKI, Berlin
15. Gößwald A, Lange M, Dölle R, Hölling H (2013) The first wave of the German Health Interview and Examination Survey for Adults (DEGS1. Participant recruitment, fieldwork, and quality management. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56:611–619
16. Bellach BM (1999) Editorial: Der Bundes-Gesundheitssurvey 1998 – Erfahrungen, Ergebnisse, Perspektiven. Gesundheitswesen 61:55–56
17. Thefeld W, Stolzenberg H, Bellach BM (1999) The Federal Health Survey: response, composition of participants and non-responder analysis (in German). Gesundheitswesen 61:57–61
18. Brauns H, Scherer S, Steinmann S (2003) The CASMIN educational classification in international comparative research. In: Hoffmeyer-Zlotnik JHP, Wolf C (eds) Advances in cross-national comparison. Kluwer, New York, pp 221–244
19. Ganzeboom HGB, De Graaf PM, Treimann DJ (1992) A standard international socio-economic index of occupational status. Soc Sci Res 4:329–360
20. Bundesministerium für Arbeit und Soziales (BMAS) (2008) Lebenslagen in Deutschland. Der 3. Armuts- und Reichtumsbericht der Bundesregierung. BMAS, Berlin
21. Wegener B (1992) Concepts and measurement of prestige. Ann Rev Sociol 18:253–280
22. Hoffmeyer-Zlotnik JHP (2003) "Stellung im Beruf" als Ersatz für eine Berufsklassifikation zur Ermittlung von sozialem Prestige. ZUMA-Nachrichten 53:114–127
23. Jöckel K-H, Babitsch B, Bellach B-M et al (1998) Messung und Quantifizierung soziodemographischer Merkmale in epidemiologischen Studien. In: Ahrens W, Bellach B-M, Jöckel K-H (eds) Messung soziodemographischer Merkmale in der Epidemiologie. RKI-Schriften 1/1998. MMV Medizin, München, pp 7–38
24. Geyer S, Hemström Ö, Peter R et al (2006) Education, income, and occupational class cannot be used interchangeably in social epidemiology. Empirical evidence against a common practice. J Epidemiol Community Health 60:804–810