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Assessment of attitudes among medicine students at the University of Mainz, Germany towards communication skills training regarding the treatment of chronic musculoskeletal pain

Einschätzung der Einstellung von Medizinstudierenden an der Universität Mainz zum Training von Kommunikationsfähigkeiten im Kontext der Behandlung chronischer muskuloskelettaler Schmerzen

Inauguraldissertation zur Erlangung des Doktorgrades der Medizin

der Universitätsmedizin
der Johannes Gutenberg-Universität Mainz
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Mainz, 2022

Wissenschaftlicher Vorstand: Dekanatsleiter

1. Gutachter:

2. Gutachter:

Tag der Promotion: 05.07.2023

Table of Contents

1. Abbreviations *4*

2. Zusammenfassung *5*

3. Introduction and Literature Discussion *8*

2.1.1 Prevalence and Demographics **10**

2.1.2 Pain Areas and Duration **10**

2.1.3 Consequences **11**

2.1.4 Assessment and Treatment **13**

2.2 Shared Decision-Making Communication *16*

2.3 Disadvantages of Ineffective Communication in Pain Care *19*

2.4 Opioid Use and Communication in Pain Care *21*

2.5 Communication Skills and Medical Students *22*

2.6 Communication Skills in Medical School Training *24*

2.7 Communication Skills as a selection criteria for Medical School *26*

2.9 Masterplan 2020 and Communicational Skills *28*

2.10 The Present Study *31*

3 Materials and Methods *33*

3.1 Participants **33**

3.2 Procedure **33**

3.3 Materials **33**

3.4 Data Analysis **34**

4 Results *35*

5 Discussion *37*

6 Summary *42*

7 Acknowledgements *44*

8 References *45*

9 Curriculum Vitae *55*

1. Abbreviations

BMG: Bundesministerium für Gesundheit/ Federal Ministry of Health
CHRONIC MUSCULOSKELETAL PAIN : Chronic musculoskeletal pain
CNCP: Chronic non-cancer pain
*CSAS:*Communication skills attitudes scale
GP: General physician
GPA: Grade point average
*NAS:*Negative Attitudes Subscale
NSAIDs: Non-steroid anti-inflammatory drugs
*OSCE:*Objective structured clinical examination
OTC: Over the counter
*PAS:*Positive Attitudes Subscale
SDM: Shared decision-making
SES: Social economic status
SJTs: Situational judgment tests (SJTs)

2. Zusammenfassung

Chronische Schmerzen stellen eine große Herausforderung auf mehreren Ebenen für das Gesundheitssystem dar, welche in Industrieländern zunimmt und zu den Top 10 der globalen Krankheitslasten gehört (Hoy et al., 2014). Chronische muskuloskelettale Schmerzen wirken sich negativ auf die Funktion des Bewegungsapparates aus und beeinträchtigen so das allgemeine Funktionsniveau und die Fähigkeit zur Teilhabe von Patienten, indem sie die Mobilität und Lebensqualität dieser einschränken (Jordan et al., 2010). Chronische muskuloskelettale Schmerzen stellen eine multidimensionale Herausforderung für das Gesundheitssystem dar (Hadi et al., 2017). Die Belastung auf verschiedensten Ebenen, die chronische Schmerzen in der Gesellschaft darstellen, macht es zu einer kritischen Angelegenheit, die untersucht und behandelt werden muss.
Eine unzureichende Kommunikation zwischen Primärversorgern und Patienten stellt eines der Haupthindernisse für eine wirksame Behandlung chronischer Schmerzen dar (Butow und Sharpe, 2013). Die Wirksamkeit der Behandlung von chronischen muskuloskelettalen Schmerzen durch Primärversorger wird positiv durch den Kommunikationsstil zwischen dem Arzt und dem Patienten beeinflusst (Frantsve und Kerns, 2007). Insbesondere unterstützt die Forschung die Implementierung eines Shared-Decision-Making-Ansatzes (SDM) (Parsons et al., 2012). SDM ist ein kollaborativer Prozess, welcher die gemeinsame Verantwortung für die medizinische Versorgung des Patienten fördert und gleichzeitig die Präferenzen des Patienten in den Entscheidungsprozess integriert (Frantsve und Kerns, 2007).
Daher ist die Lehre und der Erwerb von Kommunikationsfähigkeiten in der medizinischen Ausbildung notwendig, damit die Studierenden ausreichend qualifizierte Ärzte werden können (Alotaibi und Alsaeedi, 2016). Das Verständnis der Einstellungen von Medizinstudierenden zum Erlernen von Kommunikationsfähigkeiten ist für die Fakultätsangehörigen, Bildungsprogrammgestaltenden und Pädagogen von zentraler Bedeutung (Alotaibi und Alsaeedi, 2016). Die Einstellung von Medizinstudierenden zum Training kommunikativer Fähigkeiten hängt mit einer Vielzahl von Faktoren zusammen, die mit ausbildungs- und demografischen Variablen verbunden sind, einschließlich des Semesters, in welchem sich die Studierenden befinden, ihres Geschlechts und ob die Eltern der Studierenden Ärzte sind oder nicht (Rees und Sheard, 2002).

Insgesamt ist ein erhöhter Bedarf an der Integration und Optimierung bestehender Lehrinhalte welche Kommunikationsfähigkeiten adressieren in den medizinischen Fakultäten zu beobachten (Frantsve und Kerns, 2007). Kommunikationstraining ist in den von deutschen Hochschulen verwendeten Lernzielkatalogen unzureichend vertreten und wird daher nicht ausreichend in die Prüfungen für Medizinstudierende mit einbezogen (Jünger, 2017). Eine umfassende Neustrukturierung der Lernzielkatalogs ist daher ein zentraler Schritt zur Verbesserung der kommunikativen Ausbildung von angehenden Ärzten (Jünger, 2017). Gemäß dem in Deutschland verabschiedeten Masterplan Medizinstudium 2020 soll das Medizinstudium stärker auf die Vermittlung kommunikativer Kompetenzen ausgerichtet werden (wissenschaftsrat.de, 2018).

Die vorliegende Dissertation untersuchte, ob zwischen Medizinstudierenden der Universität Mainz des ersten und zweiten Semesters (d.h. Studienanfängern) im Vergleich zu Studierenden des neunten und zehnten Semesters (d.h. Studierenden im fünften Studienjahr) ein Unterschied in der Einstellung zur Kommunikationsausbildung besteht und ob das Geschlecht der Studierenden und die Ärzteschaft als Eltern ihre Einstellung zum Kommunikationstraining beeinflussen.

Insgesamt N = 270 (67,8% weiblich; M Alter = 23,62, SD = 3,84) Medizinstudierende nahmen an der Universität Mainz an der Umfrage dieser Dissertation teil. Der Communication Skills Attitude Scale (CSAS) wurde verwendet. Die Einstellung zur Ausbildung kommunikativer Fähigkeiten Studierender unterscheidet sich nicht signifikant zwischen Studierenden in weniger fortgeschrittenen Semestern und höheren Semestern. Darüber hinaus wurden keine signifikanten geschlechtsspezifischen Unterschiede in Bezug auf die Einstellung zum Training kommunikativer Fähigkeiten gefunden. Weiterhin unterscheidet sich die Einstellung zum Kommunikationstraining nicht signifikant zwischen Studierenden, deren Eltern Ärzte sind, und solchen, deren Eltern keine Ärzte sind.

Es besteht ein klarer Bedarf, die Einstellungen zur Kommunikationsfähigkeit von Studierenden an der Universität Mainz sowie Faktoren, die diese Einstellungen beeinflussen, weiter zu untersuchen, um behandlungsfördernde Kommunikationsstile

zukünftiger Ärzten zu fördern. Die vorliegende Dissertation zeigt Möglichkeiten zur systematischen Verbesserung des medizinischen Curriculums an der Universität Mainz auf, um die kommunikative Ausbildung von Studierenden und zukünftigen Ärzten zu verbessern.

3. Introduction and Literature Discussion

Chronic pain constitutes a major health problem that appears to be increasing in developed countries (Nygren, Berglund and Von Koch, 1995). Chronic pain is acknowledged by the World Health Organization (WHO) as a global public health issue (Di Thiene and Marceca, 2008), and is defined as pain that reappears or persists longer than the typical tissue healing time (i.e., for a period of over three months; International Association for Study of Pain,1986). Moreover, chronic pain does not entail a specific tissue damage and likely does not exist due to physical reasons (Hylands-White, Duarte and Raphael, 2017).

Trends show that chronic pain affects more individuals than heart disease, diabetes and cancer combined (Steglitz, Buscemi and Ferguson, 2012). Additionally, more recent studies have demonstrated that conditions of the musculoskeletal system, such as chronic musculoskeletal pain, are the leading cause of disability on a worldwide scope (Blyth and Noguchi, 2017). Consistent with this notion, the 2016 Global Burden of Disease study found that musculoskeletal conditions, such as osteoarthritis, neck pain and low back pain are the primary origins of disability (Hay et al., 2016). Furthermore, recent data suggests that chronic musculoskeletal pain presents a significant economic burden for society largely due to the rising health care expenses following its increasing prevalence (Oliveira et al., 2020).

In a systematic review, evidence was found indicating that chronic pain is widely present at an international level, with a prevalence of 34% in low-income nations and of 30% in high-income nations (Johnson, Elzahaf and Tashami, 2013). Comparable numbers have been found in the United States, with a prevalence of chronic pain of 30% (i.e., approximately 116 million people affected with chronic pain; Steglitz, Buscemi and Ferguson, 2012) and produced costs ranging from US$550 to US$626 billion each year (Simon, 2012). Moreover, chronic pain differing in intensity is present in approximately 20% of the adult European population (Breivik et al., 2006; Geneen et al., 2010) with the prevalence in Germany being of 17%, (Breivik et al., 2006). Recently, chronic lower back pain over a long period of time was identified as a very frequent cause of disability worldwide, and as a substantial challenge regarding healthcare spendings and reduction of working hours (Hayden et al., 2021).

Chronic musculoskeletal pain constitutes 99% of reported chronic pain (Breivik et al., 2006), and is the leading cause of disability worldwide (Taylor et al., 2016), particularly lower back pain (Hoy et al., 2014; Murray et al., 2012). The burden that chronic pain represents in society makes it a critical matter to investigate and to treat. Consistently, scientific evidence suggests that chronic musculoskeletal pain conditions are ranked within the top 10 global burden of disease (Hoy et al., 2014; Murray et al., 2012).

Formerly, the definition of chronic musculoskeletal pain was greatly focused on musculoskeletal structures such as bones and joints (Perrot et al., 2019). This focus on anatomical structures mainly referred to musculoskeletal diseases or local damage and did not consider the multidimensional mechanisms of chronic pain (Perrot et al., 2019). The recently used ICD-11 classification contains the concepts of primary and secondary chronic musculoskeletal pain and encompasses the biomedical dimensions with the psychological and social dimensions to enhance the evaluation and treatment of the complex experience that chronic musculoskeletal pain is (Perrot et al., 2019). As such, chronic primary musculoskeletal pain is now considered a subcategory of chronic musculoskeletal pain (Perrot et al., 2019).

Primary chronic musculoskeletal pain, which is within the stem of chronic primary pain, is a condition that shows no identifiable tissue aberrations and shows no signs of central sensitization (Perrot et al., 2019). Primary chronic musculoskeletal pain is regarded as a different ailment than neuropathic or nociceptive pain and can be categorized as a third pain form named nociplastic pain (Perrot et al., 2019). On the other hand, secondary chronic musculoskeletal pain can originate from a multitude of conditions such as persistent inflammation due to infection, persistent inflammation due to crystal formation, autimmuninflammatory disorders, and can be associated to structural changes (e.g., osteoarthritis, spondylosis) or to a deformity due to a fractured bone (Perrot et al., 2019). Secondary chronic musculoskeletal pain can also occur due to a musculoskeletal injury, due to neurologic diseases where there is a disfunction of the upper or lower motor neuron such as multiple sclerosis, due to extrapyramidal disorders such as Parkinson’s, or due to diabetic polyneuropathy (Perrot et al., 2019).

Chronic musculoskeletal pain negatively impacts the musculoskeletal system including muscles, joints, ligaments, and bones. Thus, chronic musculoskeletal pain severely impacts a patient’s functionality by reducing mobility and their quality of life

(Jordan et al., 2010). Diseases such as fibromyalgia, chronic neck and lower back pain, as well as osteoarthritis are very prevalent conditions within the category of chronic musculoskeletal pain (Flynn, 2020). Overall, it can be stated that chronic musculoskeletal pain conditions are a major burden within society and that a greater understanding of these conditions, as well as of factors that may promote a more favorable outcome to those suffering from these conditions, is required. To do this, further research with consequent implementation into policy is needed (Blyth and Noguchi, 2017).

2.1.1 Prevalence and Demographics

The prevalence of chronic musculoskeletal pain appears to vary according to age, sex, socioeconomic status (SES) and lifestyle factors, tending to have a higher prevalence among middle to older age individuals (i.e., 41 to 60 years old), and to be more common among females, among low SES groups, and among individuals experiencing stress (Breivik et al., 2006; McBeth and Jones, 2007; Rstøen et al., 2004). Chronic musculoskeletal pain is also commonly present among school-aged children and adolescents, representing a major hinderance on their daily living, education, social life, sleep, and eating behavior (Clinch and Eccleston, 2008; Ellert, Neuhauser and Roth-Isigkeit, 2007; Roth-Isigkeit, 2005).

Almost half of the individuals affected with chronic musculoskeletal pain report suffering from osteoarthritis and rheumatoid arthritis, and one out of five patients report pain due to processes related to herniated discs or fractures of the spine (Breivik et al., 2006). Trauma and surgery were reported accountable for 15% of pain in patients (Breivik et al., 2006). Remarkably, only 1% of chronic pain patients reported their pain to be caused by cancer (Breivik et al., 2006).

2.1.2 Pain Areas and Duration

The most commonly reported areas affected by chronic musculoskeletal pain are the upper and lower back (Valkenburg and Haanen, 1980), the shoulders (Brattberg, Thorslund and Wikman, 1989), as well as the neck, knees and hands (Breivik et al., 2006). The duration of chronic musculoskeletal pain on the body may vary, with nearly 60% of patients experiencing pain for a period ranging from two to fifteen years, 12% of patients reporting pain lasting less than two years, and 21% reporting pain lasting twenty or more years. The average amount of time that patients report suffering from chronic musculoskeletal pain is seven years (Breivik et al., 2006).

Moreover, reports measuring pain intensity using a numeric rating scale (i.e., 1 being the least amount of pain and 10 being strong and unbearable pain) indicate that 66% of chronic musculoskeletal pain patients report moderate pain levels and that 34% report severe pain levels (Breivik et al., 2006).

2.1.3 Consequences

Chronic musculoskeletal pain presents severe negative consequences on an individual's quality of life (Breivik et al., 2006). Faculties negatively affected by chronic musculoskeletal pain include physical activity, social life, activities of daily living and patient's autonomy (Breivik et al., 2006). Moreover, reports show that approximately 25 to 50% of participants experience a reduced capability for sexual or family relationships and to drive an automobile (Breivik et al., 2006). A more recent review investigating twenty studies indicated that there is an increased prevalence of cardiovascular diseases among people with chronic musculoskeletal pain compared to a group with no chronic musculoskeletal pain present (Oliveira et al., 2020). Research has demonstrated that chronic pain also interferes with the ability to obtain sufficient sleep and may intensify symptoms of depression and anxiety (Geneen et al., 2017). Moreover, an association between chronic pain and increased mortality exists, particularly when patient's activity levels are affected (Nüesch et al., 2011). These findings are in line with more recent research indicating that conditions that involve chronic musculoskeletal pain have a severe impact on people's health, especially in older people, and influence many aspects of daily living and lead to problems such as low physical activity levels, poor mobility, fragility, depression, higher risk of falling, poor sleep quality and mental decline (Blyth and Noguchi, 2017). Another major challenge for patients presented by chronic pain is restrictions in their ability to work or limitations regarding employment outside of their home. As such, loss or change of employment are common negative consequences of these conditions (Breivik et al., 2006). Furthermore, research suggests that 19% of chronic musculoskeletal pain patients lost their job because of their symptoms, 16% had to change their job responsibilities and 13% had to change their job entirely (Breivik et al., 2006). Therefore, chronic musculoskeletal pain patients are also affected with negative economic consequences arising from their health condition, which symbolizes a burden of high medical expenses (Geneen et al., 2017).

Beside the deficiencies that chronic musculoskeletal pain patients experience in their daily lives, chronic musculoskeletal pain further represents a multidimensional challenge for the health care system. First, a major concern expressed by care receivers is the establishment of inadequate patient-clinician alliances based on lack of trust, absence of empathy and deficient clinician communicational skills (Hadi et al., 2017). This represents a proposition for improving clinical practice and policy making. Hadi and colleagues (2017) stated that greater involvement of patients in treatment decision-making as well as improved communication attitudes among primary care providers may help improve this situation. Interestingly, research indicated that 12% of doctors reported never having examined the amount of pain that patients were experiencing, which demonstrates a lack of patient centeredness and lack of emphasis on the patient's needs (Breivik et al., 2006). This finding helps explain the large percentage of patients reporting that their physician's goal was to treat the illness rather than their pain, and the high percentage of patients being only partly satisfied or not satisfied with the physicians treating their pain (Breivik et al., 2006). Furthermore, some patients reported that they had the impression that their physician lacked the knowledge needed to control their pain, and that the physician did not believe the amount of pain that they were experiencing (Breivik et al., 2006). Consistently, some patients regarded their doctors as unsympathetic of their pain and as not considering their pain a problem (Breivik et al., 2006). Thus, physicians appear to lack an understanding of the extent to which their patient's pain impacts their well-being, as well as communication skills to demonstrate interest and engage empathically with their patients.

Furthermore, chronic musculoskeletal pain severely impacts medical health providers by presenting high healthcare costs and stress on physicians (Breivik et al., 2006). An issue that arises from the treatment of chronic musculoskeletal pain patients is the dissatisfaction that both patients and providers experience from regularly and unsuccessfully interacting with each other leading to multiple doctor visits (occasionally to several different doctors) for the same motive (Breivik et al., 2006; Hadi et al., 2017). Most chronic musculoskeletal pain patients reported visiting a doctor two to nine times over the past six months, and that a smaller percentage of patients saw a doctor at least ten times over the past six months (Breivik et al., 2006). Ineffective interactions between clinicians and patients stemming from avertable referrals to several specialists may result in differing methodologies for pain

treatment, which can contribute to patient dissatisfaction and can result in confrontation of opinions between primary care givers (Hadi et al., 2017). Moreover, when asked what specialized doctor patients were visiting for their chronic pain conditions, the majority reported being treated by their general physician (GP) followed by an orthopedic specialist and only 2% reported being treated by a pain specialist (Breivik et al., 2006). Therefore, most patients do not receive suitable care for their specific conditions, consequently leaving patients confused and contributing to excessive use of resources and to extended waiting times for appointments in secondary care (Hadi et al., 2017).

2.1.4 Assessment and Treatment

The assessment of pain mostly relies on information shared by the patient via self-reports describing the experienced distress (Turk and Melzack, 2011). In the assessment of chronic musculoskeletal pain, it is important to emphasize that pain is a subjective, internal experience that is perceived differently from patient to patient depending on various individual factors (Turk and Melzack, 2011). Furthermore, pain is a multifaceted experience that often absences a clear, easily assessable, and objective etiology (Turk and Melzack, 2011). For instance, although physical symptoms in patients are often identified as the source of chronic musculoskeletal pain, additional psychosocial factors almost always play at least an influential critical role, are directly related to the development of chronic musculoskeletal pain, and are associated with the occurrence of disability and emotional distress (Turk and Melzack, 2011). This is of great significance since chronic pain patients are often affected by comorbidities such as depression, anxiety and pain associated fear (Sullivan et al., 2001). Therefore, the physician-patient interaction is a key factor resulting in either enhancement or inhibition of disclosure of pain-related and treatment relevant diagnostic information (Frantsve and Kerns, 2007). The assessment reliability of conditions that fall under the category of chronic musculoskeletal pain can be improved by enhancing the quality of interactions between medical care givers and medical care receivers (Frantsve and Kerns, 2007).

For diagnosing chronic musculoskeletal pain, a detailed history as well as a thorough physical examination are required (Zhuang et al., 2022). Furthermore, a combination of a proper laboratory and imaging testing should be done to securely exclude infections, tumors or other diseases as causing factors (Zhuang et al., 2022).

After correctly diagnosing chronic musculoskeletal pain, it is of high importance to assess pain related conditions which have an influence on the determination of a treatment plan (Zhuang et al., 2022). Additionally, due to the strong presence of central sensitization in chronic musculoskeletal pain that should also be included in the diagnostic process (Zhuang et al., 2022). Essential assessment tools to assess pain intensity are the Numerical Rating Scale (NRS), Verbal Rating Scale (VRS) and the Visual Analog Scale (VAS) (Zhuang et al., 2022). Depending on the specific circumstances of an individual the adequate assessment tool should be considered (Zhuang et al., 2022). The NRS is comprised of a scale ranging from 0 to 10 and has been proven to be suitable for individual with limted understanding of their condition (Zhuang et al., 2022). The assessment using VRS is based on patients choosing from a catalogue of words what describes their pain the best and is the adequate tool for history taking and follow-up because of the varying understanding of the phrases used (Zhuang et al., 2022). Using the VAS method involves a 10 cm ruler which is supposed to be prepared in advance with the 0 cm edge indicating no pain and the 10 cm edge indicating extreme and excruciating pain. The patient is then asked to select the length that symbolizes their pain intensity, which represents a very usual means used in medical practice (Zhuang et al., 2022). The results of the VAS are subject to a high variance because of the differences in patients' cognitive ability, level of education, and understanding (Zhuang et al., 2022). For care receivers that are unable to use any of the aforementioned methods, clinicians can evaluate patients pain intensity by change in patient behavior (Zhuang et al., 2022).

Regarding chronic musculoskeletal pain care, treatment is often limited in chronic pain conditions, with the use of non-prescription as well as prescription drugs being common among chronic pain patients (Taylor et al., 2016). Roughly half of chronic pain patients take non-steroid anti-inflammatory drugs (NSAID's) and Paracetamol, with 13% using weak opioids obtained "over the counter" (OTC), and 5% being prescribed strong opioids (Breivik et al., 2006). Additionally, further cohort studies of adult chronic non-cancer pain (CNCP) addressing conditions such as chronic low back pain, rheumatoid arthritis, and osteoarthritis suggest that 2% to 8% of individuals receive treatment with strong opioids (Trouvin, Berenbaum and Perrot, 2019). Increasing worries exist concerning the adequate management of these conditions, the negative side effects of existing treatments, and the possible development of opioid dependence (Taylor et al., 2016). Pharmaceutical and

polypharmacy use is also common among children with chronic musculoskeletal pain, with 26% of children with chronic pain ingesting two to four pharmaceuticals regularly, and 20% taking opioids (Gmuca et al., 2019).

The treatment of chronic musculoskeletal pain often promotes and encourages cooperation between chronic musculoskeletal pain patients and health care providers (Frantsve and Kerns, 2007). Furthermore, the effective implementation of suitable and efficient care plans and interventions is also positively influenced by an appropriate relationship between clinicians and patients (Frantsve and Kerns, 2007). Consistently, the clinical effectiveness of medical care and quality of treatment for musculoskeletal pain patients delivered by primary care givers is positively influenced by the quality of the relationship between the clinician and the patient trough an effective and empathetic communication style (Frantsve & Kerns, 2007). Regarding this process, numerous primary care givers deliver adequate medical care to musculoskeletal pain patients while asserting that their clinical effectiveness and quality of treatment could be significantly improved through alterations in communicating information about the patient's ailment and treatment preferences (Woolf, 2004). This improvement of quality of care given by clinicians can be further enhanced by understanding patient's perception of treatment options leading to better usage of accessible treatment modalities (Woolf, 2004). Increased patient satisfaction and improved health care outcomes are empirically demonstrated to be accomplished through a collaborative clinician-patient interaction (Ong et al., 1995).

Interestingly, interventions that treat the musculoskeletal system as an object, therefore perceiving pain as something that exists only within the body, will likely not be satisfactory for patients as pain is eventually greatly influenced by the relationship between patient and physician (Frantsve and Kerns, 2007). Opposing attitudes and goals are common between health care providers and patients with chronic pain, with care receivers requesting "to be understood as individuals" and experiencing dissatisfaction in having to legitimize their pain concerns while physicians usually place a greater value on diagnosis and treatment plans over subjective patient concerns (Frantsve and Kerns, 2007).This process often leads to difficulties in engaging in cooperative treatment decision-making resulting in dissatisfaction in medical care givers as well as in medical care receivers (Frantsve and Kerns, 2007).

2.2 Shared Decision-Making Communication

Empirical literature on patient-provider communication has demonstrated how an effective and suitable communication style can facilitate the treatment of multifaceted medical states such as chronic pain (Frantsve and Kerns, 2007; Vranceanu, Cooper and Ring, 2009). Particularly, research supports the implementation of a shared decision-making (SDM) approach to help patients with chronic musculoskeletal pain (Parsons et al., 2012). SDM is a collaborative process between patients and healthcare providers that promotes shared responsibility for the medical care of the patient's condition while integrating the patient's preferences in the decision-making process (Frantsve and Kerns, 2007). Thus, SDM comprises a bidirectional practice with an emphasis on patient involvement in decision-making (Frantsve and Kerns, 2007). Findings suggest that a profound clinician-patient alliance through shared decision-making supports patient cooperation with treatment regimens (Thompson and McCabe, 2012). Hence, their compliance, which is characterized by patients' willingness to commit to and follow medical advice, contributes a major role in their health outcome (Adams and Howe, 1993). Additionally, patients benefit from SDM communication used by physicians by means of being involved in the decision making and being adequately informed about their condition, which leads to maintained autonomy whilst improving body mechanics (Barr and Threlkeld, 2000). Increased quality of communication can facilitate a better diagnostic process by making patients more willing to reveal pain relevant diagnostic information (Frantsve and Kerns, 2007). This argument is supported by the fact that pain is a personal and inner experience that greatly depends on the patient's self-report and thus relies on the information patients are willing to offer their physician (Turk and Melzack, 2011). The dominant attitude of medical scholars, residents and staff doctors is that clinicians are obligated to have larger contributions to the care decision-making than patients, and females seem to hold this attitude less than their male counterparts (Beisecker et al., 1996). Interestingly, female patients face more difficulties than male patients in communicating their pain concerns with health care providers (Frantsve and Kerns, 2007).

Possible risks that doctors may perceive that could influence the SDM approach is the increased workload that an enhanced shared decision-making may present to their daily practice (Reschovsky et al., 2001). Additionally, physicians

perceive their patients as lacking a certain understanding towards treatment and therapy options (Reschovsky et al., 2001). Doctors seem to engage less in SDM if care receivers are involved in alternative treatments (Beisecker et al., 1996), indicating perceived risk of interference with their treatment. A further concern arising from a deficiency of communication between physician and patient is that, after not receiving adequate pain relevant information from their primary care giver, patients request information from outside sources which can lead to conflicting medical treatments (McIntosh and Shaw, 2003). It is reported that a dissatisfactory encounter resulting from lack of emphatic communication can often lead to both clinicians and patients feeling unacknowledged and defeated (Frantsve and Kerns, 2007).

Evidence shows that doctors prosper from having undergone communication training emphasizing not only a patient-oriented care, but also the patient's wish of involvement in treatment decision making while assessing their preferences in the selection of treatment possibilities (Frantsve and Kerns, 2007). Furthermore, previous studies indicate that an enhanced outcome can be reached through a fulfilling patient-provider communication in chronic pain patients (Frantsve and Kerns, 2007). The effectiveness and the rewarding effect that result from communication training for chronic musculoskeletal pain and fibromyalgia patients leads to improved outcomes, including greater satisfaction of care receivers (Moral, Alamo and Jurado, 2001). Financial benefits generated by contracts with pharmaceutical companies may motivate the implementation of a paternalistic communication style. Thus, the implementation of patient-centered care may be connected to financial disadvantages for physicians practicing SDM (Rashidian, 2013).

In the paternalistic model, the doctor acts as a guard towards the patient and expresses what is best for the them (Kaplan et al., 2002). This style of doctor-care-receiver interaction is meant to ensure that the patient receives the treatment that best promotes their well-being (Kaplan et al., 2002). In that process, the physician employs his or her abilities to determine the patient's medical ailment, to administer suitable tests, and to initiate appropriate treatments which are likely to benefit the patient or relieve their pain (Kaplan et al., 2002). As such, it can be observed that most of the decision making is within the responsibility of the physician (Kaplan et al., 2002). In extreme cases, physicians inform patients authoritatively when which intervention will be initiated (Kaplan et al., 2002). Overall, within the paternalistic

approach the clinician can limit the patient's involvement and decide what is best for the patient (Kaplan et al., 2002).

Previous research has demonstrated that demographic factors influence the patient's interest in engaging in SDM (Frantsve and Kerns, 2007). Younger, female, and educated patients are more likely to be interested in being involved in their medical care and therefore more interested in engaging in SDM (Reid, 1984; Spies et al., 2006). SES appears to have a strong influence on whether physicians interact directly with their patients so that individuals with lower SES are often treated with less autonomy (Willems et al., 2005). Ethnic minority groups have also been shown to be less prone to participate in SDM, particularly if they do not speak English, leading them to be less informed about their ailments and the medical regimen that they will undergo (Frantsve and Kerns, 2007). In addition, physicians exhibit less empathy and reduced use of an SDM approach towards this group of patients (Frantsve and Kerns, 2007). Overall, it is stated that health professionals often fail to deliver sufficient care for chronic pain patients and to show a high level of deficiency in participating in SDM with their patients (Frantsve and Kerns, 2007). The aforementioned issues can be tackled through communication training, which is expected to lower patients' and physicians' frustration and disengagement (Frantsve and Kerns, 2007).

2.3 Disadvantages of Ineffective Communication in Pain Care

Several earlier reports exist indicating that problems in communication between physicians and patients lead to a greater experience of pain among patients that perceive these issues compared to those who do not (Glajchen, 2001). It is also noted that doubting the subjective reality of patient's chronic pain (i.e., doctors communicating inadequately and unempathetically with their patients as well as not considering their patients) leads to a 'double burden' in which patients experience chronic pain while, in addition, perceive an additional threat to their personal identity and the subjective reality of their conditions (Dow, Roche and Ziebland, 2012). Moreover, care-receivers are often aware of incompetence in communication by their primary care takers (Butow and Sharpe, 2013).

> *("… you're in pain but you are being told by your doctors "No, no you haven't got pain, it's just a pain you're feeling in your head". It just destroys you completely and it gives you a double burden to carry and that's what had happened to me, and I was destroyed by it' (CP07, woman aged 50)")* (Dow, Roche and Ziebland, 2012.)

Furthermore, lack of emphatical communication skills and inability of physicians to listen to their patients, may essentially lead to a complete breakdown of communication, preventing any sufficient care from taking place or from being implemented (Dow, Roche and Ziebland, 2012).

> *("'I have been known to, you know, storm out, be, you know, what's the word, a difficult patient because I'm frustrated. You know, if you feel you're not being listened to, it's frustrating, really frustrating' (CP18, woman aged 52) ")* (Dow, Roche and Ziebland, 2012.)

It appears evident that incompetent communication between primary care providers and patients presents one of the major obstacles to effective pain management (Butow and Sharpe, 2013). Research suggests that patients desire a more participatory role in the diagnostic and treatment process, and a greater level of openness and honesty on the part of the physician regarding their concerns towards pain management (Butow and Sharpe, 2013). Furthermore, the traditional method of

paternalistic communication has been found to be a hindrance to SDM, to lead to a reduction of adherence to the treatment regime, and to increase the probability of unsatisfactory medical outcomes (Sam et al., 2019). Evidence suggests that financial benefits, such as agreements with pharmaceutical companies, may be a significant motive for disregarding SDM and favoring the use of a paternalistic communication style (Rashidian, 2013). As such, the use of patient-centered care (i.e., SDM) may possibly present financial disadvantages for physicians applying these evidence-based practices in their care, which puts them at risk of not being financially compensated for applying patient-centered care practices (Rashidian, 2013). Lack of empathetic communication skills and inability of physicians to listen to their patients may fundamentally lead to a complete cessation of communication, preventing appropriate care from taking place or from being implemented (Dow, Roche and Ziebland, 2012). Therefore, ineffective communication between primary care providers and patients presents one of the major obstacles to successful pain management (Butow and Sharpe, 2013).

2.4 Opioid Use and Communication in Pain Care

Over the years, the prescription of opioids to chronic pain patients has increased in developed countries (Paterson at al., 2016), leading to growing concerns about suitable management, negative side effects of treatments in use, and the possibility of developing an opioid addiction in chronic pain patients (Taylor et al., 2016). Additionally, the use of pharmaceuticals and the occurrence of polypharmacy are also common in children with chronic musculoskeletal pain, with an alarmingly high percentage of children with chronic pain taking plenty of medication, including opioids (Gmuca et al., 2019). Previous findings support patient centered communication as an effective means for preventing adverse effects of and overuse of opioids (Kaye et al., 2020). These reports suggest that efficient patient centered communication prior to a surgical intervention can reduce the intake of opioids during the postoperative period as well as the number of pills ingested and supports the forming of realistic expectations regarding the amount of pain experienced after surgery (Kaye et al., 2020). Thus, leading to a reduced frequency of the development of chronic musculoskeletal pain (Kaye et al., 2020). Patients often report that they lack an appropriate description of the use, benefits, and risks of using opioids when they receive them for the first time, which can put them at risk of inadequate medication use after their hospitalization (Paterson et al., 2016). Thus, increasing the possibility of developing medication misuse and even dependency (Paterson et al., 2016). A high number of patients perceive their physicians as lacking the ability to prescribe opioids due to absence of expertise and practice, whereby this perception can be regarded to be caused by lack of patient centeredness (i.e., SDM) (Paterson et al., 2016). In other cases, patients report being persuaded to initiate the use of opioids (Paterson et al., 2016). SDM has been shown to be effective in reducing patient's reliance on opioids (Seal et al., 2017), enabling patients to consider pain care plans that are aligned with their personal aims and ideals (Seal et al., 2017). These plans can include treatment options such as exercise, cognitive behavioral therapy, pleasurable hobbies, and NSAD's (Seal et al., 2017).

2.5 Communication Skills and Medical Students

Adequate communication skills are required to build an effective clinician-patient relationship and can be regarded as an indispensable aspect of medical competency (Alotaibi and Alsaeedi, 2016). Evidence shows that doctors prosper from having undergone communication training emphasizing not only a patient-oriented care, but also the patient's wish of involvement in treatment decision making while assessing their preferences in the selection of treatment possibilities (Frantsve and Kerns, 2007). Furthermore, evidence indicates that an enhanced outcome can be reached through a fulfilling patient-provider communication in chronic pain patients (Frantsve and Kerns, 2007). The results of implementing effective communication skills training among chronic musculoskeletal pain and fibromyalgia patients leads to improved outcomes, including greater satisfaction of care receivers (Moral, Alamo and Jurado ,2001).

Various studies on medical education have proven that communicational abilities can be obtained and mastered after receiving appropriate training (Alotaibi and Alsaeedi, 2016) to positively influence a variety of fundamental clinical factors such as patient's compliance, comprehension, and general satisfaction (Ong et al., 1995). Therefore, the teaching and acquirement of communicational skills is necessary for medical students to become sufficiently qualified physicians (Alotaibi and Alsaeedi, 2016). Supporting the significance of communication skills training for physicians, Frantsve and Kerns (2007) found that an increased emphasis on communication training and SDM can be regarded as a mechanism to improve patient-provider interaction and collaboration.

Based on the aforementioned importance of communication skills training among medical students, understanding of attitudes, values and beliefs about communication skills learning held by medical students is of key significance to faculty authorities, educational program designers, and educators (Alotaibi and Alsaeedi, 2016). Attitude measurements towards communication skills training can be regarded as an adequate tool to assess curricular programs and the necessity to further innovate the educational agenda (Rees and Sheard, 2002). Attitudes refer to assessments of situations, individuals, or items in a positive or negative manner that influence one's feelings and behavior towards them (Ajzen, 2001).

The attitude of medical students concerning communication skills training appears to be strongly related to a variety of factors associated with education and demographic variables (Rees and Sheard, 2002). For instance, the attitude concerning communication skills training evolves throughout medical school, with evidence suggesting an increase in positive attitude in more advanced years of medical school as opposed to the first years (Alotaibi and Alsaeedi, 2016; Kahari and Takavarasha, 2013; Khashab, 2006). Therefore, training regarding communicational skills and implementation of this training in the final years of medical school is encouraged (Khashab, 2006).

Regarding sex differences in attitudes towards communication skills training, female students have shown significantly lower negative attitude scores and greater positive attitude scores than males (Cleland, Foster and Moffat, 2005). Furthermore, females disagreed more often with the statement that their communication and clinical skills were competent (Cleland, Foster and Moffat, 2005), indicating that females show greater belief that their communicational skills could be further improved. The dominant attitude of medical scholars, residents and staff doctors is that clinicians are obligated to have larger contributions to the decision-making process than patients, and female students appear to hold this attitude less than their male counterparts (Beisecker et al.,1996).

Mixed findings exist regarding differences in attitudes towards communication skills training among medical students whose parents are physicians and among students whose parents are not physicians. For instance, evidence exists suggesting that students whose father or mother is a physician tend to show significantly less negative attitudes towards communication skills training compared to students whose parents perform other occupations (Khashab, 2006).Conversely, a positive attitude towards communication skills training has been demonstrated to be less present among students whose parents are physicians (Rees and Sheard, 2002). As such, further research on this topic is needed in order to determine whether parental profession as physicians influence their offspring’s attitudes towards communicational skills training in medical school.

2.6 Communication Skills in Medical School Training

Overall, an increased need of incorporating and optimizing existing communicational training into medical school can be observed (Frantsve and Kerns, 2007). The purpose is to increase students' capability consider ethical responsibilities which include involving care receivers in their care and enhancing patients' participation in treatment plans and decision making (Frantsve and Kerns, 2007). Clinical experience shows that insecurities and lack of routine in combination with the wrong incentives system leads to "preferring to prescribe more so as not to overlook anything" resulting in overtreatment and mistreatment of patients. The acquisition of clinical decision-making skills as well as of appropriate communication skills is one of the central learning goals of future medical studies (Stallmach and Jünger, 2020). It is particularly problematic that vital medical tasks, such as communication skills or interprofessional collaboration, were insufficiently represented in the subject catalogs used by German universities and were therefore not included in written exams of medical students (Jünger, 2017). For medical students to be capable of dealing with future challenges in everyday work, a reorientation of medical training is required (Frenk et al., 2010). In particular, the strengthening of doctor-patient communication and interprofessional cooperation has already been recognized as highly relevant in terms of health policy (Stallmach and Jünger, 2020). However, these practices are yet to be included in the conception of state examinations for the first time (Stallmach and Jünger, 2020). Consequently, a widespread restructure of the subject catalogs is a central step to enhance communication skills training (Jünger, 2017).

A program designed to better medical students communicational skills and to tackle the lack of communicational training within medical school is a course called Summer School „Ärztliche Kommunikation für Tutorinnen und Tutoren"– an offer of the medical faculties for qualifying motivated tutors which teaches students proper medical communicational skills (www.impp.de, 2022). This qualification program is aimed at interested students who consider communication an important topic (www.impp.de, 2022). In the summer/autumn of 2019 the Summer School program, which is open for medical students of all faculties, and which qualifies them with teaching didactical skills as well as information to be an effective tutor for doctorly communication, was held for the fifth time (www.impp.de, 2022). In this two-day program, tutors are trained by an interdisciplinary team in topics such as medical

didactics, basics of communication, leading a group, and interprofessional communication regarding lacking treatment adherence and miscommunication (www.impp.de, 2022). The „Summerschool Ärztliche Kommunikation für Tutorinnen und Tutoren" is a cooperation project of various partner faculties (host faculties) and is designed to support faculties and students in implementing the demands of the "Masterplan Medizinstudium 2020" to make medical training more competency oriented (www.impp.de, 2022). Upcoming medical school should be oriented towards patient-centeredness, on measurable effectiveness and on proven effects (i.e., outcome-orientation) (Stallmach and Jünger, 2020). Moreover, these topics should be of more prominence in the field (Stallmach and Jünger, 2020).

Improving the course of medical studies must be done by implementing a stronger practical approach as well as by strengthening the teaching and attainment of decision-making abilities which include communicational skills mainly because of the increasing demand of these skills for future physicians (Stallmach and Jünger, 2020). With the resolution text published by the federal government on March 31, 2017, for the "Master plan for medical studies 2020", the high level of medical studies in Germany was recognized. On the other hand, clear deficits have also been named, which should be remedied by orienting future teaching towards instructing various patient-related skills such as communication and interprofessional skills (Stallmach and Jünger, 2020). This takes up the change that has already taken place at an international level transitioning from pure transfer of knowledge to training oriented towards medical roles and skills (Stallmach and Jünger, 2020).

2.7 Communication Skills as a selection criteria for Medical School

The importance of abilities that are not related to academic performance such as communication skills, professional behavior, and certain personality traits has increased significantly in recent years in the selection and acceptance into university of future medical students (Niessen and Meijer, 2016). Non-academic tests aim to measure skills such as professional behavior, ethical decision making, personality characteristics and communicational skills (Niessen and Meijer, 2016). Furthermore, non-academic admission tests are often structured in a self-report questionnaire (Adam et al., 2015). The multiple mini-interview test (MMI) is an example of such an instrument for measuring the mentioned non-academic skills (Niessen and Meijer, 2016). The MMI is comprised of a series of short, structured interviews and tasks where students can show their ethical standard, empathy and interpersonal skills (Niessen and Meijer, 2016). An additional example in form of a video-based assessment are the situational judgment tests (SJTs) that entail social interactions with colleagues who are physicians as well as doctor-patient interactions in which candidates are required to demonstrate how they would respond to a particular situation (Niessen and Meijer, 2016). A further benefit of using tests to assess non-academic skills in the selection process of medical school applicants is that it may result in a self-selection of future students therefore resulting in more applications of people that possibly fit the profile of a successful future physician better (Niessen and Meijer, 2016).

A growing interest in considering non-academic abilities such as communicational skills can be seen in the selection of future medical students contrasting the traditional knowledge-based academic tests such as the Medical College Admission Test® (MCAT) (Niessen and Meijer, 2016). Additionally, an increased number of colleges and universities are looking for measurement methods to assess and evaluate these skills (Niessen and Meijer, 2016). Internationally, interviews are among the most frequently used procedures in the selection of applicants for medical studies (Patterson et al., 2015). Interviews allow for the opportunity to assess the interests, motivation, interpersonal abilities, and communication skills of candidates (Patterson et al., 2015). Similarly, in Germany, these interviews are among the possible selection criteria listed in the Higher Education Framework Act (www.gesetze-im-internet.de, 2017). The fundamental argument for including tests

that measure non-academic skills in addition to tests that measure academic achievements (such as grade point average (GPA) or other standardized test scores) is that they enhance the selection procedure of future students by providing a more complete impression of whether the applicant has both adequate academic as well as personal skills to successfully undertake an education in medicine and consequently, a career as a medical practitioner (Niessen and Meijer, 2016). Contrasting the positive attitude towards the use of non-knowledge-based tests and situational judgment tests to assess desired professional attitudes such as ethical consciousness, researchers argue that the validity of the predictions for academic performance of these tests was low compared to knowledge-based tests in the selection process for future doctors (Harris, Walsh and Lammy, 2015). However, the use of academic performance as a criterion may not be suitable for this particular purpose because the aim is to predict performance as a doctor instead of academic performance (Niessen and Meijer, 2016). Additionally, a meta-analysis suggests a moderate relationship between SJTs and mental ability (Niessen and Meijer, 2016). Furthermore, other studies demonstrate a pattern in which academic and non-academic skills show a positive correlation (Schripsema et al., 2014, Eva et al., 2009), indicating that both non-academic and academic skills are not independent (Schripsema et al., 2014). As an example, a study conducted in the Netherlands concluded that pre-university students who had a higher GPA also accomplished higher scores in a professionalism course which, among others, included non-academic variables such as communicational skills, ethical decision making and professional behavior (Schripsema et al., 2014). A university that already uses non-academic criteria for selection of candidates is the McMaster University in Canada which uses a video SJT to assess teamwork, communication skills, professionalism, and confidentiality of all applicants at a pre-selection stage (Dore et al., 2017). Therefore, the assessment of communication skills presents a suitable measure for testing qualifications for entering medical school (Schripsema et al., 2014).

2.9 Masterplan 2020 and Communicational Skills

As per the Master Plan for Medical Studies 2020 passed in Germany, medical studies should move away from their strong focus on imparting facts and knowledge and focus more on teaching and learning competencies and skills (wissenschaftsrat.de, 2018). Innovative examination formats, such as key feature cases and Objective Structured Clinical Examination (OSCE) as well as examinations on patients as part of the M4 state examination in the future (provided in the current draft of the medical licensing regulations, which is based on the "smart decisions" recommendations of the German Association Of Gastroenterology), help to ensure a comprehensive implementation of these recommendations (Stallmach and Jünger, 2020). The majority of the 37 measures of the master plan are aimed at a competence-oriented restructuring of medical studies, for which the national catalog of learning objectives is to be further developed and become a mandatory part of the medical license regulations (wissenschaftsrat.de, 2018). The course should be geared more towards physician-related skills, abilities, and attitudes, including scientific, communicative and interprofessional (wissenschaftsrat.de, 2018). A particular emphasis is on doctor-patient communication, which is decisive for the doctor-patient relationship, and consequently, of the success of the treatment and the patient's well-being (wissenschaftsrat.de, 2018). Doctor-patient communication is also a key element concerning cooperation with fellow doctors from different disciplines who are involved in the treatment process of a patient (wissenschaftsrat.de, 2018). Henceforth with the masterplan 2020, the admission to medical school in Germany should more strongly emphasize the demands that doctorly duties and activities present, such as interpersonal and communicational skills as well as strong motivation for studying medicine and the academic requirements that this entails (wissenschaftsrat.de, 2018). Therefore, universities should implement at least two further selection criteria in addition to the grade point average (GPA) when selecting students applying to medical school (wissenschaftsrat.de, 2018). A restructuring of medical studies is aimed to address the challenges of the next generation of medicine practitioners sufficiently and successfully (wissenschaftsrat.de, 2018). These challenges must be adequately reflected in the content of training and examinations (wissenschaftsrat.de, 2018). The intention with the aforementioned restructuring of medical studies is that the students

acquire relevant medical skills and that they come into closer contact with patients and experience clinical practice starting from the beginning of or relatively early in their university career (wissenschaftsrat.de, 2018). In general, the objective is to prepare future doctors to have the ability of communicating satisfactorily with patients and of working effectively with fellow healthcare professionals (wissenschaftsrat.de, 2018). During the course, the foundations for suitable medical communicational skills must therefore be laid as a central element in medical studies (wissenschaftsrat.de, 2018). Correspondingly communicative skills can be demonstrably improved if they are trained as early as possible and then continuously advanced (wissenschaftsrat.de, 2018). The Federal Ministry of Health (BMG) in Germany supports the acquisition of communicative skills regarding the requirements of the Licensing Regulations for Physicians (wissenschaftsrat.de, 2018). These licensing regulations express specifically communication skills as a subject of medical training and content of the final state examination, and the learning objectives developed in the Neustrukturierung des Medizinstudiums und Änderung der Approbationsordnung für Ärzte for this purpose of medical training (wissenschaftsrat.de, 2018). The aim is to implement the model curriculum "National Longitudinal Communication Curriculum in Medicine" in the curricula of German universities, and to develop special examination formats for this (wissenschaftsrat.de, 2018). Therefore, social and communicative skills as well as relevant professional experience will also have greater influence in the selection process for entering medical school in the future (wissenschaftsrat.de, 2018). The university admissions law is being changed in order for universities to implement further selection criteria (in addition to the GPA) in their selection process (wissenschaftsrat.de, 2018). These should, include a strong emphasis on assessing social and communication skills (wissenschaftsrat.de, 2018). The Commission's proposal thus considers central changes of the masterplan where communicative and clinical-practical competencies should be strengthened at the level of certification and exam records (wissenschaftsrat.de, 2018). The growth in the body of knowledge and the rapid, ubiquitous availability of information also increases health literacy outside of health care specialists and changes the traditional doctor-patient relationship towards shared information-based, joint decision-making about an appropriate and accepted medical treatment approach (wissenschaftsrat.de, 2018). Medical progress is therefore not only increasing the demands on academic and scientific skills of its practitioners, but also on the communicative skills of doctors

(wissenschaftsrat.de, 2018). A special focus is on medical interviewing (communicative skills), which should be acquired early during the medical studies to strengthen the development of these skills throughout the course of medical studies in order to promote joint decision-making and its proved benefits (wissenschaftsrat.de, 2018). The "student selection network", coordinated by the Hamburg University Medical Center, has demonstrated a positive example of a joint assessment of faculties by including measurements of cognitive, social, and communicative skills of the applicants (wissenschaftsrat.de, 2018). Furthermore, they enforce the longitudinal strengthening of practical skills whilst in medical training, which ensures that, at the level of the study content, skills are to be acquired, further developed, and ultimately preserved. This process involves an early and integrated teaching of clinical-practical skills and medical skills, in particular communicative and psychosocial skills with an emphasis on medical interviewing (wissenschaftsrat.de, 2018).

2.10 The Present Study

The critical need of clinicians with adequate training on communication skills to treat patients suffering from chronic musculoskeletal pain is evident. Towards the later years of medical school, students should be able to apply a certain level of proficiency in communication skills and should have obtained attitudes consistent with excellent medical practice (Khashab, 2006). As the attitudes towards communication skills training appear to change throughout the course of medical studies (Kahari and Takavarasha, 2013), it is important to investigate how attitudes vary throughout the semesters, and what factors might influence students' attitudes to accurately develop suitable curriculums to prepare medical students for a career as physicians with suitable communicational skills. This topic has not been previously investigated at the university of Mainz. Therefore, the primary aim of the present study was to investigate whether a difference in attitude towards communication skills training exists among medicine students from the University of Mainz of the first and second semester (i.e., first year students) compared to students in the ninth and tenth semester (i.e., fifth year students). We selected students undergoing the first and second semester as well as students undergoing the ninth and tenth semester as studies suggest that first year students appear to have lower positive attitudes regarding communication skills training than students in more advanced years (Kahari and Takavarasha, 2013). Supporting this notion, students undergoing the fifth year of studies were selected based on findings suggesting that higher positive attitudes regarding communication skills training are present among students in more advanced semesters, indicating an increase in positive attitudes throughout medical education (Khashab, 2006). Conversely, Rees and Sheard (2002) reported a decrease in positive attitudes throughout medical education. Thus, we will investigate whether an increase or decrease of positive attitudes regarding communication skills training is present throughout medical education. Furthermore, we will investigate whether students' sex has an influence on attitudes towards communication skills training as evidence exists indicating that female students appear to hold more positive attitudes than male students (Beisecker et al.,1996). Lastly, we will also investigate whether having physicians as parents influences a positive attitude regarding communication skills training as previous reports have demonstrated that this is likely to occur (Khashab, 2006). Based on the aforementioned findings

supporting the significance of adequate communication skills training (i.e., SDM communication style) to optimize the treatment of chronic pain (Parsons et al., 2012; Frantsve and Kerns, 2007; Spies et al., 2006) and on findings indicating that certain factors influence medical students' attitudes towards communication skills training (Beisecker et al.,1996; Khashab, 2006) the present study hypothesized that:

(H1) Medical students in more advanced semesters will show higher levels of positive attitudes regarding communication skills training than medical students in earlier semesters.

(H2) Female medical students will show a higher level of positive attitudes regarding communication skills training than male medical students.

(H3) Medical students whose parents are physicians will show higher levels of positive attitudes regarding communication skills training than medical students whose parents are not physicians.

3 Materials and Methods

3.1 Participants

Students of medicine at the University of Mainz undergoing the first, second, ninth and tenth semesters were recruited to participate in our study. Inclusion criteria included being a medical student at the University of Mainz in one of these semesters, and willingness to complete all measures.

3.2 Procedure

The present study was granted exemption from ethical approval by the Ethics Committee of the University of Mainz. Nevertheless, informed consent was voluntarily obtained from participants who were informed of benefits and risks involved. To recruit participants, e-mails were sent to students of the corresponding semesters. The e-mail contained an electronic link granting access to the questionnaire. Personal informed consents were completed before starting the questionnaire. Participants were thanked for their participation. No compensation for participation was offered.

3.3 Materials

Sociodemographic questions as wells as a validated self-report measure were administered to all participants. Sociodemographic questions inquired about age, sex, education level, and whether their parents are physicians or not. The Communication Skills Attitude Scale (CSAS) is a 26-item self-report scale and the most frequently administered measure to assess students' attitudes towards communication skills training. The 26 items are divided into 2 subscales where 13 items comprise a positive attitude scale (PAS), and 13 items comprise a negative attitude scale (NAS). The response format is a 5-point Likert scale (1 meaning strong disagreement with a statement and 5 meaning strong agreement with a statement). Results can range from 13 to 65, with higher scores indicating greater positive or negative attitudes towards communication skills training depending on the number of points obtained in each subscale. Satisfactory internal consistency is shown for both subscales with a Cronbach-α of 0.81 for PAS and 0.81 for NAS (Rees and Sheard, 2002). Additionally, test-retest reliability has been validated as well, with a kappa coefficient for PAS of 0.65 and of 0.77 for NAS (Rees and Sheard, 2002).

3.4 Data Analysis

Data analysis was conducted by using the statistical analysis software IBM SPSS Statistics version 27.0. An a priori power analysis was conducted by means of the software G*Power (Faul et al., 2007) including a two-tailed test, a medium effect size (d = .50), and an alpha level of 5% to detect significant results. The analyses specified a minimum sample size of N = 116 participants with 4 groups of minimum n = 29 participants for identifying small effects with 80% power at an alpha level of .05. The dataset was revised to account for any outliers or missing data. Independent samples t-tests were conducted to identify baseline differences between participants in lower and higher semesters regarding age. Moreover, sex differences as well as differences regarding whether the participant's parent is a physician or not were analysed using chi^2 analyses. The first hypothesis was tested by conducting Analyses of Variance (ANOVA) including attitude towards communication skills training as the dependent variable and semester (4 groups) as the fixed factor. The second and third hypotheses were tested using independent samples t-tests including the respective predictor variable for each hypothesis (i.e., sex and whether the parents are physicians or not) and participants' attitudes towards communication skills training as the dependent variable.

4 Results

Sociodemographics:

A total of *N* = 270 (67.8% female; *M* age = 23.62, *SD* = 3.84) medical students at the University of Mainz participated in our study. From those, *n* = 64 (23.7%) were undergoing their first semester of studies, *n* = 81 (30.0%) were undergoing their second semester, *n* = 59 (21.9%) were undergoing their ninth semester, and *n* = 66 (24.4%) were undergoing their tenth semester. Moreover, most participants (*n* = 203; 75.2%) had already completed a nursing internship (Pflegepraktikum), *n* = 121 (44.8%) had completed the preliminary medical examination (Physikum exam), and only *n* = 3 (1.1%) had completed the pre-final examination (M2 exam). Most participants (*n* = 240; 88.9%) reported speaking German at home, and a minority reported having a physician as their mother (*n* = 33; 12.2%) or father (*n* = 44; 16.3%). No significant differences between participants in lower and higher semesters regarding age were found. Lastly, sex differences as well as differences regarding whether the participant's parent is a physician or not were not found.

Attitudes towards communication skills training:

Semester. A one-way ANOVA was conducted to assess the effect of semester on student's positive attitudes towards communication skills training. Results did not support the first hypothesis as the levels of positive attitudes regarding communication skills training between medical students in lower and more advanced semesters did not significantly differ $F(3,263) = 2.02$, $p = .11$. The effect of semester on student's negative attitudes towards communication skills training was also assessed, yet no significant results were found $F(3,261) = .73$, $p = 54$.

Sex. Regarding the second hypothesis, *t*-tests revealed no significant effect for sex, $t(265) = 4.26$, $p = .43$, despite females ($M = 51.89$, $SD = 6.90$) attaining higher scores on the PAS than males ($M = 47.90$, $SD = 7.69$). Nonetheless, significantly higher scores regarding negative attitudes towards communication skills training, $t(263) = –4.53$, $p = .05$, were found among males ($M = 29.98$, $SD = 6.22$) compared to females ($M = 26.67$, $SD = 5.18$).

Physicians as Parents. The third hypothesis was not supported, as independent samples *t*-tests showed that the levels of positive attitude towards communication skills training did not significantly differ, $t(265) = –1.12$, $p = .27$, between participants whose parents are physicians ($M = 49.67$, $SD = 8.33$) and those whose parents are

not physicians (*M* = 50.87, *SD* = 7.09). Moreover, the levels of negative attitude towards communication skills training also did not significantly differ between participants whose parents are physicians (*M* = 27.66, *SD* = 5.70) and those whose parents are not physicians (*M* = 27.85, *SD* = 5.85), *t*(263)= .22, *p* = .83.

5 Discussion

Drawing on evidence supporting the significance of suitable communication skills training (i.e., SDM communication style) to enhance the treatment of chronic musculoskeletal pain among patients (Parsons et al., 2012; Frantsve and Kerns, 2007; Spies et al., 2006), and on evidence suggesting that certain demographic factors influence medical students' attitudes towards communication skills training (Beisecker et al.,1996; Khashab, 2006), the present study investigated whether a difference in attitude towards communication skills training exists among medicine students from the University of Mainz of the first and second semester (i.e., first year students) compared to students in the ninth and tenth semester (i.e., fifth year students). More specifically, the present study analyzed whether an increase or decrease of positive attitudes regarding communication skills training is present throughout medical education. Furthermore, the present study investigated whether students' sex has a significant effect on their attitudes towards communication skills training (i.e., whether male or female students show higher scores in PAS). Lastly, the present study assessed whether having physicians as parents is related to students having a positive attitude regarding communication skills training (i.e., whether students with parents that are physicians show higher levels of PAS than students whose parents are not physicians).

Frist, the present study hypothesized that medical students in more advanced semesters would show higher levels of positive attitudes regarding communication skills training than students in less advanced semesters. The investigation did not show a significant increase in PAS in medical students of more advanced semesters. Thus, the first hypothesis was not supported. These findings contrast the findings of Kahari and Takavarasha (2013) as well as of Alotaibi and Alsaeedi (2016) who found results suggesting an increase in positive attitude in higher years of medical school. Moreover, a study done at the University of Alexandria in Egypt found a PAS towards communication skills training to be more present in fifth year medical students (Khashab, 2006). Rees and Sheard (2002) speculate that younger students may not value the opportunity afforded by communication skills training to the same extent that older students do. This can be related to older students having had more experience in communication due to previous communication-related education and exposure. As such, the result of no decline in PAS in more advancement semesters

appears to be more in line with the findings of Cleland and colleagues (2005) who reported that students showed higher PAS and lower NAS toward communication skills learning in the first year compared to the second or third year. As the present study was conducted during the Covid-19 pandemic, neither students in more advanced semesters nor students in earlier semesters had prolonged exposure to, nor personal interaction with patients due to contact restrictions in place due to the pandemic. Thus, we speculate that our non-significant results may be related to this lack of exposure and interaction with patients during the Covid-19 pandemic and not to an actual lack of an effect. Our study should be replicated once all Covid-19 restriction have been completely lifted in order to derive conclusions that are in line with the course of interactions between clinicians and patients during conventional non-pandemic times. Revaluating students' attitudes towards communication skills training would be crucial as, throughout the progression of their medical studies, students should develop and strengthen communication skills and attitudes consistent with adequatet medical practice (Khashab, 2006). This is also crucial considering the evident need of doctors with suitable training on communication skills to treat patients suffering from chronic musculoskeletal pain.

Second, the present study hypothesized that female medical students would show a higher level of positive attitudes regarding communication skills training than male students. Although evidence exists indicating that female students appear to hold more positive attitudes than male students (Beisecker et al.,1996), in divergence to the second hypothesis, no significant difference was found between female and male participants iregarding PAS scores. These findings may indicate that males and females exhibit similar levels of positive attitude towards communication skills training corroborating findings of a study among medical students in Sri Lanka (Cleland, Foster and Moffat, 2005). As previous evidence suggests that females overall show a more positive attitude towards all university courses than males, particularly towards communication skills training (Cleland, Foster and Moffat, 2005), we speculate that perhaps male students have had a chance to increase their positive attitudes towards communication skills training and resemble their female counterparts regarding this. Furthermore, as the direction of results was as expected and most participants were females, these results might suggest a lack of homogeneity regarding the sex distribution and not a lack of effect. As such, future

studies investigating attitudes towards communication skills training among medical students should focus on obtaining a more similar gender distribution.

Third, the present study hypothesized that medical students whose parents are physicians would show higher levels of positive attitudes regarding communication skills training than medical students whose parents are not physicians. Although previous reports have demonstrated that this is likely to be the case (Khashab, 2006), the third hypothesis was not supported as we found no significant differences between the PAS of students whose parents are physicians and those whose parents are not physicians. As most students reported that their parents are not physicians, a lack of power in this regard may have influenced this lack of effect. On the other hand, the present findings appear to be in line with findings by (Rees and Sheard ,2002) indicating that a lower PAS towards communication skills training has been shown by students whose parents are physicians compared to students whose parent are not physicians. A potential explanation for these results is that parents that are physicians might have a poor attitude towards learning communicational skills due to the fact that communication skill training was not present in their curriculum when they were students, therefore their children are socialized into having adopted these negative attitudes (Rees and Sheard, 2002) Several studies have indicated that poor attitudes are transferred unto students or less experienced workers from practicing and seasoned health care givers (Kassebaum and Cutler, 1998).

Limitations and future Research

The present findings provide valuable insights regarding the effects of semester progression, sex, and parental profession influences on the attitude towards communication skills training among medical students at the University of Mainz. Nonetheless, these findings should be interpreted considering potential limitations. First, the study was conducted at a single university in Germany with students who are part of a similar academic cohort. Thus, the results of the study may be difficult to generalize to students of other universities in different cities. Second, although there was sufficient number of participants as indicated by an a priori power analysis, the sample size of students per semester remains relatively small to draw generalizable inferences. Third, the period of data collection might not reflect changes in attitudes towards communication skills training that participants may have had during the course of their respective semester. As such, further studies should be done with a larger sample size, including students of different

universities and cohorts, during an extended period of data collection to derive more concrete interpretations. Fourth, females where overrepresented in the present study, which may further limit the generalizability of our results. Future research should focus on including an equivalent number of males and females to allow for the elaboration of actual differences. Fifth, the study was conducted during the Covid-19 pandemic in which a decrease in patient contact for university students was observed (Harries et al., 2021). As such, students' attitudes regarding communication skills training may therefore have been influenced due to the increased lack of contact with patients. Correspondingly, the present study should be replicated at a time were restrictions related to Covid-19 are not in place and students are exposed to the typical amount of exposure and contact with patients observed under regular circumstances. Sixth, the study may have been subject to volunteer bias or a systematic error due to differences between participants that choose to partake in a study and those who did not. Thus, these results may represent an already highly motivated sample with initial positive attitudes towards communications skills training instead of the average medical student at the University of Mainz. Finally, the CSAS was used as a validated tool for the self-reporting of attitudes towards communication skills training. A direct observation of attitudes may have led to a more robust assessment.

Conclusions

Despite these limitations, the present study highlights opportunities for systematic improvement of the medical curriculum at the University of Mainz to enhance communication skills training among students and future physicians. First, the entry requirements for studying medicine at the University of Mainz should include a stronger focus on existing communications skills as one of the main requirements for applicants. Second, the curriculum could be restructured to include a greater emphasis on training students on suitable communicational skills with a somewhat higher emphasis on training male students to increase their positive attitudes towards communicational skills. Lastly, the university could include incentives to promote change towards more positive attitudes and could provide additional opportunities to practice the learned skills. There is a clear need to further investigate the attitudes towards communication skills training among students at the University of Mainz as well factors that influence these attitudes in order to promote

communicational styles among future physicians that will positively impact the treatment of chronic musculoskeletal pain.

6 Summary

Chronic pain constitutes a major health problem that appears to be increasing in developed countries and is ranked within the top 10 global burden of disease (Hoy et al., 2014). Chronic musculoskeletal pain negatively impacts the musculoskeletal system thus severely impacting a patient's functionality by reducing mobility and their quality of life (Jordan et al., 2010) and representing a multidimensional challenge for the health care system (Hadi et al., 2017). The burden that chronic pain represents in society makes it a critical matter to investigate and to treat. Inadequate communication between primary care providers and patients presents one of the major obstacles to effective chronic pain treatment (Butow and Sharpe, 2013). The effectiveness treatment for musculoskeletal pain delivered by primary care givers is positively influenced by the communication style between the clinician and the patient (Frantsve & Kerns, 2007). Particularly, research supports the implementation of a shared decision-making (SDM) approach (Parsons et al., 2012). SDM is a collaborative process that promotes shared responsibility for the medical care of the patient's condition while integrating the patient's preferences in the decision-making process (Frantsve and Kerns, 2007). As such, the teaching and acquirement of communicational in medical school skills is necessary for students to become sufficiently qualified physicians (Alotaibi and Alsaeedi, 2016). Understanding of attitudes about communication skills learning held by medical students is of key significance to faculty authorities, educational program designers, and educators (Alotaibi and Alsaeedi, 2016). The attitudes of medical students concerning communication skills training are related to a variety of factors associated with education and demographic variables including the semester that the student is undertaking (less or more advanced in their studies), sex, and whether the student's parents are physicians or not (Rees and Sheard, 2002). Overall, an increased need of incorporating and optimizing existing communicational training into medical school can be observed (Frantsve and Kerns, 2007). Communication skills training is insufficiently represented in the subject catalogs used by German universities and is therefore, not included in examinations for medical students (Jünger, 2017). Consequently, a widespread restructure of the subject catalogs is a central step to enhance communication skills training (Jünger, 2017). As per the Master Plan for Medical Studies 2020 passed in Germany, medical studies should have a stronger

focus on teaching communication skills (wissenschaftsrat.de, 2018). The present study investigated whether a difference in attitudes towards communication skills training exists between medicine students from the University of Mainz of the first and second semester (i.e., first year students) compared to students in the ninth and tenth semester (i.e., fifth year students), and whether students' sex and having physicians as parents influence their attitudes towards communication skills training. A total of N = 270 (67.8% female; M age = 23.62, SD = 3.84) medical students at the University of Mainz participated in our study. The Communication Skills Attitude Scale (CSAS) was administered. Attitudes towards communication skills training between students in lower and more advanced semesters did not significantly differ. Moreover, no significant sex differences were found regarding attitudes towards communication skills training. Attitude towards communication skills training also did not significantly differ between participants whose parents are physicians and those whose parents are not physicians. There is a clear need to further investigate the attitudes towards communication skills training among students at the University of Mainz as well factors that influence these attitudes to promote communicational styles among future physicians. The present dissertation highlights opportunities for systematic improvement of the medical curriculum at the University of Mainz to enhance communication skills training among students and future physicians.

7 Acknowledgements

I am privileged to be able to recognize individuals who have supported me on the journey to achieving this doctoral dissertation and who have enhanced my experience as a medical student.

It is imperative that I direct my gratitude to for supervising my doctoral dissertation. His support and guidance played a significant role in all qualities of this doctoral dissertation.

Additionally, I would like to extend my appreciation to generously providing her time and feedback for my doctoral dissertation.

It is also important to acknowledge all students who agreed to complete the questionnaire, thus making this doctoral dissertation achievable.

I would also like to express my gratitude to my partner, who has been a great source of joyfulness during demanding times, for providing consistent support and unceasing reinforcement throughout my years of study, for her understanding, for her love.

I thank my loving mother for her support and sacrifices made for my education, and for a life filled with challenges that became valuable lessons and essential virtues that have profoundly shaped my life.

8 References

Adam, J., Bore, M., Childs, R., Dunn, J., Mckendree, J., Munro, D. and Powis, D. (2015). Predictors of professional behaviour and academic outcomes in a UK medical school: A longitudinal cohort study. *Medical Teacher*, 37(9), pp.868–880. doi:10.3109/0142159x.2015.1009023.

Adams, S.G. and HOWE, J.T. (1993). Predicting Medication Compliance in a Psychotic Population. *The Journal of Nervous and Mental Disease*, 181(9), pp.558–560. doi:10.1097/00005053-199309000-00005.

Ajzen, I. (2001). Nature and Operation of Attitudes. *Annual Review of Psychology*, 52(1), pp.27–58. doi:10.1146/annurev.psych.52.1.27.

Alotaibi, F. and Alsaeedi, A. (2016). Attitudes of medical students toward communication skills learning in Western Saudi Arabia. *Saudi Medical Journal*, 37(7), pp.791–795. doi:10.15537/smj.2016.7.14331.

Barr, J. and Threlkeld, A.J. (2000). Patient–practitioner collaboration in clinical decision-making. *Physiotherapy Research International*, 5(4), pp.254–260. doi:10.1002/pri.206.

Beisecker, A.E., Murden, R.A., Moore, W.P., Graham, D. and Nelmig, L. (1996). Attitudes of Medical Students and Primary Care Physicians Regarding Input of Older and Younger Patients in Medical Decisions. *Medical Care*, 34(2), pp.126–137. doi:10.1097/00005650-199602000-00005.

Blyth, F.M. and Noguchi, N. (2017). Chronic musculoskeletal pain and its impact on older people. *Best Practice & Research Clinical Rheumatology*, 31(2), pp.160–168. doi:10.1016/j.berh.2017.10.004.

Brattberg, G., Thorslund, M. and Wikman, A. (1989). The prevalence of pain in a general population. The results of a postal survey in a county of Sweden. *Pain*, 37(2), pp.215–222. doi:10.1016/0304-3959(89)90133-4.

Breivik, H., Collett, B., Ventafridda, V., Cohen, R. and Gallacher, D. (2006). Survey of chronic pain in Europe: Prevalence, impact on daily life, and treatment. *European Journal of Pain*, [online] 10(4), pp.287–287. doi:10.1016/j.ejpain.2005.06.009.

Butow, P. and Sharpe, L. (2013). The impact of communication on adherence in pain management. *Pain*, 154(Supplement 1), pp.S101–S107. doi:10.1016/j.pain.2013.07.048.

Chin, J. J. (2002) “Doctor-patient relationship: from medical paternalism to enhanced autonomy,” Singapore medical journal, 43(3), pp. 152–155.

Classification of chronic pain. Descriptions of chronic pain syndromes and definitions of pain terms. Prepared by the International Association for the Study of Pain, Subcommittee on Taxonomy” (1986) Pain. Supplement, 3, pp. S1-226.

Cleland, J., Foster, K. and Moffat, M. (2005). Undergraduate students’ attitudes to communication skills learning differ depending on year of study and gender. *Medical Teacher*, 27(3), pp.246–251. doi:10.1080/01421590400029541.

Clinch, J. and Eccleston, C. (2008). Chronic musculoskeletal pain in children: assessment and management. *Rheumatology*, 48(5), pp.466–474. doi:10.1093/rheumatology/kep001.

Coulter, A. (1999). Paternalism or partnership? *BMJ*, [online] 319(7212), pp.719–720. doi:10.1136/bmj.319.7212.719.

Coulter, A., Peto, V. and Doll, H. (1994). Patients’ Preferences and General Practitioners’ Decisions in the Treatment of Menstrual Disorders. *Family Practice*, 11(1), pp.67–74. doi:10.1093/fampra/11.1.67.

Di Thiene, D. and Marceca, M. (2008). Closing the gap in a generation: health equity through action on the social determinants of health. *Child: Care, Health and Development*, 35(2), pp.285–286. doi:10.1111/j.1365-2214.2008.00935_10.x.

Dore, K.L., Reiter, H.I., Kreuger, S. and Norman, G.R. (2017). Correction to: CASPer, an online pre-interview screen for personal/professional characteristics: prediction of national licensure scores. *Advances in Health Sciences Education*, 22(5), pp.1321–1322. doi:10.1007/s10459-017-9798-6.

Dow, C.M., Roche, P.A. and Ziebland, S. (2012). Talk of frustration in the narratives of people with chronic pain. *Chronic Illness*, 8(3), pp.176–191. doi:10.1177/1742395312443692.

Eggly, S. and Tzelepis, A. (2001). Relational Control in Difficult Physician–Patient Encounters: Negotiating Treatment for Pain. *Journal of Health Communication*, 6(4), pp.323–333. doi:10.1080/108107301317140814.

Ellert, U., Neuhauser, H. and Roth-Isigkeit, A. (2007). Schmerzen bei Kindern und Jugendlichen in Deutschland: Prävalenz und Inanspruchnahme medizinischer

Leistungen. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, 50(5-6), pp.711–717. doi:10.1007/s00103-007-0232-8.

Eva, K.W., Reiter, H.I., Trinh, K., Wasi, P., Rosenfeld, J. and Norman, G.R. (2009). Predictive validity of the multiple mini-interview for selecting medical trainees. *Medical Education*, 43(8), pp.767–775. doi:10.1111/j.1365-2923.2009.03407.x.

Faul, F., Erdfelder, E., Lang, A.-G. and Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), pp.175–191. doi:10.3758/bf03193146.

Flynn, D. M. (2020) “Chronic musculoskeletal pain: Nonpharmacologic, noninvasive treatments,” American family physician, 102(8), pp. 465–477.

Frantsve, L.M.E. and Kerns, R.D. (2007). Patient–Provider Interactions in the Management of Chronic Pain: Current Findings within the Context of Shared Medical Decision Making: Table 1. *Pain Medicine*, 8(1), pp.25–35. doi:10.1111/j.1526-4637.2007.00250.x.

Frenk, J., Chen, L., Bhutta, Z.A., Cohen, J., Crisp, N., Evans, T., Fineberg, H., Garcia, P., Ke, Y., Kelley, P., Kistnasamy, B., Meleis, A., Naylor, D., Pablos-Mendez, A., Reddy, S., Scrimshaw, S., Sepulveda, J., Serwadda, D. and Zurayk, H. (2010). Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *The Lancet*, 376(9756), pp.1923–1958. doi:10.1016/s0140-6736(10)61854-5.

Geneen, L.J., Moore, R.A., Clarke, C., Martin, D., Colvin, L.A. and Smith, B.H. (2017). Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *Cochrane Database of Systematic Reviews*, [online] 4(4). doi:10.1002/14651858.cd011279.pub3.

Gesetze im Internet (2017) Hochschulrahmengesetz in der Fassung der Bekanntmachung vom 19. Januar 1999 (BGBl. I S. 18), das zuletzt durch Artikel 6 Absatz 2 des Gesetzes vom 23. Mai 2017 (BGBl. I S. 1228) geändert worden ist. https://www.gesetze-im-internet.de/hrg/HRG.pdf. Zugegriffen: 22. Aug. 2017).

Glajchen, M. (2001). Chronic pain: Treatment barriers and strategies for clinical practice. The Journal of the American Board of Family Practice, 14(3), 211–218.

Gmuca, S., Xiao, R., Weiss, P.F., Sherry, D.D., Knight, A.M. and Gerber, J.S. (2019). Opioid Prescribing and Polypharmacy in Children with Chronic Musculoskeletal Pain. *Pain Medicine*, 20(3), pp.495–503. doi:10.1093/pm/pny116.

Hadi, M.A., Alldred, D.P., Briggs, M., Marczewski, K. and Closs, S.J. (2017). 'Treated as a number, not treated as a person': a qualitative exploration of the perceived barriers to effective pain management of patients with chronic pain. *BMJ Open*, [online] 7(6), p.e016454. doi:10.1136/bmjopen-2017-016454.

Harries, A.J., Lee, C., Jones, L., Rodriguez, R.M., Davis, J.A., Boysen-Osborn, M., Kashima, K.J., Krane, N.K., Rae, G., Kman, N., Langsfeld, J.M. and Juarez, M. (2021). Effects of the COVID-19 pandemic on medical students: a multicenter quantitative study. *BMC Medical Education*, 21(1). doi:10.1186/s12909-020-02462-1.

Harris, B.H., Walsh, J.L. and Lammy, S. (2015). UK medical selection: lottery or meritocracy? *Clinical Medicine*, 15(1), pp.40–46. doi:10.7861/clinmedicine.15-1-40.

Hay, S.I., Abajobir, A.A., Abate, K.H., Abbafati, C., Abbas, K.M., Abd-Allah, F., Abdulkader, R.S., Abdulle, A.M., Abebo, T.A., Abera, S.F., Aboyans, V., Abu-Raddad, L.J., Ackerman, I.N., Adedeji, I.A., Adetokunboh, O., Afshin, A., Aggarwal, R., Agrawal, S., Agrawal, A. and Ahmed, M.B. (2017). Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, [online] 390(10100), pp.1260–1344. doi:10.1016/s0140-6736(17)32130-x.

Hayden, J.A., Ellis, J., Ogilvie, R., Malmivaara, A. and van Tulder, M.W. (2021). Exercise therapy for chronic low back pain. *Cochrane Database of Systematic Reviews*, 2021(10). doi:10.1002/14651858.cd009790.pub2.

Hoy, D., March, L., Brooks, P., Blyth, F., Woolf, A., Bain, C., Williams, G., Smith, E., Vos, T., Barendregt, J., Murray, C., Burstein, R. and Buchbinder, R. (2014). The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Annals of the Rheumatic Diseases*, [online] 73(6), pp.968–974. doi:10.1136/annrheumdis-2013-204428.

Hylands-White, N., Duarte, R.V. and Raphael, J.H. (2017). An overview of treatment approaches for chronic pain management. *Rheumatology International*, 37(1), pp.29–42. doi:10.1007/s00296-016-3481-8.

Johnson, M.I., Elzahaf, R.A. and Tashani, O.A. (2013). The prevalence of chronic pain in developing countries. *Pain Management*, 3(2), pp.83–86. doi:10.2217/pmt.12.83.

Jordan, J.L., Holden, M.A., Mason, E.E. and Foster, N.E. (2010). Interventions to improve adherence to exercise for chronic musculoskeletal pain in adults. *Cochrane Database of Systematic Reviews*, (1). doi:10.1002/14651858.cd005956.pub2.

Jünger, J. (2017). Kompetenzorientiert prüfen im Staatsexamen Medizin. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, 61(2), pp.171–177. doi:10.1007/s00103-017-2668-9.

Kahari, L. and Takavarasha, P. (2013) “A study of university of Zimbabwe medical students’ attitudes towards the teaching and learning of communication skills,” International Journal of Advance Research, 1(9), pp. 35–42.

Kaplan, K.J., Schneiderhan, M., Harrow, M. & Omens, R. 2002, "Autonomy, gender, and preference for paternalistic or informative physicians: A study of the

Kassebaum, D.G. and Cutler, E.R. (1998). On the culture of student abuse in medical school. *Academic Medicine*, 73(11), pp.1149–58. doi:10.1097/00001888-199811000-00011.

Kaye, A.D., Kandregula, S., Kosty, J., Sin, A., Guthikonda, B., Ghali, G.E., Craig, M.K., Pham, A.D., Reed, D.S., Gennuso, S.A., Reynolds, R.M., Ehrhardt, K.P., Cornett, E.M. and Urman, R.D. (2020). Chronic pain and substance abuse disorders: Preoperative assessment and optimization strategies. *Best Practice & Research Clinical Anaesthesiology*, 34(2), pp.255–267. doi:10.1016/j.bpa.2020.04.014.

Kenny, D.T. (2004). Constructions of chronic pain in doctor–patient relationships: bridging the communication chasm. *Patient Education and Counseling*, 52(3), pp.297–305. doi:10.1016/s0738-3991(03)00105-8.

Khashab, Sahar S. (2006) “Attitudes of Alexandria Medical Students towards Communication Skills Learning.” *The Journal of the Egyptian Public Health Association*, 81(5-6)

McBeth, J. and Jones, K. (2007). Epidemiology of chronic musculoskeletal pain. *Best Practice & Research Clinical Rheumatology*, 21(3), pp.403–425. doi:10.1016/j.berh.2007.03.003.

McIntosh, A. and Shaw, C.F.M. (2003). Barriers to patient information provision in primary care: patients' and general practitioners' experiences and expectations of information for low back pain. *Health Expectations*, 6(1), pp.19–29. doi:10.1046/j.1369-6513.2003.00197.x.

Moore, R.A., Moore, O.A., Derry, S., Peloso, P.M., Gammaitoni, A.R. and Wang, H. (2001). Responder analysis for pain relief and numbers needed to treat in a meta-analysis of etoricoxib osteoarthritis trials: bridging a gap between clinical trials and clinical practice. *Annals of the Rheumatic Diseases*, 69(2), pp.374–379. doi:10.1136/ard.2009.107805.

Moral, R.R., Alamo, M.M., Jurado, M.A. and de Torres, L.P. (2001). Effectiveness of a learner-centred training programme for primary care physicians in using a patient-centred consultation style. *Family Practice*, 18(1), pp.60–63. doi:10.1093/fampra/18.1.60.

Murray, C.J., Ezzati, M., Flaxman, A.D., Lim, S., Lozano, R., Michaud, C., Naghavi, M., Salomon, J.A., Shibuya, K., Vos, T., Wikler, D. and Lopez, A.D. (2012). GBD 2010: design, definitions, and metrics. *The Lancet*, 380(9859), pp.2063–2066. doi:10.1016/s0140-6736(12)61899-6.

Niessen, A.S.M. and Meijer, R.R. (2016). Selection of medical students on the basis of non-academic skills: is it worth the trouble? *Clinical Medicine*, [online] 16(4), pp.339–342. doi:10.7861/clinmedicine.16-4-339.

Nüesch, E., Dieppe, P., Reichenbach, S., Williams, S., Iff, S. and Juni, P. (2011). All cause and disease specific mortality in patients with knee or hip osteoarthritis: population based cohort study. *BMJ*, 342(mar08 2), pp.d1165–d1165. doi:10.1136/bmj.d1165.

Nygren, A., Berglund, A. and von Koch, M. (1995) "Neck-and-shoulder pain, an increasing problem. Strategies for using insurance material to follow trends," Scandinavian journal of rehabilitation medicine. Supplement, 32, pp. 107–112.

Oliveira, C.B., Maher, C.G., Franco, M.R., Kamper, S.J., Williams, C.M., Silva, F.G. and Pinto, R.Z. (2020). Co-occurrence of Chronic Musculoskeletal Pain and Cardiovascular Diseases: A Systematic Review with Meta-analysis. *Pain Medicine*, 21(6). doi:10.1093/pm/pnz217.

Ong, L.M.L., de Haes, J.C.J.M., Hoos, A.M. and Lammes, F.B. (1995). Doctor-patient communication: A review of the literature. *Social Science & Medicine*, [online] 40(7), pp.903–918. doi:10.1016/0277-9536(94)00155-m.

Parsons, S., Harding, G., Breen, A., Foster, N., Pincus, T., Vogel, S. and Underwood, M. (2012). Will shared decision making between patients with chronic musculoskeletal pain and physiotherapists, osteopaths and chiropractors improve patient care? *Family Practice*, 29(2), pp.203–212. doi:10.1093/fampra/cmr083.

Paterson, C., Ledgerwood, K., Arnold, C., Hogg, M., Xue, C. and Zheng, Z. (2015). Resisting Prescribed Opioids: A Qualitative Study of Decision Making in Patients Taking Opioids for Chronic Noncancer Pain. *Pain Medicine*, 17(4), p.n/a-n/a. doi:10.1111/pme.12921.

Patterson, F., Knight, A., Dowell, J., Nicholson, S., Cousans, F. and Cleland, J. (2015). How effective are selection methods in medical education? A systematic review. *Medical Education*, 50(1), pp.36–60. doi:10.1111/medu.12817.

Perrot, S., Cohen, M., Barke, A., Korwisi, B., Rief, W. and Treede, R.-D. (2019). The IASP classification of chronic pain for ICD-11. *PAIN*, 160(1), pp.77–82. doi:10.1097/j.pain.0000000000001389.

Publikationen - Neustrukturierung des Medizinstudiums und Änderung der Approbationsordnung für Ärzte | Empfehlungen der Expertenkommission zum Masterplan Medizinstudium 2020 (Drs. 7271–18), September 2018, Wissenschaftsrat, [online] https://www.wissenschaftsrat.de/download/archiv/7271-18 [abgerufen am 20.05.2022].

Rashidian, H., Nedjat, S., Majdzadeh, R., Gholami, J., Haghjou, L., Abdollahi, B., Davatchi, F. and Rashidian, A. (2013). The perspectives of iranian physicians and patients towards patient decision aids: a qualitative study. *BMC Research Notes*, 6(1), p.379. doi:10.1186/1756-0500-6-379.

Rees, C. and Sheard, C. (2002). The relationship between medical students' attitudes towards communication skills learning and their demographic and education-related characteristics. *Medical Education*, 36(11), pp.1017–1027. doi:10.1046/j.1365-2923.2002.01333.x.

Reid, D.W. (1984) “Participatory control and the chronic-illness adjustment process,” *Research with the Locus of Control Construct*, pp. 361–389. Available at: https://doi.org/10.1016/b978-0-12-443203-1.50010-7.

Reschovsky, J., Reed, M., Blumenthal, D. and Landon, B. (2001). Physicians??? Assessments of Their Ability to Provide High-Quality Care in a Changing Health Care System. *Medical Care*, 39(3), pp.254–269. doi:10.1097/00005650-200103000-00006.

Roth-Isigkeit, A. (2005). Pain Among Children and Adolescents: Restrictions in Daily Living and Triggering Factors. *PEDIATRICS*, 115(2), pp.e152–e162. doi:10.1542/peds.2004-0682.

Rustøen, T., Wahl, A.K., Hanestad, B.R., Lerdal, A., Paul, S. and Miaskowski, C. (2004). Gender differences in chronic pain—findings from a population-based study of Norwegian adults. *Pain Management Nursing*, 5(3), pp.105–117. doi:10.1016/j.pmn.2004.01.004.

Sam, S., Sharma, R., Corp, N., Igwesi-Chidobe, C. and Babatunde, O.O. (2019). Shared decision making in musculoskeletal pain consultations in low- and middle-income countries: a systematic review. *International Health*, 12(5). doi:10.1093/inthealth/ihz077.

Schripsema, N.R., van Trigt, A.M., Borleffs, J.C.C. and Cohen-Schotanus, J. (2014). Selection and study performance: comparing three admission processes within one medical school. *Medical Education*, 48(12), pp.1201–1210. doi:10.1111/medu.12537.

Seal, K., Becker, W., Tighe, J., Li, Y. and Rife, T. (2017). Managing Chronic Pain in Primary Care: It Really Does Take a Village. *Journal of General Internal Medicine*, 32(8), pp.931–934. doi:10.1007/s11606-017-4047-5.

Simon, L.S. (2012). RELIEVING PAIN IN AMERICA: A BLUEPRINT FOR TRANSFORMING PREVENTION, CARE, EDUCATION, AND RESEARCH. *Journal of Pain & Palliative Care Pharmacotherapy*, 26(2), pp.197–198. doi:10.3109/15360288.2012.678473.

Spies, C.D., Schulz, C.M., Weiß-Gerlach, E., Neuner, B., Neumann, T., von Dossow, V., Schenk, M., Wernecke, K.-D. . and Elwyn, G. (2006). Preferences for shared decision making in chronic pain patients compared with patients during a premedication visit. *Acta Anaesthesiologica Scandinavica*, 50(8), pp.1019–1026. doi:10.1111/j.1399-6576.2006.01097.x.

Stallmach, A. and Jünger, J. (2020). „Klug entscheiden“ in der Gastroenterologie – eine Wissenschaftskompetenz, die bereits im Medizinstudium gelernt werden muss. *Zeitschrift für Gastroenterologie*, 58(07), pp.659–663. doi:10.1055/a-1153-9320.

Steglitz, J., Buscemi, J. and Ferguson, M.J. (2012). The future of pain research, education, and treatment: a summary of the IOM report ‘Relieving pain in America: a blueprint for transforming prevention, care, education, and research’. *Translational Behavioral Medicine*, 2(1), pp.6–8. doi:10.1007/s13142-012-0110-2.

Sullivan, M.J.L., Thorn, B., Haythornthwaite, J.A., Keefe, F., Martin, M., Bradley, L.A. and Lefebvre, J.C. (2001). Theoretical Perspectives on the Relation Between Catastrophizing and Pain. *The Clinical Journal of Pain*, 17(1), pp.52–64. doi:10.1097/00002508-200103000-00008.

Taylor, S.J.C., Carnes, D., Homer, K., Kahan, B.C., Hounsome, N., Eldridge, S., Spencer, A., Pincus, T., Rahman, A. and Underwood, M. (2016). Novel Three-Day, Community-Based, Nonpharmacological Group Intervention for Chronic Musculoskeletal Pain (COPERS): A Randomised Clinical Trial. *PLOS Medicine*, 13(6), p.e1002040. doi:10.1371/journal.pmed.1002040.

Thompson, L. and McCabe, R. (2012). The effect of clinician-patient alliance and communication on treatment adherence in mental health care: a systematic review. *BMC Psychiatry*, 12(1). doi:10.1186/1471-244x-12-87.

Trouvin, A.-P., Berenbaum, F. and Perrot, S. (2019). The opioid epidemic: helping rheumatologists prevent a crisis. *RMD Open*, 5(2), p.e001029. doi:10.1136/rmdopen-2019-001029.

Turk, D.C. and Melzack, R. (2011). *Handbook of Pain Assessment, Third Edition*. [online] *Google Books*. Guilford Press. Available at: https://play.google.com/store/books/details?id=PMr3NQh20VoC [Accessed 6 Dec. 2022].

Valkenburg, H. and Haanen, H. (1980) “The epidemiology of low back pain.” Edited by A. A. White and S. L. Gordon, pp. 9–22.

Vranceanu, A.-M., Cooper, C. and Ring, D. (2009). Integrating Patient Values into Evidence-Based Practice: Effective Communication for Shared Decision-Making. *Hand Clinics*, 25(1), pp.83–96. doi:10.1016/j.hcl.2008.09.003.

Willems, S., De Maesschalck, S., Deveugele, M., Derese, A. and De Maeseneer, J. (2005). Socio-economic status of the patient and doctor–patient communication: does it make a difference? *Patient Education and Counseling*, 56(2), pp.139–146. doi:10.1016/j.pec.2004.02.011.

Woolf, A.D. (2004) “Musculoskeletal pain in Europe: Its impact and a comparison of population and medical perceptions of treatment in eight European countries,” *Annals of the Rheumatic Diseases*, 63(4), pp. 342–347. Available at: https://doi.org/10.1136/ard.2003.010223.

www.impp.de. (n.d.). *Summerschool - www.impp.de*. [online] Available at: https://www.impp.de/forschung/drittmittelprojekte/summerschool.html [Accessed 20 May 2022].

Zhuang, J., Mei, H., Fang, F. and Ma, X. (2022). What Is New in Classification, Diagnosis and Management of Chronic Musculoskeletal Pain: A Narrative Review. *Frontiers in Pain Research*, 3. doi:10.3389/fpain.2022.937004.

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Sprachkenntnisse

Deutsch (fließend); Englisch (fließend); Spanisch (fließend)