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School-to-work and school-to-university transition and health inequalities among young adults: a scoping review

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ABSTRACT

Objectives The main objective was to systematically map evidence regarding the emergence of health inequalities in individuals aged 16–24 years during school-to-work and school-to-university transition (STWT). Second, we aimed to summarise the evidence on potential effects of contextual and compositional characteristics of specific institutional contexts entered during STWT on health and health behaviours.

Design Scoping review.

Study selection Relevant literature was systematically searched following the methodological framework proposed by Arksey and O'Malley. Ovid MEDLINE and Web of Science, and websites of the International Labour Organization and National Institute for Occupational Safety and Health were searched, using a predetermined search strategy. Articles in English or German published between 1 January 2000 and 3 February 2020 were considered.

Data extraction To collect the main information from the selected studies, a data extraction spreadsheet was created. Data were summarised and grouped into five health outcomes and five institutional contexts (school, vocational training, university, work, unemployment).

Results A total of 678 articles were screened for inclusion. To be able to draw a picture of the development of various health outcomes over time, we focused on longitudinal studies. Forty-six prospective studies mapping health-related outcomes during STWT were identified. Higher family socioeconomic position (SEP) was associated with higher levels of health behaviour and lower levels of health-damaging behaviour, but there was also some evidence pointing in the opposite direction. Disadvantaged family SEP negatively impacted on mental health and predicted an adverse weight development. There was limited evidence for the outcomes physical/ somatic symptoms and self-rated health. Meso-level characteristics of the institutional contexts identified were not systematically assessed, only individual-level factors resulting from an exposure to these contexts, rendering an analysis of effects of contextual and compositional characteristics on health and health behaviours impossible.

Conclusions This scoping review demonstrated a wide range of health inequalities during STWT for various health outcomes. However, knowledge on the role of the core

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The scoping review was conducted based on a rigorous scoping review methodology with a systematic search approach supported by an experienced information specialist.

⇒ Due to the complexity of the research question and the unreliable availability of core concepts of the research question in the abstracts of relevant references, we may not have captured all relevant studies with our search strategy.

⇒ To be able to map transitions, this scoping review only focused on longitudinal studies, cross-sectional evidence regarding the role of institutional contexts for health will be the subject of future research.

institutional contexts regarding the development of health inequalities is limited.

INTRODUCTION

The life stage of the so-called 'school-to-work-transition' (STWT) usually takes place between the ages of 16 and 24 years (ie, from late adolescence to young adulthood). It is an important time during the life course, where individuals typically become increasingly autonomous and form new relationships with peers, while family ties and networks, which were relevant during childhood and adolescence, are loosened (life transition).[1] This stage is a decisive period in the life course because working careers depend on STWT and the qualifications gained. At a population level, this time is characterised by a pronounced social stratification and mobility begins, with different possible scenarios for those leaving secondary education.[2] For example, a large proportion of young adults gain first experiences in the labour market and, hence, are exposed to work and employment conditions for the first time in their lives. Those who enter tertiary or vocational

education (ie, going through a 'school-to-university' transition) also face new contexts with specific challenges, such as psychosocial stress arising from university exams.[3]

Despite the potential health impact of developmental tasks that young adults are confronted with during this sensitive period (eg, initiation of alcohol or substance use),[4][5] it is notable that the majority of young adults are in good health[6] and many age-dependent chronic diseases have not yet emerged.[7] Hence, physical resilience is relatively high compared with other age groups and chronic health conditions have not yet manifested. Nonetheless, at least for some physical and mental health conditions, incidence or prevalence rates are noteworthy. For instance, mental health problems are an important issue: in Germany, 7% of young women and 4% of young men report a doctor-diagnosed depression[8] (compared with 4.5%–6% of females and 3%–4% of males aged 15–25 years worldwide).[9] Considerable rates are also reported for atopic diseases, in Germany, with a lifetime prevalence of around 30% among young adults,[10] as well as for accidents which are a major cause of disability in this age group in Germany[8] (individuals aged 18–29 years): 15% compared with European Union rates for individuals aged 15–24 years, 3% due to car accidents and 13% due to accidents during leisure-time or household activities.[11] And lastly, current generations of German young adults appear to be at the forefront of the ongoing obesity epidemic,[12] which is a European and global public health challenge (approximately 4% of young adults aged 16–24 years are obese in the European Union, 340 million children and adolescents aged 5–19 years are overweight or obese worldwide).[13][14]

Importantly, this stage is also a decisive period for the socioeconomic position (SEP), (SEP is defined by the social and economic factors that influence the positions that individuals or groups occupy within the structure of a society[15]), as later career paths depend on educational attainment and qualifications gained during these life years. Social stratification, both horizontal (eg, by gender or ethnicity) or vertical (eg, through differences in education or income), is known to be strongly related to health and social factors and it is therefore of interest to study the health of young people during STWT from an inequalities perspective or a combination thereof.[16] Similar to all other age groups, health inequalities seem to exist among individuals aged 16–24 years.[17–19] Some studies even suggest that health, symptoms of acute illness, accidents and injuries re-increase in the phase of transition to young adulthood, while the gap typically decreases in early adolescence.[17–19] A comprehensive overview of the scientific literature, however, is not available thus far. This also holds true for research on the possible explanations of health inequalities during STWT.[20] They may be explained by differences in exposure to health-related risk factors or differences in the prevalence of chronic health conditions at earlier stages of the life course prohibiting an individual from educational attainment (ie, *selection:* healthy individuals obtain higher levels of education

than less healthy individuals). It could also be that higher levels of education lead to healthier behaviour and better health (*causation*) or that there is *confounding* (ie, good health and high educational attainment both result from advantages established in childhood).[21–25]

Several institutional contexts are involved in the stage of STWT, including schools, universities, vocational schools and workplaces. Each institutional context has its own setup in terms of purpose and organisation. Institutional contexts relevant during STWT may vary by country (eg, in part due to differences in educational systems), but general effects on health across countries may arise from two processes. First, contextual characteristics of an institution constitute a distinct physical and psychosocial environment for members of the particular institution. These environments may exert both positive and negative effects on the health of individuals (so-called *contextual effects*).[26] To illustrate, individual health-related behaviour, such as physical activity (PA), depends on organisational structures of institutions, such as academic schedules, working time arrangements, work tasks, existing institutional health promotion and the availability of facilities (eg, sports grounds). Psychosocial factors are also dependent on the institutional setting, because institution-specific arrangements can act as external stressors or resources for the individual within the institution. A high number of exams in a university degree course is an example for a contextual factor, which may exert stress on the individual, while workplace health promotion is an example of a psychosocial resource bound to an institutional setting. A second process operates via the composition of the members of a particular institution by age, sociodemographic characteristics, beliefs or values also affecting the individual member of an organisation (so-called *compositional effect*).[26] This compositional effect is mostly mediated by health behaviours that are strongly influenced by collective behaviours of the peer group or other social referents in formalised institutional settings, such as vocational school classes or university courses.

Here, three main scenarios can be distinguished to describe how contextual and compositional characteristics may influence health inequalities in the phase of STWT across various countries. First, continuous risk accumulation may occur when individuals from low SEP families transition to institutions with higher immanent risks and fewer resources (scenario 1: selection into different institutions). For example, it is known from previous scientific research that in the rather segregated German educational system, SEP of the family of origin strongly determines the choice of institution entered after leaving secondary school.[27][28] Children from low SEP families, for instance, are more likely to enter the labour market earlier, first in vocational training and, after that, in full-time employment. Accordingly, they are under-represented in tertiary education.[29] As work is one of the major sources of health risks during adulthood, selection into early work instead of higher education may increase the risk of impaired health for persons from low

SEP families in later life. In this case, health inequalities during childhood generally have the tendency to widen over time.[30] However, it is also possible that an opposite effect occurs when children from low SEP families enter institutions that are beneficial for their health. In that case, inequalities may decrease, as health-promoting features of the institution may buffer negative health effects of low initial SEP.

The main objective of this scoping review was to systematically map the evidence regarding health and health behaviours and possible inequalities in individuals 16–24 years of age during STWT. Second, we aimed to summarise the evidence on potential effects of contextual and compositional characteristics of specific institutions entered during STWT on health and health behaviours. This scoping review was conducted as part of the research endeavour of a research unit funded by the German Research Foundation aimed at improving the understanding of the development of health inequalities from birth to early adulthood and focusing on the interplay between young individuals and different institutional contexts. The first overarching aim of the entire unit is to systematically review existing international evidence on the impact of different institutional contexts on health, in general, and on socioeconomic inequalities in health, in particular, from childhood to early adulthood. The second aim is to examine whether and how characteristics of different institutional contexts in Germany are associated with the emergence of individual-level inequalities in health.

METHODS

The scoping review was reported according to the 'Preferred Reporting Items for Systematic Review and Meta-Analyses statement: Extension for Scoping Reviews'.[31] This type of review synthesises the existing literature on broader topics addressing complex and inter-related research questions. The methodological difference between a scoping and a systematic review is explained by Arksey and O'Malley.[32] Briefly, in a systematic review, the question to be addressed is already well-defined and very narrow, whereas, in a scoping review, broader topics are identified which may have been investigated based on a plethora of study designs. Furthermore, the systematic review is typically based on a rather narrow range of quality-assessed studies, while in a scoping review, the quality of the included studies is not assessed and broader evidence, also based on observational and qualitative studies, can be included. The study protocol was published in *BMJ Open*.[33] This scoping review was conducted as part of the research programme of a research unit funded by the German Research Foundation (FOR 2723, for further detail, see https://www.for2723.de/en/profil/ziele).

Study questions

The following two questions were examined in this scoping review:

1. What is the current state of evidence on health and health behaviours and possible health inequalities in the age group of 16–24 years during STWT?
2. What is the current evidence on health effects of contextual and compositional characteristics of the specific institutions involved?

Study inclusion and exclusion criteria

The following inclusion and exclusion criteria were applied:

► *Countries*: only studies conducted in high-income countries as defined by the United Nations[34] were included.

► *Populations*: studies examining STWT of individuals between the ages of 16 and 24 years were included. Populations included were students (still attending school and university students in the older age brackets), employed, unemployed, other individuals in this age group, neither in education, work nor tertiary education due to various reasons (eg, military service). Studies examining populations with chronic diseases (eg, type 1 or 2 diabetes mellitus, chronic disability) were excluded, as well as those exclusively focusing on teenage pregnancy or sexual health.

► *Institutional context*: studies conducted in the context of the school, university or workplace (eg, including apprenticeship programmes, vocational training) and analysing contextual and compositional characteristics of institutions were included. Studies were excluded, if they were solely school-based (ie, only included pupils at high schools not yet in STWT), if student health was examined, but SEP/socioeconomic status (SES refers to a measure of social position that generally includes income, level of education and occupation[35]) was not reported, if SEP/SES was only adjusted for, but no subgroup analysis by SEP/SES was presented in the respective articles.

► *Study design*: only studies including at least one assessment (baseline or follow-up) in the age range of 16–24 years were included. To better map the transition from school to work or to vocacional training/university, we only focused on the longitudinal studies. Furthermore, a clear contextual reference to the contexts of interest (eg, workplace, university) had to be provided in the respective article. Studies spanning fewer than 2 years of the STWT (eg, individuals were only followed from the age of 16 until the age of 17 years) were excluded, because they typically focused on the health of high school students (see above).

Search strategy

The search strategy employed to identify the relevant literature, including inclusion and exclusion criteria, can be found in the published study protocol.[33] Briefly, the strategy was developed by an information specialist (MM) who used text analysis methods with the web-based tools Voyant (https://voyant-tools.org/) and Search Refiner (https://ielab-searchrefiner.uqcloud.net/). It

was conceptualised based on a set of 13 relevant references, which were known to the authors previous to conducting the scoping review. The following databases were searched by one author (MM), including publications from 1 January 2000 until 3 February 2020: (1) electronic database: Ovid, MEDLINE, (2) electronic database: Web of Science, (3) grey literature: website of the International Labour Organization, (4) grey literature: website of the US National Institute for Occupational Safety and Health. The search was restricted to studies published in English or German.

Study selection
The search results were deduplicated using the reference management software EndNote. The resulting set was imported to and screened with the online tool Rayyan (https://rayyan.qcri.org/). The study selection phase involved two stages and was performed independently by two members of the research team (PMMF and SS or CP and ND). During the first stage, titles and abstracts of each article were examined to assess their relevance for the review, according to predefined inclusion and exclusion criteria. During the second stage, all records included in the first stage were full-text read. Any disagreements between the two reviewers were resolved with a third researcher of the team.

Charting the data
Data extraction was performed independently by two authors (PMMF and CP). As a tool for standardised data extraction, a predetermined template in Microsoft Excel was developed by the authors (PMMF and CP). The following information was extracted from the included studies: general information (author(s), year of publication, journal of publication, study location, title), study information (aims/purpose of study, size of population, study population, study design), participant characteristics (age, gender, number of participants), health outcomes, main measures of family and/or own SEP/SES (education, occupation, income), contextual characteristics, other characteristics, key findings pertaining to the questions addressed in this scoping review.

Data synthesis
After data extraction, the relevant data of the studies, including major findings, were discussed in the research team and after reaching agreement, the collected data were charted by health outcome. Health inequalities were summarised by institutional context. One author (PMMF) performed the initial summarisation, which was verified and refined by a second author (CP). The synthesis included, first, a descriptive summary, including the following items: authors and publication year, study location, study population, age, gender, number of participants, main outcomes, measures/indicators of SEP/SES and context. In a second step, a frequency analysis was performed to provide an overview of the number of manuscripts dealing with the different health outcomes.

Five main health outcome categories were inductively derived from the material in an iterative process. In several cases, these categories were not distinct, as the majority of studies examined more than one outcome. Hence, if the main outcome fell into one of the five overarching categories, the study was described in detail under the respective section in the results. If secondary outcomes were included in a given study falling into the other categories, they were only cited there. The following institutional contexts were considered for determining inequalities in health outcomes: school, vocational training, university, work, unemployment. During data extraction, we realised that the predefined time period of 16–24 years was arbitrary, because transitions or changes in the different health outcomes may start occurring before the age of 16 years and after the age of 24 years. Hence, we decided to also include studies, if they spanned the years between 18 and 24 years and reported results pertaining to the outcomes of interest before or after the 6-year STWT, because they provide information on how health inequalities evolve during the life course.

Deviations from the study protocol
In order to map the transition from school to work or to vocational training/university, we decided to only focus on the prospective longitudinal studies in a first article. Future research will focus on summarising the results of the cross-sectional studies identified in the search (n=125).

Patient and public involvement
No patients involved.

RESULTS
Literature search
In total, the search of electronic databases identified 25 069 records. After deduplication, a total of 15 508 records remained (see figure 1). Screening of titles resulted in 678 potentially eligible articles. A total of 74 articles was included for full-text review. After the full-text review, 28 manuscripts were excluded. The most common reasons for excluding articles were that the study did not include the intended population (n=14), was not conducted in the context of interest (n=3), did not include the outcomes of interest (n=7), did not include an indicator of SEP/SES (n=3) or no full text was available (n=1). Finally, 46 articles were included for data synthesis which can be seen in detail, including references, in online supplemental file 1.

Study characteristics
Studies were conducted in 12 different countries. Almost 60% of the included articles were published after 2012. Around half of the studies (42%, n=19) were conducted in the USA, followed by Sweden and Finland (13%, n=6).

Health outcomes
The following health-related behaviour and health outcomes were reported in the included articles. Reported
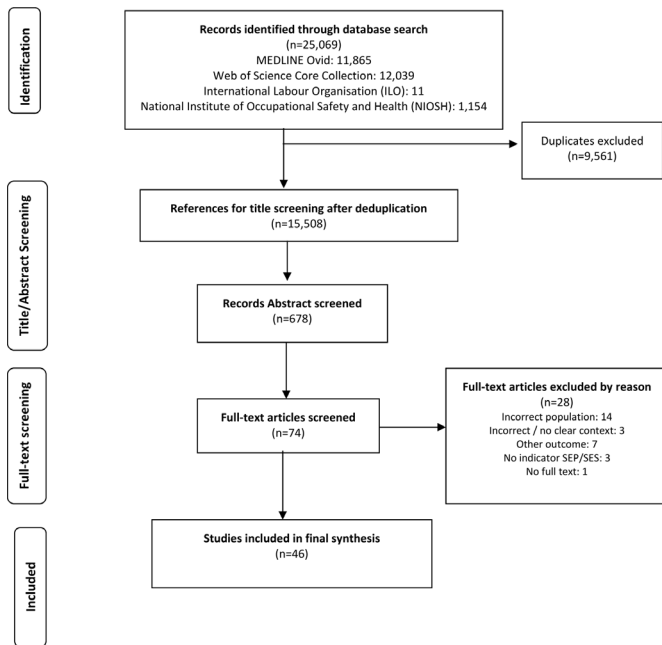
Figure 1 Flow chart of study selection. Adapted from Preferred Reporting Items for Systematic Review and Meta-Analyses flow diagram. SES, socioeconomic status; SEP, socioeconomic position.

Figure 2 Health outcomes by institutional context.

health-related behaviour included PA (min/week), dietary behaviour (eg, fruits and vegetable consumption), sleep and substance use (smoking, alcohol and cannabis use). Reported mental health indicators included depressive symptomatology (eg, Center for Epidemiological Studies Depression score of >16), anxiety, hospitalisations due to non-fatal suicidal behaviour (eg, intentional injury), as well as psychological well-being, life satisfaction and protective psychological resources (eg, self-esteem). Other health outcomes reported in the included studies were weight status (overweight/obesity, normal weight, underweight), physical/somatic symptoms due to musculoskeletal disorders, gastric complaints, tiredness, overstrain, accidental injuries and risk of injuries, and self-rated health typically assessed with one item (ie, "In general, how is your health?").

In the 46 included studied, we found 72 observations, in total, falling into the 5 categories of health outcomes outlined above. The most prevalent outcomes were health-related behaviour (37.5%), followed by mental health outcomes (30.6%), weight status (16.7%), physical/somatic symptoms (9.7%) and SRH (5.6%). Figure 2 shows the frequency (%) of health outcomes by the respective institutional context. Health-related behaviour and mental health outcomes were the most often examined health outcome in all of the institutional contexts. Health-related and mental health outcomes were the most reported (n=26 and n=18, respectively) in the school context. Weight status was most reported for the school context (n=12), following by university context (n=4). No study investigated SRH in the vocational training and unemployment contexts.
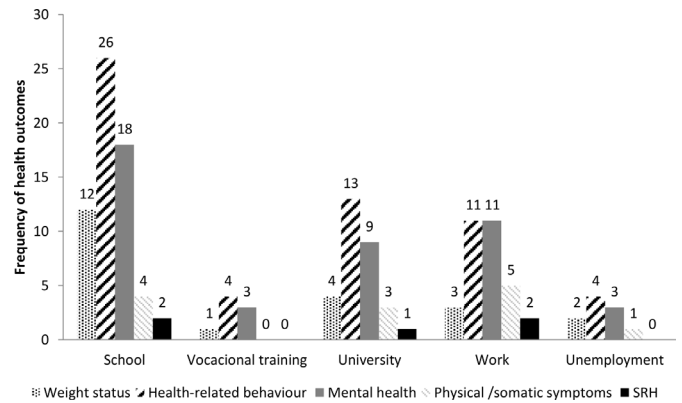
Table 1 displays the age ranges that study participants fell into during baseline and follow-up assessments in the individual studies by the five different outcome groups. Some studies had more than one follow-up.

Health inequalities during STWT (differences by SES/SEP)

Figure 3 presents health inequalities during STWT (differences by SEP/SES) for the different outcome categories by context. A total of 30 articles reported health inequalities during STWT in the contexts of school, vocational training, university and unemployment, reflecting a total of 84 observations. Inequalities in the context of unemployment (n=7 observations) and vocational training (n=4 observations) were the least frequently reported. Regarding mental health outcomes (n=25 observations). Health inequalities in the school context (n=37 observations) and in the university context (n=20 observations). For the outcome category physical/somatic symptoms, n=5 observations were counted (ie, n=1 of the studies reported inequalities in the work context, n=1 in the school, n=1 in the unemployment and n=2 in the university context). Inequalities in SRH were only detected in school context (n=2), university (n=1) and work context (n=1).

In the following sections, only studies examining health inequalities for the five different health outcome categories are described in detail (n=29) (aim 1).

Health-related behaviour

Evidence suggests that individuals with more highly educated parents exercise more frequently than young adults, and were less likely to smoke compared with their counterparts with less highly educated parents (p<0.05).[36 37] A cohort study including 2376 adolescents investigated whether adolescent cigarette, alcohol, marijuana and hard drug use predicted life satisfaction in young adulthood finding that adolescent substance use limited socioeconomic opportunities and had a lasting effect on health, consequently decreasing life satisfaction (p<0.05).[38] A study conducted by Clark et al[37 39] described patterns of alcohol use from early adolescence to adulthood by age and race/ethnicity to identify sociodemographic correlates. Alcohol trajectories varied significantly

Table 1 Baseline and follow-up ages by outcome (n=46 included articles)

	Baseline 16–24 years	Baseline <16 years	Follow-up 16–24 years	Follow-up >24 years
Weight status	10	5	9	7
Health-related behaviour	21	12	23	17
Mental health	19	9	18	13
Physical somatic symptoms	4	2	6	5
Self-rated health	4	2	1	3

by race. Mixed-racial respondents who lived with both parents were less likely to drink than all the other ethnic groups. The amount of alcohol consumed increased among whites at higher income levels compared with non-drinking whites. Black American Indians showed the highest levels of alcohol use at lower income levels. No clear differences in alcohol trajectories across gender emerged before the age of 19 years.[37 39] Examining cigarette smoking and binge drinking trajectories during the transition to adulthood and how the likelihood of experiencing different behaviour trajectories varies by SES, Daw et al[37 40] found that individuals with higher SES were more likely to be adult-onset drinkers compared with individuals with lower SES.[37 40] A study conducted by Fergusson and Boden[4] examined the use of cannabis at ages 15, 16, 18 and 21 years as an outcome showing that the observed increase of cannabis use prior to the age of 21 years was associated with a decline of levels of own degree attainment (ie, a decreased likelihood of a university degree attainment by the age of 25 years), declining income at age 25 years and increasing unemployment during the ages 21–25 years.[4] Furthermore, a study analysing data from three UK cohorts (at ages: 16, 22, 23, 26 years) and examining the effects of early transitions into employment or family roles on early adult smoking and drinking showed that early transitions tended to be associated with higher levels of early adult smoking (OR 3.25; 95%

CI 2.81 to 3.75), but lower levels of drinking, compared with the tertiary education group (OR 0.65; 95% CI 0.56 to 0.75). Increased odds of heavy drinking for the early transition into work group compared with the delayed transition group (ie, those who left school at age 16 years or earlier, entered employment (almost) immediately, but then delayed other transitions (eg, leaving full-time education)) were seen in two cohorts.[41]

A study with 2697 adolescent females (average age: 18 years in wave 1 and 24 years in wave 3) examined whether this group was influenced by tobacco control policies in terms of smoking initiation and transitions to more adverse stages of smoking behaviour from adolescence to young adulthood. As part of this policy evaluation study, predictors of smoking were reported for low, middle, and high SES females differentiating between those who never smoked and those with an adverse transition (ie, initiating smoking or with increased smoking severity). SES was determined based on family income and parent education in wave 1. The study found that among low SES females, a higher number of best friends who smoked was associated with an increased likelihood of an adverse transition during the 7 years of transition from adolescence to adulthood. Availability of cigarettes at home increased the odds for an adverse transition in all SES groups.[37 42] Another study found that risk behaviour (ie, getting drunk, smoking marijuana) in adulthood was significantly lower among respondents who had a low family SES in adolescence.[37 43] Lee et al,[44] in a study among 808 young adults from the Seattle Social Development Project, found that low educational attainment at age 21 years predicted cigarette smoking at age 30 years.[44] Paavola et al[45] found that the level of own education measured at the age of 21 years was strongly associated with smoking at all survey times (ages 13, 15, 16, 17, 21, 28 years).[45] In the middle (12–15 years of education) and high education (≥16 years) groups, the risk for smoking at the age of 28 years was much smaller compared with the lowest education group (≤11 years). Another study, including 10 142 individuals aged 18–26 years, investigated the association of parental education and cigarette smoking in young adulthood and found that, among current smokers, individuals with more highly educated parents smoked fewer cigarettes per day compared with those with lower educated parents.[36] However, a study by Spein et al[46] did not find a connection between low SES
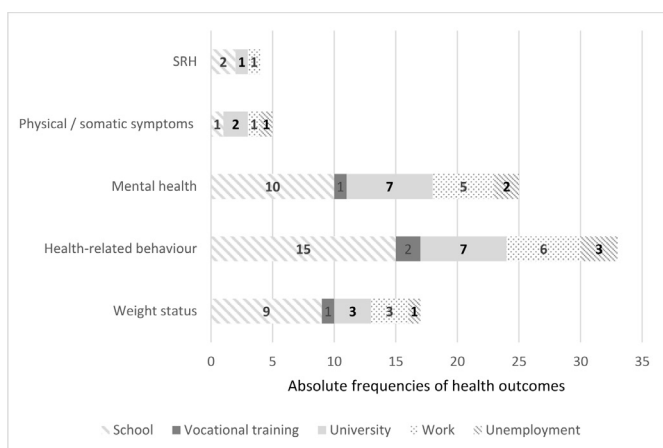

Figure 3 Health inequalities during school-to-work-transition (differences by socioeconomic status/socioeconomic position) for various categories by context (absolute frequencies).

and smoking behaviour in a sample of Norwegian adolescents aged 15–18 years.

Other health-promoting behaviours, such as eating vegetables and fruits, were investigated in a study by Friestad and Klepp.[47] Young girls and women were less likely to engage in health-promoting behaviours when they had lower educational aspirations and lower parental SES in a cohort of Norwegian adolescents and young adults (measured at 13, 15, 18, 21 years). Another study found less positive weight-related health behaviour in men (19–26 years) with low SES compared with their socioeconomically advantaged peers (eg, less exercise, vegetable intake).[48]

Mental health

Hjorth et al[49] conducted a 4.8-year follow-up study among students (16–29 years) to examine the association between mental health and school dropout across educational levels and genders and found that the relative risk of poor self-reported mental health was lowest among students at the elementary level (OR 1.3, 95% CI 0.8 to 2.3) and increased among students in higher level education. Furthermore, women were significantly more likely to report poor mental health than were men.[49] A follow-up study analysed data of participants in the West of Scotland Twenty-07 Study at ages 15 (baseline), 18, 24, 30 and 36 years revealing associations between disadvantaged SEP at age 18 years and poorer mental health at age 24 years, and selection among women due to differences in mental health in early adulthood.[50] A study based on data of all 16-year-old ninth graders of an entire Finnish city followed up at ages 22 and 32 years analysed whether SES was a cause or consequence of psychosomatic symptoms when transitioning from adolescence to adulthood.[51] Among girls, but not boys, at age 16 years, parental SES was inversely associated with psychosomatic symptoms at age 16 years, as well as at the ages of 22 and 32 years. When modelling both social causation and health selection paths for women, the authors of the study found that the pathway from psychosomatic symptoms at age 16 years to lower education at age 22 years was significant suggesting health selection processes at play. Furthermore, the paths from parental SES to psychosomatic symptoms at age 16 years and from own education at age 22 years to symptoms at age 32 years were significant and pointing towards social causation processes. Parental SES did no longer appear to play a role at age 22 years in women. In men, a different picture emerged. Particularly the path from psychosomatic symptoms at 16 years to lower education at age 22 years was strong.[51]

However, a study by Harding et al[52 53] pointed in the opposite direction. Ethnic minorities, who were more often socially disadvantaged, reported better mental health than white socially advantaged in a cohort examined at 11–13, 14–17 and 21–23 years. The effect is explained by protective cultural factors, such as family connectedness and religious involvement.

A study conducted by Ferro et al[54] examined trajectories of depressive symptoms in a sample of 2825 Canadian individuals between the ages of 12 and 25 years over the course of a 14-year follow-up. Based on latent class growth modelling, three distinct trajectories of depressive symptoms during emerging adulthood were identified: minimal, subclinical and clinical. Subclinical and clinical symptoms were more common than minimal symptoms in female individuals and in those with lower SES. All trajectories had a parallel course, with peak symptoms between the ages of 15 and 17 years, that is, during the period of life in which the transition from high school to posthigh school or workforce occurs. Melchior et al[55] examined the role of family income and associations with depressive symptoms and anxiety in a cohort study finding that depressive symptoms and anxiety were higher among youths from families with low income compared with youths from families with intermediate/high income. The likelihood of psychological difficulties was elevated among youths from families that experienced decreasing and persistently low income over 8 years of follow-up.[55] Another study conducted with 12 000 adolescents found that individuals who experienced more cumulative socioeconomic adversity over the course of 12 years reported higher levels of depressive symptoms during adolescence than those with less cumulative socioeconomic adversity.[37 56] A study conducted by Landstedt et al[57] among 1083 individuals from the Northern Swedish Cohort, analysed the role of SEP and depressive symptoms in adolescence for trajectories of education and work. Four types of trajectories were identified: trajectory 1—long education into stable employment; trajectory 2—medium education into stable employment; trajectory 3—short education into stable employment; trajectory 4—continuously unstable situation. They found that low parental occupational class and unemployment were significantly associated with a higher risk of ending up in less advantaged trajectories for men, while, for women, this association was only apparent for parental occupational class. Specifically, men with higher levels of depressive symptoms (at age 16 years) had a relative risk ratio of 2.48 of falling into trajectory 4.[57]

Kiviruusu et al[58] found that lower SES was prospectively associated with lower psychological resources (eg, self-esteem, meaningfulness). In this Finnish cohort study, 2194 pupils were assessed for the first time when they were 15.9 years old (SD: 0.3 years), on average, in 1983, and then followed up, when they were 22 and 32 years of age. Individuals with only comprehensive schooling at age 22 years, and, likewise, individuals with manual worker status at 32 years had poorer psychological resources at age 22 years than their higher SES counterparts.[58] In addition, changes in psychological resources appeared to moderate the effect of SES on distress symptoms. Among individuals losing psychological resources between the ages of 22 and 32 years, those with lower SES reported pronounced increases in distress. In contrast, this was not the case for individuals with more positive

resource changes. Here, SES did not appear to play a role concerning distress.[58]

The Australian Longitudinal Study on Women's Health (12 599 Australian women aged 18–23 years) analysed the social patterning of overeating and symptoms of disordered eating and found that a low level of own education was associated with a higher prevalence of binge eating prospectively 4 years later.[59] Jablonska et al[60] reported hospitalisations due to non-fatal suicidal behaviour (ie, poisoning, intentional injury, event of undetermined intent) in a national cohort investigating trajectories of 447 929 children (born between 1973 and 1977) who were followed prospectively from completion of ninth grade until 2001. In this register-based study, lower parental SES was associated with higher levels of hospitalisation.

Weight status

An Australian study investigated body weight trajectories over 13 years (baseline at age 18–23 years, n=14.247, first follow-up: 22–27 years, second follow-up: 25–30 years, third follow-up: 28–33 years, fourth follow-up: 28–33 years) among women and found that, while all women increased weight over time, adult education level was significantly associated with weight trajectories.[61] The level of education was inversely related to long-term weight gain. High-educated women weighed less compared with women with low or medium education levels and gained less weight over time. In contrast to women remaining in the low education group over time, those with the greatest educational mobility had a similarly favourable weight status at baseline and weight trajectories as those with a high level of education at baseline and over time (ie, they reported similar weight and gained less than women in the low education group over time). Gustafsson et al[62] could show that parental SES and cumulative socioeconomic disadvantage at each age (defined as the number of life course stages experienced with low SES, ie, at age 16 years: range 0–1, at age 21 years: 0–2, at age 30 years: 0–3, at age 43 years: 0–4) predicted change of BMI towards more adverse weight status over time. This was not the case in men. The results support the cumulative risk and sensitive period assumptions. However, the associations were stronger for BMI at older ages than for BMI assessed during adolescence and young adulthood.

Crossman et al[37 63] analysed data of 90 000 adolescents in grades 7–12 from 80 public and private high schools and 52 middle schools, which were representative of all regions of the USA. Adolescents completed questionnaires at baseline in 1995 and 6 years later (2001–2002) when the original respondents were between the ages of 18 and 26 years. For women, higher parental educational attainment reduced female adolescents' risk for excessive weight gain during young adulthood (OR=−0.8; p<0.01). Parental education did not play a role concerning male adolescents' weight trajectories. Another study examined predictors of change in BMI percentiles in girls aged 9–10 years at baseline and 18–19 years at the end of the follow-up (the National Heart, Lung, and Blood Institute

growth and health study, n=2150) finding that family SEP (household income and parent education) was predictive of BMI change and onset of overweight and obesity.[64] Lee et al[37 65] used the National Longitudinal Study of Adolescent Health (Add Health) spanning the transition from adolescence (grades 7–12) to young adulthood (18–26 years, wave 3) and found that low parental education was similarly associated with adverse weight development across both sexes during the transition to young adulthood. Welfare receipt before the age of 18 years or family income below the poverty level significantly increased the odds of becoming or staying obese compared with remaining non-obese or reducing obesity during the stage of young adulthood. Daw et al[37 40] examined the most common risk behaviour clusters, including obesity as a component, and trajectories based on the same dataset, but spanning the transition from adolescence (grades 7–12) in wave 1 to the ages of 24–32 years in wave 4. They found that approximately 78% of survey participants were consistently non-obese, 11% consistently obese and 11% had an increased likelihood to become obese over time. In terms of the clustering, they identified an obesity and inactivity cluster. Cluster-analysis yielded a 'healthy but increasingly obese' class (12.4% of the total sample) displaying relatively healthy behaviour (low prevalences of smoking, binge drinking, moderate sedentary behaviour) over time, but a rapid increase in obesity across the four waves with 96% falling into the obese category in wave 4. Females and lower SES individuals were significantly more likely to be categorised into the 'healthy but increasingly obese' group compared with their male and higher SES counterparts (13% vs 11 % and 14% vs 11%, respectively).

Physical/Somatic symptoms

Concerning the risk of incidence back pain during the transition from childhood and adolescence to adulthood, Mustard et al[66] found in a prospective cohort study of children aged 4–16 years at baseline and aged 21–34 years at follow-up (n=1928) that the risk was elevated for lower levels of parental education in childhood (OR 1.72, 95% CI 1.06 to 2.80), as well as for low, moderate and high levels of stress (OR 1.86, 95% CI 1.14 to 3.03 and OR 1.85, 95% CI 1.07 to 3.02, respectively), current heavy smoking (OR 1.85, 95% CI 1.10 to 3.10) and emotional and behavioural disorders in childhood (OR 1.87, 95% CI 1.02 to 3.41). In this model, the authors controlled for age, sex, childhood conditions and health status, indicators of early adult health, behaviour, SES and work environment. The association between risk of incident back pain and lower SES in early adulthood disappeared after controlling for other factors relevant in the early adult and childhood periods. Data from the West of Scotland cohort surveying participants five times between the ages of 15 and 36 years (ie, 15, 18, 24, 30, 36 years) suggest no associations between parental occupational class (age 15 years) and both physical and mental health measures at every age,[50] including somatic symptoms. This lack of

association was also evident for parental education and income. Interestingly, an association emerged at age 24 years for both men and women between own SEP and physical health. Berg et al[67] examined, whether difficult family conditions during adolescence (eg, lack of parental support) at age 16 years were related to economic adversity at age 42 years (ie, self-reported household income and the ability to cover expenses), including an analysis of indirect effects of adversities (eg, somatic or depressive symptoms, low education) experienced at ages 22 and 32 years. In women, education at age 22 years was associated with somatic symptoms at age 32 years. Brydsten et al investigated the effect of employment status on short-term and long-term functional somatic symptoms from age 16 to 42 years. Results indicated a connection between youth unemployment functional somatic symptoms in men, short-term and long-term.[68]

A study using data from 'TRacking Adolescents' Individual Lives Survey', involving individuals aged 10–19 years examined at four time points, found more frequent use of general care in low and medium socioeconomic status families, as well as more frequent use of youth social care and mental healthcare.[69 70]

Self-rated health

Results of the study by Lynch and Hippel[71] suggest that all three processes, causation, selection and confounding occur at different stages during the lifecourse, depending on time period analysed, and varying by gender. In the underlying US American National Longitundinal Study of Youth (1997 cohort), educational attainment and SRH were assessed from age 15 years on until the age of 31 years. In this study, SRH was associated with advantages in early life (confounding), but after controlling for these confounding factors, adolescent SRH still predicted adult educational attainment (selection). Educational attainment did not appear to affect SRH at the stage of completing high school, but later on, in the 30s, after completion of a Bachelor's or graduate degree appeared to have a positive impact on SRH.[71] The authors concluded that there was no causal effect of education, but that differences in SRH noted at age 31 years were mostly due to selection. Another study, examining a cohort of children and adolescents aged 12–18 years at baseline, found an association between low household income and poor self-rated health, although partly mediated by cumulative violence exposure, which was more common in socially disadvantaged adolescents and young adults.[72] Akkermans[73] examined SRH by level of education among n=1650 young employees based on the two-wave Netherlands Working Conditions Cohort Study.[73] They found that employees with lower levels of education reported poorer SRH compared with their higher educated counterparts (p<0.01).[63]

Contextual and compositional factors (aim 2)

Although several studies finding health differences by type of institution entered during the STWT, none of the included 46 longitudinal studies directly studied meso-level-specific contextual and compositional characteristics of the institutions, which could explain these differences. However, 16 studies reported individual-level perceptions of institutional environments. For example, in the university context, good relationships with teachers/supervisors predicted maintained health and academic performance. In the work context, weekly hours worked and perceived work pressure were associated with well-being and alcohol use (for further detail, see table 2). Some of these factors were also related to SEP, suggesting a mediating role of contextual factors.

DISCUSSION

The first aim of this scoping review was to systematically map the existing evidence regarding health and health behaviours and possible health inequalities in the age group of 16–24 years and during STWT noted in high-income countries. To be able to draw a picture of the development of various health outcomes over time, we focused on longitudinal studies and were able to identify 46 prospective studies mapping health-related outcomes during this life stage. The identified studies included 72 observations, in total, which we grouped into five broad categories of health outcomes. The most frequently examined health outcome category was health-related behaviour with approximately 37.5% (n=27) of the included studies reporting results concerning the development of health-related behaviour during STWT. A very heterogeneous picture of results coming from the various longitudinal studies emerged. Results of several studies suggested that higher family SEP was associated with higher levels of health-promoting behaviour[37 43 45 57 65 74 75] and lower levels of health-damaging behaviour. However, two studies pointed in the opposite direction.[58 76] Furthermore, elevated health-damaging behaviour, such as excessive drinking or cannabis use during adolescence, which is not independent of parental SEP and parental behaviour patterns, seemed to persist into adulthood with negative consequences regarding educational attainment and professional development.[4] Approximately, one-quarter of the included studies examined mental health outcomes, partly demonstrating an impact of disadvantaged family SEP on mental health, including increased depressive symptoms,[71] in individuals during STWT.[77] Poor mental health also reduced chances of educational attainment in early adulthood (selection). The most coherent picture emerged for the included studies examining weight trajectories (16.7% of all included studies). Results clearly suggested that an adverse family SEP predicted adverse weight development over the course of STWT and beyond. Only approximately 6% (n=4) of included studies examined SRH as an outcome with very mixed findings pointing to selection processes and varying SEP predictors playing a role in adolescence and early adulthood. Results regarding somatic/physical

Table 2 Individual-level factors assessed in the included prospective cohort studies

Context	Individual-level factors	Indicators/Measures of individual-level factors	Main findings
School	Educational attainment[4 43 44 71 76 77 88–90]	Reports of achievement in reading, written expression, spelling and mathematics averaged over these domains and age intervals (baseline). Bachelor's level or above, attainment prior to age 25 years (follow-up at 21–25 years).[4]	Increase of cannabis use associated with declining levels of degree attainment.[4]
	Timing of degree[76]	Early/On time, defined as age 25 years or under, versus late, defined as over age 25 years, based on population patterns of age at graduation and years of enrolment.[76]	High school graduates who did not transition into college ended up drinking slightly less than high school graduates who transitioned into college.[76]
	School connectedness[37 78]	Feeling of belonging and being part of the school and fair treatment at school, higher scores indicate greater connectedness.[78]	Greater school connectedness associated with higher levels of healthy behaviours across adolescence and adulthood.[78]
	Social support [37 74 78 79]	Perceived support: how much individuals felt that friends care about them (range of responses: 1=not at all to 5=very much).[79]	More social support by friends among adolescents living with two parents.[79]
Work	Work pressure[73]	Four items, based on the job content questionnaire of Karasek, 1985; Karasek *et al*, 1998.[91 92]	Work pressure related to future motivation and well-being of young employees.[73]
	Weekly worked hours[43 80]	Number of hours worked per week. Ranges from 1 (0–9 hours per week) to 4 (40+ hours per week).[43]	Increasing number of hours worked associated with the probability of getting drunk.[43]
	Social support[66 73 74 81]	Four items, based on the job content questionnaire of Karasek, 1985; Karasek *et al*, 1998.[91 92]	Less social support among young employees with lower educational level.[73]
	Physical and emotional workload[66 73]	*Physical workload*: three items derived from the Integrated System of Social Surveys (Statistics Netherlands, 2003).[73] *Emotional workload*: three items based on the Copenhagen psychosocial questionnaire (Kristensen and Borg, 2000).	Physical and emotional workload related to future motivation and well-being of young employees.[73]
University	Timing of degree[76]	Early/On time, defined as age 25 years or under, versus late, defined as over age 25 years, based on population patterns of age at graduation and years of enrolment.[76]	High school graduates who did not transition into college ended up drinking slightly less than high school graduates who transitioned into college.[76]
	Social support[74 78 79]	Perceived support: dichotomous indicator, that is, respondent feels that their friends care about them very much or not at all.[78]	Social support from friends was associated with less frequent engagement in health behaviour.[78]

symptoms were mixed with some suggesting an influence of parental education and some not.

One major challenge encountered during the course of conducting this scoping review was that cohort studies included assessment points which often did not exactly match the transition time from 16 to 24 years of interest in the scoping review. The predefined time period may have been slightly arbitrary because transitions or changes in the different health outcomes may start occurring before the age of 16 years and after the age of 24 years. Studies including assessment points before or after the ages of 16 and 24 years, respectively, provide information on how health inequalities evolve during the life course and may inform future secondary data analyses of existing German longitudinal data. Furthermore, based on the evidence identified in this scoping review the impact of transitions per se (successful vs not, too early or too late) on

health could not be analysed which is a major limitation. Another limitation was that the studies included in this scoping review were large cohort studies predominantly conducted in Scandinavian countries or North America, which cannot be generalised to the German context. Recent results based on the German longitudinal National Educational Panel Study suggest that there are variations in SRH by education group in German individuals during STWT. However, analyses of the trajectories, including the years preceding or following STWT and pertaining to other health outcomes, are still warranted.

The second objective was to summarise the evidence on the potential effects of contextual and compositional characteristics of specific institutions entered during this life stage on health and health behaviours. Contextual or meso-level characteristics describing the social and physical environments of the various

settings indivdiuals enter during the STWT (eg, institutional structures for health promotion, availability of sports facilities) were usually not assessed in longitudinal cohort studies. This may not come as a surprise, as cohort studies typically rely on self-reported data. Hence, in some studies, perceptions of work or study conditions were assessed via self-report of participants. For example, stressors resulting from an exposure to these institutional contexts were inquired about in several of the included studies (eg, work pressure[43 66 73 74 78–81]). Furthermore, a wide array of studies included long-term follow-up of indicators of educational or professional attainment or a lack thereof (timing and level of degree obtained, unemployment[49 76 82–84]). Thus, the results of our scoping review suggest that other data sources are required to obtain objective data on meso-level characteristics (eg, availablilty of equipment or counselling services, teacher/student ratio), possibly from national data regularly collected to track and monitor the progress made in organisational development at universities or vocational schools over time. To our knowledge, no national database exists, including long-term assessment of (changes of) meso-level characteristics for all German universities or vocational schools. Furthermore, if it existed, this information would have to be pooled with longitudinal data on health trajectories to figure out the influence of meso-level characteristics on the development of health inequalities over time. In our scoping review, we did not find any studies undertaking such an effort.

In the cross-sectional studies (n=125), which were screened in this scoping review, but not full-text screened and systematically analysed, meso-level characteristics of the different contexts of interest were assessed in greater detail (eg, social network support, counselling visitors, social worker support, workplace conditions[85–87]), because they typically include a sample of participants exposed to one context which can be either described by participants via self-report or via separate data collection efforts of the research team in order to assess aspects of the social and physical environment of a given context (eg, available resources at university X or vocational school Y, company Z). However, health trajectories (and potential inequalities) and causal pathways cannot be analysed based on cross-sectional data. Better measurement of contextual factors and more research to evaluate the role of contextual factors regarding the emergence of health inequalities during STWT are needed.

CONCLUSION

This scoping review provides a broad picture of health inequalities observed during STWT for various indicators of health. Still, there is a need for research, including the time before and after STWT, taking a life course approach. There is some indication based on the results of this scoping review that differences in family SEP continue to evoke health inequalities in early adulthood. However, own SEP also increasingly impacts on health, as individuals transition from adolescence to adulthood. Individual-level factors resulting from an exposure to institutional contexts, but not meso-level characteristics of these contexts, were tracked in the included studies, rendering an assessment of the role of meso-level characteristics on health (inequalities) impossible. Thus, results of longitudinal cohort studies are limited and cannot serve as the basis for answering the question of when exactly during the transition of an individual from school to work or higher education public health interventions or policies should be implemented or which contextual and compositional factors should be addressed in complex interventions aimed at preventing and/or reducing health inequalities in young adults in the future.

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