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Developmental Aspects of Parental Mental Health and Child Development

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1. Introduction

Scientists and parents alike have pondered the development of infants in the first few months of life: their physical growth, motor development, ability to think, language development, and building of social relationships. More importantly, does their early relationship with their parents shape their development? An important factor which may influence the parent-child relationship and interaction is the mental health condition of the mother. A study has shown that although mothers with and without depressed symptoms both show the same concern for their children's safety and feeding, differences can be found in the finer interactions with their children (McLearn et al., 2006). Mothers who do not have a healthy mental state may not provide a positive environment or interaction, which can diminish the children's motivation and interest in communication. Tough and colleagues (2008) further found that a mother's poor emotional health is a predictor for her child's developmental delay. Mothers need to have the ability to detect the needs of their children and respond positively to them. This positive interaction can then motivate the children to communicate, which stimulates their cognitive development (Sohr-Preston & Scaramella, 2006). Thus, maternal mental health plays an important role in child development.

Fathers have a moderating effect on the influence of the mothers on children's development. With the increase in the number of mothers entering the workforce, the roles fathers play in children's lives are also greater. Mezulis et al. (2004) found that paternal involvement can reduce the effect of maternal depressive symptoms on their children. The father's better mental health may decrease the negative influence that maternal poor mental health has on children's behavioral and emotional problems (Kahn et al., 2004). However, when both parents have poor mental health, the children will develop more severe behavioral and emotional problems (Kahn et al., 2004).

In addition, as early as seven months, infants are able to react to mood regulation and social interaction and can attempt to influence their parents (Kochanska & Akasan, 2004). Mothers of children who are born premature with autism spectrum disorder or other chronic illnesses experience higher parenting stress (Davis & Carter, 2008; Mussatto, 2006; Singer et

al., 1999). Thus, not only does parental mental health affect children's development, but children's development can in turn affect maternal mental health.

Many other factors in the environment in which children grow up can also influence children's development. The triad of parental mental health, children's development and child-rearing context is important in understanding children's development. Of most importance, since this interaction is continuous, continuous follow-up is necessary to understand the possible reciprocal effect among these factors.

Both prospective and retrospective studies have been used to investigate the influence of parents on their children. Retrospective studies have generally used recollections of the influence of parental mental health on children, including adult recall of parenting skills on their personality characteristics and mental health state. On the other hand, prospective studies generally are longitudinal cohort studies, which have the advantage of no recall bias. A previous study found that in the investigation of lifetime prevalence of mental disorders, the number of prospective studies was double that of retrospective studies (Moffitt et al., 2010). This was due to the participants' underreporting of past disorder symptoms (Simon & VonKorff, 1995). However, since cohort studies are costly and time-consuming, and may have the problems of possible bias due to loss to follow-up (Cesar & Carvalho, 2011), both retrospective and prospective studies can provide valuable information regarding the effect of parents on their children.

2. Retrospective studies: the effect of parental attachment and mental health

The mental health condition of parents can affect their parenting style, for when mothers are in a state of emotional distress, or do not have the time and energy to care for their children, they may not be able to provide the positive interaction or environment that the child needs (Stein et al., 1991), which may increase children's distress and arousal and diminish their interest and motivation in communication (Field, 1995; Gauvain, 2001). It is well established that parenting style has an influence on children's later development, including the children's psychosocial development, academic achievement, and social competence, and the development of mental disorders (Lung, 2011; U.S. Census Bureau, 2004). Using Parker et al.'s theory (1979), parental bonding can be separated into the two dimensions of care and protection. A high level of care indicates warmth, and a low level implies neglect. On the other hand, a high level of protection implies over-protection and control, and a low level indicates encouragement of autonomy and independence. Thus, a parenting style with a high level of care and a low level of protection has generally been found to be better for the mental health of children (Huppert et al., 2010; Lung, 2011). A series of studies have found that the influence of parental bonding on mental health is mediated by personality characteristics (see review in Lung, 2011). Parenting rearing behaviors can influence children's development in terms of behavior, personality, interpersonal relationships and the ability to adjust (Parker & Gladstone, 1996). Lung et al. (2002) and Chen et al. (2011) both found that males who were overprotected by their mothers had higher neuroticism and lower extraversion, which increased their risk of developing adjustment disorder. Similarly, maternal overprotection can lead to a greater tendency to develop neurotic personality characteristics, which may affect the individual's mental health status and contribute to the development of hyperventilation syndrome (Shu et al., 2007; Lung et al., in press). This is understandable, since mothers are the main caregivers.

Thus, the molding of an individual's personality and that person's ability to adjust psychologically are influenced by their attachment to their parents (Bowlby, 1977). Besides mental illnesses, parenting style has also been found to contribute to the tendency to commit offenses, and to develop antisocial behavior and poor interpersonal relationships (Clifford, 1959). The above-mentioned retrospective studies all found parental rearing style to play a vital role in the development of children's mental health and behavior.

3. Prospective cohort studies

As stated earlier, retrospective studies have the possibility of recall bias, but cohort studies or even birth cohort studies can provide us with a longitudinal understanding of how conditions develop overtime and how exposures in childhood can influence outcomes later in life (Thompson et al., 2010). For instance, the British cohort study, which started in 1970, is one of the longest-standing birth cohort studies with the largest existing sample (Thompson et al., 2010) showing that parental style affects children well into adulthood (Huppert et al., 2010). However, secular changes have caused differences in family structures. In the British cohort study, mothers are generally stay-at-home moms and the rate of separation and divorce is much lower (Huppert et al., 2010). In addition, the mean maternal and paternal age has also increased (Bray et al., 2006). In fact, most of mental disorders are emotional disorders. Categorical diagnoses have to pay attention to environmental factors (Horwitz & Wakefield 2007). On the other hand, Anna Freud (1965) argued against adopting a symptomatological diagnostic system for psychopathology, advocating instead the evaluation of disturbances in children based on their abilities to perform age-appropriate developmental tasks. For instance, the studies of serotonin related polymorphism associated with depression vulnerability and suicide (Chen et al., 2011; Hung et al., in press; Hung et al., 2011; Lin et al, 2009; Lung & Lee, 2008; Lung et al., 2011c). Genes interact with life events to create mental disorder (Caspi et al., 2003). The body is not a machine that built from a plan. Bodies are resilient as a product of natural selection overtime (Nesse & Stearns, 2008).

In the following sections we present recent findings from recent cohort or birth cohort studies regarding the relationship between parental mental health and children's development, and the factors mediating or confounding this relationship in Taiwan. Along with results from cohort studies worldwide, the results from the Taiwan Birth Cohort Study and the Taiwan Birth Cohort pilot Study were also presented. The Taiwan Birth Cohort Study is a national household study, which randomly sampled 21,648 infants and their family at birth, and followed up their development, parental health and environmental context factors (as shown in Appendix I). General population birth cohort studies can eliminate the bias from high risk populations and help us understand the phenomenon of common sporadic cases. For example, previous medical-center based studies have shown that taking care of children with autism spectrum disorder increases stress on both parents (Davis & Carter, 2008), and especially affects the mental health condition of the mothers (Shu et al., 2000). However, in the household probability sample database of the Taiwan Birth Cohort pilot Study, mothers who had perceived better physical health quality of life had increased concern regarding their children being at risk for autism spectrum disorder (as described in Lung et al., 2011b). We hypothesized this increased concern might be due to children who are brought to medical centers exhibiting more disruptive symptoms, and

creating greater maternal distress, which is why their parents chose to seek help. However, since most studies on autism spectrum disorder are medical center-based samples, a health worker effect bias is shown in these studies, and the results may not be generalizable to all mothers of children with autism spectrum disorder. Thus, a household probability sample is important in understanding community-based factors which effect child development (Lung et al., 2011b).

3.1 The effect of parental mental health vs. education and age at childbirth on children's development

As mentioned in the introduction, the mental health of both parents has been found to have a vital impact on children's development. However, other important parental characteristics have also been found to impact children's development, and one of these is the parental level of education (Kolobe, 2004). The educational level of the mother has been found to impact the mother's dietary practices (Wachs et al., 2005), childbearing style (Kolobe, 2004) and breastfeeding, which affects children's cognitive development (Angelsen et al., 2001). Furthermore, the parental level of education has been found to be a stronger predictor for child well-being than family income, single parenthood or family size (Zill, 1996). Parental age at childbirth is another important factor which has been found to influence children's development. Parents who are either too young or too old at childbirth can have a potentially detrimental effect on children's development. Both teenage pregnancies and elder paternal age have been found to increase the rate of low birth weight (Li & Chang, 2005; Reichman & Teitler, 2006), which is associated with an increased risk of motor developmental delays (Liu et al., 2001).

The Taiwan Birth Cohort Study found the mental health of both parents had an effect on children's development, with maternal mental health having a more persistent and pervasive effect than paternal mental health (Lung et al., 2009b). Paternal mental health was not associated with children's six months' development, and was associated only with children's fine motor development at 18 months (Lung et al., 2009b). This may be because mothers are generally the main caregiver at infancy, and paternal involvement in children's development increases over time (Bailey, 2004).

However, when the covariates of parental education and age were added, parental education had a more pervasive and persistent effect than parental mental health, showing that parental level of education is a vital confounding factor in children's development (Lung et al., 2009b). Lung et al. (2010b) further found the impact of maternal education on child development increases with time, and the effect of maternal mental health on child development decreases with time. This may be because the maternal level of education is a variable that does not change with time; however, the mother's own perceived mental health may change with time. Parents who are highly educated may have more access to up-to-date information regarding childcare and make better use of family and community resources (Guldan et al., 1993), thus promoting child development.

With regards to parental age, children of mothers who were older had better development, but children of fathers who were older had worse development at six months; however, this association dissipated at 18 months, showing only slower language development (Lung et al., 2009b). This is consistent with the results of the US Collaborative Perinatal Project, also a

general population birth cohort study, which found an opposing effect of older paternal and maternal age on children's behavioral outcomes (Saha et al., 2009). In that study, advanced paternal age increased the risk of adverse externalizing behaviors, and advanced maternal age was found to be protective of adverse externalizing behaviors, but carried a risk of internalizing behavior outcomes (Saha et al., 2009). Furthermore, a New Zealand birth cohort study also found advanced maternal age to be associated with declining risks of educational underachievement, juvenile crime, substance misuse, and mental health problems (Fergusson & Woodward, 1999). In previous studies, older parental age has generally been shown to be a risk factor for children's development (Li & Chang, 2005; Liu et al., 2001; Reichman & Teitler, 2006), since older age is associated with a higher risk of low birth weight (Li & Chang, 2005; Reichman & Teitler, 2006), which is associated with motor developmental delay (Liu et al., 2001). One of the risks of being an older parent is the increase in the children's mortality rate (Donoso & Carvajal, 1999; Zhu et al., 2008), and if the mother's age at first birth was over 40, the rate of maternal health problems and birth complications was greatly increased (Gilbert et al., 1999). However, since birth cohort studies only included children who survived the birth mortality risk, we hypothesized that since older parents have had more time to build their wealth, establish a more stable marriage, and provide their children with better, more supportive nurturing and a stable home environment, the socioeconomic advantage would seemingly overtake the biological limitation of parental age.

A British and American cohort study investigated the association between women's young age at first childbirth and their mental health in midlife, and found that poorer mental health persisted in those who experienced early motherhood long after the birth itself (Henretta et al., 2008). Although young mothers from both Britain and the United States were from lower socioeconomic backgrounds, the association between mental health at midlife and early motherhood remained significant, even after the factor of socioeconomic background was controlled; however, this association became non-significant after the level of education was controlled (Henretta et al., 2008). Again, this showed the importance of controlling for the level of education and age at childbirth when investigating the mental health condition of the parents.

In conclusion, although parental mental health plays an important role in children's development, parental education and age at childbirth are vital confounding factors, which should be considered in future studies. Since the association of paternal mental health had a delayed effect on children's development (Lung et al., 2009b), follow-up of the long-term effect of parents on children's development is necessary. Health care workers should screen for the mental health condition of parents and provide appropriate treatment when necessary to prevent a future impact on children's development. Furthermore, special attention should be paid to young parents or those with a lower level of education. Health care workers should provide these parents with additional resources and childrearing skills when necessary to advance the children's development and prevent delays.

3.2 Reciprocal association between parental mental health and child development

In the previously mentioned study (Lung et al., 2009b), the uni-directional effect of parental mental health on children's development was investigated. However, we hypothesized that a bi-directional or reciprocal effect may exist in the relationship between parental mental

health and children's development, since children may also affect the mental health of their parents. For instance, children of low birth weight are at higher risk of motor developmental delay (Cheung et al., 2001), which can potentially augment maternal distress (Singer et al., 1999). To adjust for the possible effect of the children's own characteristics of low birth weight or short gestational age on their development (Cheung et al., 2001), we included gestational age and weight at birth in our investigation of the reciprocal association of parental mental health and children's development (Lung et al., 2009a).

The Taiwan Birth Cohort pilot Study showed that parental mental health did not affect children's development until 36 months (Lung et al., 2009a). On the other hand, children's development affected maternal mental health at 6 months, and this effect expanded to the mental health of both parents at 18 and 36 months (Lung et al., 2009a). Parental mental health at 6 months had a delayed effect on children's development at 36 months (Lung et al., 2009a), implying that as early as 6 months, children were able to detect the emotional changes of their parents. A study found that as early as 3.5 months, infants were able to differentiate their mother's expressions (Montague & Walker-Andrews, 2002). Specifically, maternal mental health at 6 months affected children's 36 months' development, and paternal mental health at 6 months affected children's 36 months language development (Lung et al., 2009a). The stages of emotional development proposes that children learn to express emotions through modeling how others around them express their emotions with words, thus language is closely linked with children's ability to express emotion (Thomasgard & Metz, 2004). Furthermore, when children fail in an attempt to verbally express their emotions, they will express them by action (Thomasgard & Metz, 2004); therefore, children of mothers with mental symptoms are at higher risk of developing emotional and behavioral problems (Kahn et al., 2004). On the other hand, the Providence, Rhode Island birth cohort study found that a high level of maternal affection when the infants were 8 months old was associated with fewer symptoms of distress in the offspring 30 years later (Maselko et al., 2011).

In conclusion, increasing attention has been paid to the effect of parental mental health on their children (Kahn et al., 2004; Lung et al., 2009b; Ramchandani et al., 2005). However, we found that besides the effect of parental mental health on the children's development, a reciprocal effect of the children's developmental state on parental mental health was found (Lung et al., 2009a). In addition, the effect of parental mental health had a postponed effect on children's language and social development. Thus, future research should consider reciprocal effects when investigating the relationship between parental mental health and children's development. Clinicians should also take notice of the stress and mental health condition of the parents of children with developmental delay to prevent possible development of mental health symptoms. Intervention should be provided to these parents to alleviate their stress and mental health problems when necessary.

3.3 The relationship of paternal and maternal mental health

Lung et al. (2009a, 2009b) found that the mental health states of the father and mother were positively correlated with each other, and that when mothers had better mental health, fathers did too, and vice versa. This is consistent with previous studies which found that depression in one partner is correlated with depression in the other (Ballard et al., 1994; Ramchandani et al., 2008; Soliday et al., 1999). In further investigation, we found that the

mental health of parents with children at high risk of autism spectrum disorder was not affected by the children's developmental condition, but rather, by maternal mental health. This is supported by a previous qualitative study showing that stress perceived by fathers of children with autism spectrum disorder was not associated with the children's characteristics but with their partner's mental health condition (Hastings et al., 2005). Along the same line, fathers of children with autism spectrum disorder were not affected by their children's condition (Gray, 2003), but the children's condition was associated with the mothers' condition, which in turn would affect the fathers (Gray, 2003). Mothers carry the main burden in the care-giving role, thus they are closely connected with the conditions of the children, while fathers serve more as backup support for the mothers (Gray, 2003).

3.4 Factors which can exacerbate or alleviate maternal mental health related to childcare

There are several factors which can alleviate or exacerbate maternal mental health conditions. Factors that have been found to be associated with maternal mental health included a perception of more family support, which led to better maternal mental health conditions (Wills, 1998). On the other hand, working mothers had worse mental health (Grice et al., 2007; Walker & Best, 1991). Nowadays, a higher percentage of mothers have entered the work force (U.S. Census Bureau, 2004), thus women have to take on multiple social roles, including the primary roles of employee, spouse, and parent (Repetti, 1998). These roles interact with each other, positive characteristics in one role have been found to reduce the impact of the strain of another role, and in turn, stressful experiences in one role can also cause a vulnerability to negative experiences in another role (Repetti, 1998). For instance, a study has shown that working mothers have the tendency to neglect their own health (Walker & Best, 1991), and dissatisfaction with the work-family balance has been found to result in negative mental health outcomes (Grice et al., 2007), showing that multiple roles can potentially drain the mother's energy, leading to a lower level of life satisfaction (Grice et al., 2007).

In contrast, social support is a health-promoting resource, and has a direct, positive effect on mental and physical health (Grice et al., 2007). Social support has been found to have a buffering effect on both the mental and physical health of women, lowering their risk of depression and mortality, and giving them a greater likelihood of recovery from clinical illnesses (Wills, 1998).

The spouse is an important source of support, thus a marriage of poor quality or the end of a marriage can also have an influence on the mental health of the mother (Dehle & Weiss, 1998; Whisman & Bruce, 1999). An Australian population birth cohort study found that a marital relationship of poor quality was associated with increased depressive symptoms in both mothers and children 7 years later (Clavarino et al., 2011). However, the mothers' depressive symptoms alleviated if they became single, although the children experienced an increase in depression (Clavarino et al., 2011).

Therefore, although mothers experience stress from childcare and this stress may increase if they are working at the same time, other factors can minimize this stress. Factors such as emotional and social resources, including positive marital adjustment, a sense of accomplishment in parenting, social support, and higher educational achievement can all serve as protective factors against stress-related somatic symptoms (Weiss, 2002).

4. Conclusion

These studies show that the mental health of both parents can impact children's development (Lung et al., 2009a, 2009b). Furthermore, mother's mental health is more closely tied to children's development, and fathers act more as a support for maternal mental health. All these studies show that parental mental health may have a delayed effect on children's development, showing the importance of longitudinal studies in the investigation of children's development.

Since social support has been shown to be an important factor alleviating mother's mental health (Grice et al., 2007), parent support programs for parents with greater stress could be implemented. An interesting phenomenon found in our studies is that the parental level of education has a great and enduring impact on children's development. Furthermore, since a sense of accomplishment in parenting can also ameliorate maternal mental health (Weiss, 2002), parental educational programs may be of assistance to parents with a lower level of education and help prevent the development of mental symptoms in the parents.

On the other hand, children's development has a reciprocal effect on parental mental health. Thus, besides focusing on parental mental health, early screening of children's development and providing effective intervention is also vital in preventing the future development of parental mental symptoms.

These retrospective and prospective birth cohort studies have provided us with a wealth of information regarding the relationship between parental mental health and the development of children, including the importance of confounding factors such as parental age at childbirth, level of education, support system, family structure, etc. However, existing birth cohort studies provide us only with limited information regarding the full range of factors which may contribute to the development of mental illnesses (Thompson et al., 2010). Through continuous follow-up of the Taiwan Birth Cohort Study and future nested-controlled studies, we hope to continually investigate the association between parents and children, and provide ongoing information regarding the predisposing and maintaining factors which predict the long-term outcome of parental mental health and children's development.

5. Appendix I. The Taiwan birth cohort study

The Taiwan Birth Cohort Study is a national household probability sampled study of randomly sampled children born between January 1st and December 31st of 2005 with no exclusion criteria, so the study was designed to represent the Taiwanese Community. Since the aim was to select a sample which incorporated rare illnesses with a prevalence of less than 4%, 12% of the original sample was selected, resulting in the final sample size of 21,248 babies selected at 6 months (response rate of 87.8%). The sampling process is mentioned in detail in Lung et al. (2011b). A pilot sample was collected and conducted prior to the Taiwan Birth Cohort Study. The response rate of the Taiwan Birth Cohort pilot Study and Taiwan Birth Cohort Stud is shown in Figure 1.

In the Taiwan Birth Cohort Study, parental characteristics and environmental factors which may have a potential impact on children's health, growth or development were all collected. Within these factors, an important factor was parental mental health. Parental mental health

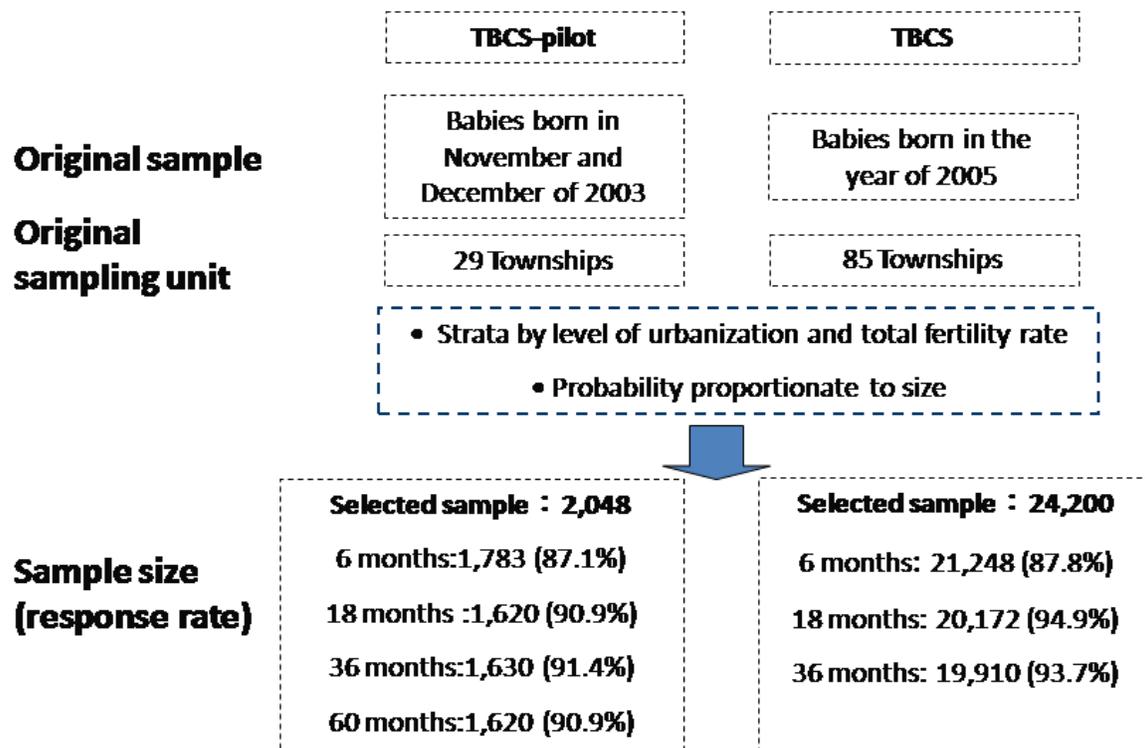


Fig. 1. The sampling process and response rate in each stage of the Taiwan Birth Cohort (TBCS) and Taiwan Birth Cohort Study-pilot (TBCS-p).

was measured using the Taiwanese version of the 36-Item Short Form Health Survey (Ju et al., 2003; Tseng et al., 2003) and children's development using the parent-report Taiwan Birth Cohort Study Developmental Instrument (Lung et al., 2010a; Lung et al., 2011a). It should be noted that the SF-36 does not measure mental health symptoms; instead it is a self-perceived instrument of the overall assessment of quality of life in relation to the mental health conditions.

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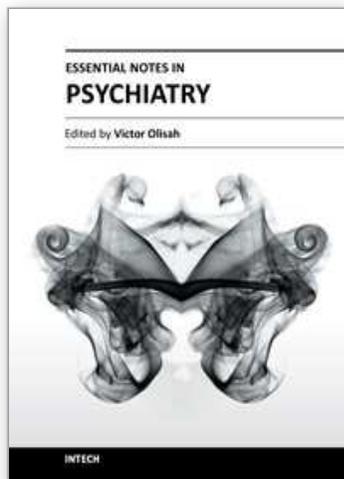
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Psychiatry is one of the major specialties of medicine, and is concerned with the study and treatment of mental disorders. In recent times the field is growing with the discovery of effective therapies and interventions that alleviate suffering in people with mental disorders. This book of psychiatry is concise and clearly written so that it is usable for doctors in training, students and clinicians dealing with psychiatric illness in everyday practice. The book is a primer for those beginning to learn about emotional disorders and psychosocial consequences of severe physical and psychological trauma; and violence. Emphasis is placed on effective therapies and interventions for selected conditions such as dementia and suicide among others and the consequences of stress in the workplace. The book also highlights important causes of mental disorders in children.

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